



ecosupport

Ecology Report

Oak Lodge, Bursledon

Author(s):

Lyndsey McBean BSc (Hons)
PGCert Grad CIEEM

Client:

Reflect Homes

23rd July 2020



Report	Ecology Report
Site Name	Oak Lodge, Bursledon
Author(s)	Lyndsey McBean BSc (Hons) PGCert Grad CIEEM & Adam Jessop BSc (Hons) MSc
Client	Reflect Homes
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Executive Summary

Ecosupport Ltd was instructed by Reflect Contractors to undertake a Preliminary Ecological Appraisal (PEA) and Phase II bat and reptile surveys of Oak Lodge, Bursledon and the associated land to identify any potentially important ecological features that may be affected by the proposed development. As part of this assessment, the following surveys were undertaken:

- Desktop survey submitted to the Hampshire Biological Information Centre (HBIC) (November 2016)
- Updated extended phase I habitat survey (May 2020)
- Preliminary roost assessment (buildings) (May & June 2020)
- Phase II emergence survey (outbuilding) (June 2020)
- Bat activity surveys (April- October 2018)
- Phase II reptile surveys (May 2018)

The following important ecological features were identified on site following the conclusion of the above survey work and may be subject to adverse impacts in the absence of suitable mitigation/compensation:

- Potential for breeding and nesting birds
- Low-moderate use by common and rarer foraging and commuting bats (high use by Common Pipistrelles around T8)
- Low potential for foraging and commuting Badgers

In the absence of any mitigation measures, the proposed development is anticipated to result in, certain adverse effects.

Suitable avoidance, mitigation measures and ecological enhancements will be outlined within **Section 6.0** of this report and it is considered by following these the proposed development will unlikely have a residual impact.

1.0 INTRODUCTION

1.1 Brief

Ecosupport Ltd was instructed by Reflect Contractors to conduct an updated Preliminary Ecological Appraisal (PEA) of the Oak Lodge, Bursledon and the associated land (here after referred to as 'the site'). The purpose of this survey was to assess any ecological impacts that may arise as a result of the proposed development. The objectives of the survey were as follows:

- Identify and classify any priority habitats;
- Assess the ecological value of the site;
- Identify any signs of protected species and potential features that may support them;
- Make recommendations for any necessary ecological avoidance, mitigation and compensation measures;
- Make recommendations for site ecological enhancements as per planning policy.

NB: If the development does not take place within 18 months of this report¹ then the findings of these surveys will no longer be considered valid and may require updating.

Ecosupport Ltd was instructed by Reflex Contractors to complete bat activity surveys and reptile surveys as part of a previous planning application for the site (F/19/85770). As the habitats were found to be unchanged during the updated walkover (May 2020), these surveys have been used to assess the ecological baseline of the site in respect to foraging and commuting bats, and reptiles (see sections 4.3.5 and 4.5.2).

1.2 Site Description & Location

The site comprises of the garden areas and land associated with Oak Lodge located off Bridge Road, Bursledon, Southampton, SO31 8AL (centred on OS grid reference SU 490101). The south-west of the site is bounded by Bridge Road, the east by residential properties, the west by a new residential development and north by an area of grass land which is a designated as a SINC for botanical diversity (**Fig 1**).

¹ <https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf>

Figure 1. Redline boundary of the site (courtesy of PDP Architecture).



1.3 Proposed Development

It is proposed a development of 6 new dwellings with associated gardens will be constructed (**Fig 2**). The Oak House dwelling will be retained, although this will be partially renovated to include the installation of wooden cladding around the externals and the demolition of the ground floor extension. An extension of the outbuilding to become a residential bungalow is also included as part of the proposals.

Figure 2. Proposed development at Oak Lodge, Bursledon (courtesy of PDP Architecture).



2.0 RELEVANT LEGISLATION AND POLICY

2.1 Legislation

2.1.1 *The Conservation of Habitats and Species Regulations (2019)*

This instrument makes changes to the three existing instruments which transpose the Habitats and Wild Birds Directives so that they continue to work (are operable) upon the UK's exit from the European Union (EU). These include The Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017. This instrument also amends section 27 of the Wildlife and Countryside Act 1981 to ensure existing protections continue.

The intention is to ensure habitat and species protection and standards as set out under the Nature Directives are implemented in the same way or an equivalent way when the UK exits the EU.

This transposes the EU Habitats Directive (Council Directive 92/43/EEC) into UK domestic law. It provides protection for sites and species deemed to be of conservation importance across Europe. It is an offence to deliberately capture, kill or injure species listed in Schedule 2 or to damage or destroy their breeding sites or shelter. It is also illegal to deliberately disturb these species in such a way that is likely to significantly impact on the local distribution or abundance or affect their ability to survive, breed and rear or nurture their young.

In order for activities that would be likely to result in a breach of species protection under the regulations to legally take place, a European Protected Species (EPS) licence must first be obtained from Natural England.

2.1.2 *The Wildlife and Countryside Act (1981) (as amended)*

This is the primary piece of legislation by which biodiversity is protected within the UK. Protected fauna and flora are listed under Schedules 1, 5 and 8 of the Act. They include all species of bats, making it an offence to intentionally or recklessly disturb any bat whilst it is occupying a roost or to intentionally or recklessly obstruct access to a bat roost. Similarly, this Act makes it an offence to kill or injure any species of British reptiles and also makes it an offence to intentionally kill, injure or take any wild bird or to take, damage or destroy their eggs and nests (whilst in use or being built).

The Wildlife & Countryside Act (1981) states that it is an offence to 'plant or otherwise cause to grow in the wild' any plant listed in Schedule 9 art II of the Act. This list over 30 plants including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) and Parrots Feather (*Myriophyllum aquaticum*).

2.1.3 *The Countryside and Rights of Way Act (2000)*

This Act strengthens the Wildlife & Countryside Act by the addition of "reckless" offences in certain circumstances, such as where there is the likelihood of protected species being

present. The Act places a duty on Government Ministers and Departments to conserve biological diversity and provides police with stronger powers relating to wildlife crimes.

2.1.4 Natural Environment and Rural Communities Act (2006)

The Natural Environment and Rural Communities (NERC) Act 2006 requires that public bodies have due regard to the conservation of biodiversity. This means that Planning authorities must consider biodiversity when planning or undertaking activities. Section 41 of the Act lists species found in England which were identified as requiring action under the UK Biodiversity Action Plan and which continue to be regarded as conservation priorities under the *UK Post – 2010 Biodiversity Framework*.

2.1.5 Protection of Badgers Act

The Protection of Badgers Act (1992) relates to the welfare of Badgers (*Meles meles*) as opposed to nature conservation considerations. The Act prevents:

- The wilful killing, injury, ill treatment or taking of Badgers and / or
- Interference with a Badger sett
- Damaging or destroying all or part of a sett
- Causing a dog to enter a set and
- Disturbing a Badger while it is occupying a sett

Provisions are included within the Act to allow for the lawful licensing of certain activities that would otherwise constitute an offence under the Act.

2.2 Planning Policy

The development would seek to comply with relevant Planning Policy at a local, regional and national level.

2.2.1 National

The revised National Planning Policy and Framework (NPPF) (last updated February 2019) replaces the previous NPPF (published 2012, revised July 2018) and sets out the Government's vision for biodiversity in England in line with the country's 25 Year Environment Plan. The revised NPPF is supported by the National Planning Practice Guidance (NPPG) (published January 2016, last updated July 2019). The relevant section of the Guidance concerning biodiversity is 'Natural Environment: Biodiversity, Geodiversity and Ecosystems'. Under this Guidance, Local Authorities' duty to have due regard to the conservation of biodiversity under the NERC Act (2006) is highlighted.

Chapter 15 of the revised NPPF, 'Conserving and Enhancing the Natural Environment', together with associated guidance within the NPPG, outlines key principles related to the natural environment.

Development plans should contribute to and enhance the natural environment. Plans should take both an individual and strategic approach to minimising biodiversity impacts, creating, conserving, restoring and enhancing priority habitats and habitat networks, protecting and aiding in the recovery of priority species and their populations, and providing measurable biodiversity net gains. Individual developments must consider how they can contribute to

habitat networks in the wider area (including as part of the Nature Recovery Network), thereby increasing their resilience to current and future pressures.

2.2.2 Local – Eastleigh Borough Council

The Eastleigh Borough Councils Adopted Local Plan (2001 – 2011) outlines a number of policies which seek to preserve and enhance the Boroughs biodiversity. These include;

- *21 NC – Development which is likely to adversely affect the integrity of a European nature conservation site will not be permitted.*
- *22 NC – Development which is likely to have a direct or indirect adverse affect on a SSSI will not be permitted, unless the Borough Council is satisfied that the reasons for the development clearly outweigh the harm to nature conservation value of the site.*
- *23 NC – Development which is likely to have a direct or indirect adverse affect on a Site of Importance for Nature Conservation (SINC) will not be permitted, unless it can be demonstrated to the satisfaction of the BC that benefits of the development clearly outweigh the need to safeguard the nature conservation value of the site. If development is to be permitted, the Council will require appropriate measures to be taken to mitigate for the adverse effects on the SINC.*
- *24 NC – Development will not be permitted where it would adversely affect species or habitats which are protected by legislation, unless appropriate measures are proposed which would acceptably mitigate the impact on those species.*
- *25 NC – Development which will adversely affect a habitat or feature of importance for wild fauna and flora will not be permitted, unless it can be demonstrated to the satisfaction of the Council that:*
 - i) the benefits of the development outweigh the adverse impacts;*
 - ii) the adverse impacts are unavoidable, and*
 - iii) appropriate measures are taken which would mitigate or compensate for any adverse impact.*

26 NC – Development proposals will be required to include measures to enhance the value of features and habitats of nature conservation importance where reasonable opportunities exists in connection with the development.

2.3 Biodiversity Action Plans & UK Post-2010 Biodiversity Framework

The UK Post-2010 Biodiversity Framework (JNCC & DEFRA, 2010) supersedes the UK Biodiversity Action Plan 1992-2012 (UKBAP), setting out goals relating to nature conservation at a UK scale, for example the reduction and reversal in the decline of threatened species and improving the status of biodiversity. The specific habitats and species contained within the UKBAP continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework, and are required to be a material consideration in the planning process under the 2019 NPPF.

3.0 METHODOLOGY

3.1 Desk Study

3.1.1 Data Request

A data request was submitted to Hampshire Biological Information Centre (HBIC) to ascertain any records held of nature conservation designations and protected species within 1km of the boundary of the site.

The data search covered:

- Statutory designated sites
- Non-statutory designations such as SINCs
- Records of protected and notable species.

3.1.2 Waterbodies

Any ponds located within 500 m of the proposed development were searched for using Ordnance Survey maps and available aerial images.

3.2 Field Surveys

3.2.1 Habitats

The original field survey work which forms the basis of the findings of this report was carried out by Adam Jessop BSc (Hons) MSc, Ecology Director (7 years post MSc graduation experience) firstly in October 2016 and subsequently updated in May 2018. A more recent updated walkover was completed by Lyndsey McBean BSc (Hons) PGCert Grad CIEEM, Project Ecologist (3 years post-graduation experience) on the 29th May 2020 (class level I bat licence number 2018-38386-CLSCLS; class level I Dormouse licence number 2020-44360-CLS-CLS).

The Phase 1 Habitat survey (JNCC, 2010) methodology was adopted which is a method of classifying and mapping wildlife habitats in Great Britain. It was originally intended to provide “...*relatively rapidly, a record of semi-natural vegetation and wildlife habitat over large areas of the countryside*”. The standard Phase 1 Habitat survey methodology has been ‘extended’ in this report to include the following:

- Floral species lists for each identified habitat;
- Descriptions of habitat structure, the evidence of management and a broad assessment of habitat condition;
- Mapping of additional habitat types (e.g. hardstanding);
- Identification of Priority Habitats under Section 41 of the NERC Act;
- Evidence of, or potential for, the presence of certain species/groups

3.2.2 Badger

The site was thoroughly searched for evidence of use by Badgers (*Meles meles*), with the specific aim of identifying the presence and location of any setts. In accordance with the *Badgers and Development: A Guide to Best Practice and Licensing* (Natural England, 2011)

guidance, the survey accounted for a 30m from the site's boundary (observed where possible i.e. does not conflict with private dwellings). Evidence of Badgers could include latrines, dung pits, feeding remains and foraging evidence, trails and setts.

3.2.3 Bats

3.2.3.1 Preliminary Roost Assessment

On the most recent visit (May 2020) an assessment was made of the suitability of the outbuilding on site to support roosting bats based on the presence of any Potential Roost Features. An assessment was also completed of the dwelling extension to be demolished on the 4th June 2020. These surveys involved the use of 8 x 42 close focus binoculars and a high-powered torch (where required) for a more detailed inspection of any features. An assessment was then made of the suitability for the buildings to support roosting bats based on the presence of potential roosting features (PRFs).

PRF's include, but are not limited to:

- The presence of free-hanging bats within voids/crevices.
- Potential access points.
- Cobweb free patches.
- Feeding remains e.g. moth wings.
- Grease marks from fur rubbing.
- Urine staining.
- Droppings

Externally, all verges, soffits, ridge tiles, roof tiles, fascias, lead flashing and cracks in walls (where applicable) were examined for potential access points into the buildings (where possible). Internally, inspections were made of the floors, walls, purlins, ceiling joists, roof timbers, insulation (where relevant) and any other cracks/crevices in the roof voids.

The survey conformed to current best practice guidance as described *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016) and were carried out by Lyndsey McBean (2018-38386-CLS-CLS).

3.2.3.2 Emergence Survey

The Phase II survey on the outbuilding was carried out by Lyndsey McBean with assistance from Gregory Barratt. Both a Bat Scanner and a Bat Box Duet heterodyne detector were used. These were supplemented with an Anabat Express frequency division detector and the results were analysed. The survey began approximately 15 minutes prior to sunset and continued until approximately an hour and 30 minutes after sunset and the dawn surveys began approximately an hour and 30 minutes before sunrise and continued until sunrise itself. Survey sheets were used to record the following information:

- Time of call registration
- Species
- Location / activity
- Direction of flight (if seen)

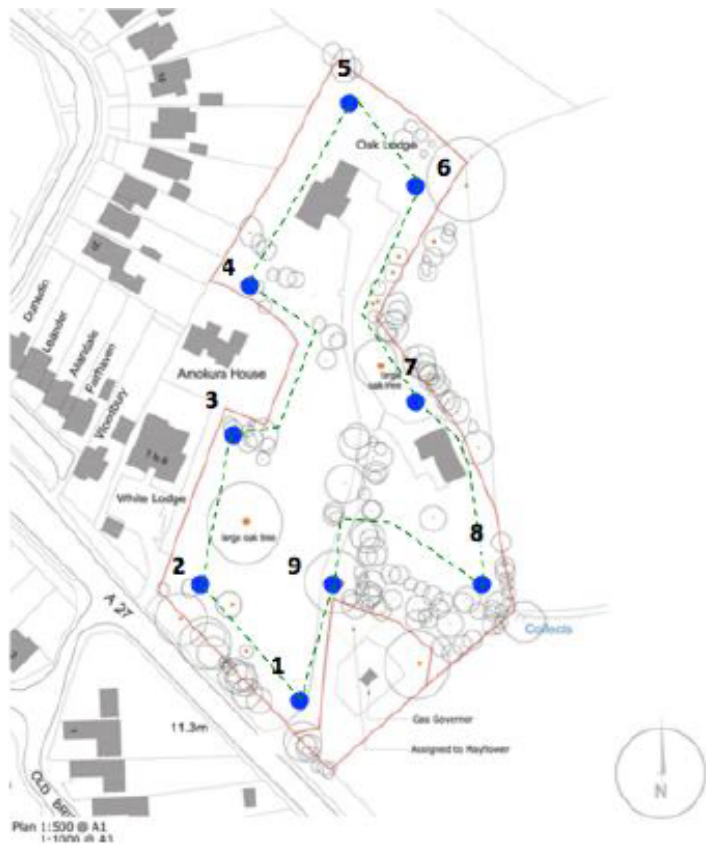
3.2.3.3 Activity Surveys

3.2.3.3.1 Walked Transects

For a development where the habitat has been assessed as being of moderate quality for foraging and commuting bats, the current Bat Conservation Trusts (BCT) *Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition* (Collins(ed) 2016) suggest activity transect surveys should be conducted throughout the active season (one visit per month April- October) to qualitatively assess the bat activity within the site.

Based on the sites area and available habitat, a single transect was considered sufficient to cover the whole site with a total of 9 listening stations used (**Fig 3**).

Figure 3. Walked transect route (dashed green line) with numbered listening points (blue dots) used.



Approximately 12 minutes was spent at each listening station during which passes of species were noted. Both a Bat Box duet/Elkon Batscanner heterodyne and Anabat Express frequency division detector (for analysis of calls via sonogram) was deployed during surveys. Surveys were carried out by Lyndsey McBean, Aaron Domblides, Adam Tollefson, Robert Todd, Rebecca Gane, Martin Reed, Gemma Crow and Chris Lovell.

3.2.3.3.2 Static Monitoring

An additional aspect of the recommended bat monitoring within the BCT guidelines is for static detectors to be placed at different locations along the transect route for 5 consecutive nights each month (April-October). The detector used for this was an Anabat Express and the locations of the statics during different months is provided below (**Fig 4**).

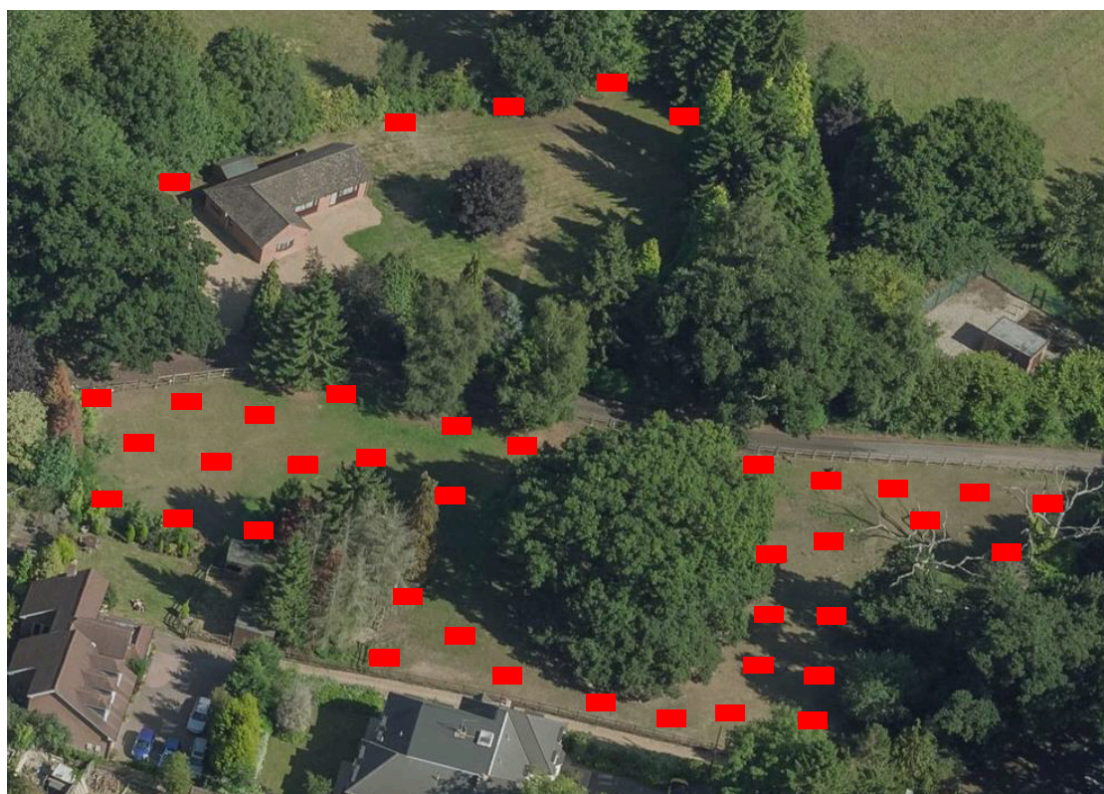
Figure 4. Locations of Anabat Express static detectors across the site. A=May, B=June, C=July, D=August, E=September (issue with detector during the October deployment prevented any data being obtained).



3.2.4 Reptile Survey

The surveys were undertaken by Ecosupport staff experienced in herpetology. These were carried out in accordance with best practice guidelines as stated in various sources (Froglife, 1999) (Gent & Gibson, 1998) during May and June 2018. The survey involved placing 48 artificial refugia (0.5m² squares of bitumen roofing felt) within all suitable habitats on site (with approximate locations of refugia indicated in **Fig 5**). These were left to 'bed in' for 5 days before being checked a total of 7 times during suitable weather conditions in combination with a visual observation transect.

Figure 5. Approximate distribution of artificial refugia across the site (red squares).



3.3 Assessment Methodology

3.3.1 Introduction

The methodology for the assessment of the likely ecological effects of the proposed development is based on CIEEM's *Guidelines for Ecological Assessment in the UK* (CIEEM 2018). Although this assessment does not constitute a formal Ecological/ Environmental Impact Assessment, the CIEEM guidelines provide a useful framework for assessing ecological impacts at any level.

3.3.2 Valuation

Features of ecological interest are valued on a geographic scale. Value is assigned on the basis of legal protection, national and local biodiversity policy and cultural and/or social significance.

3.4 Limitations

There were not considered to be any significant limitations on the results of the walkover survey with the site visit conducted at an appropriate time of year when vascular plants are flowering.

4.0 ECOLOGICAL BASELINE

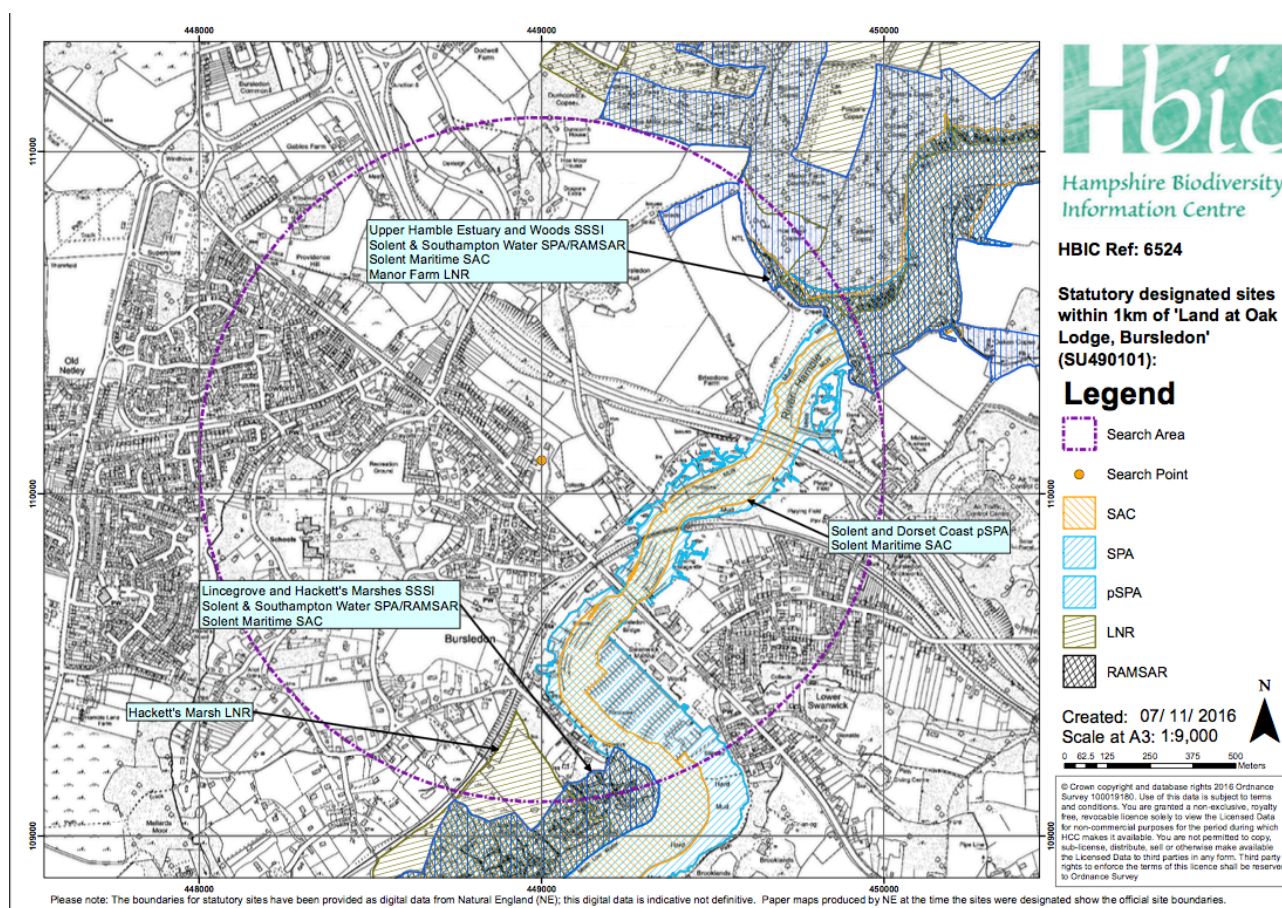
4.1 Designated Sites

4.1.1 Statutory

Fig 6 below indicates the locations of any statutory designated sites within 1km of the site. This has identified the following:

- Upper Hamble Estuary and Woods SSSI
- Solent & Southampton Water SPA/RAMSAR
- Solent Maritime SAC
- Manor Farm LNR
- Lincegrove and Hackett's Marshes SSSI
- Solent and Dorset Coast SPA

Figure 6. Map of the statutory designated sites located within 1km of the site as provided by HBIC.



4.1.2 Non-statutory

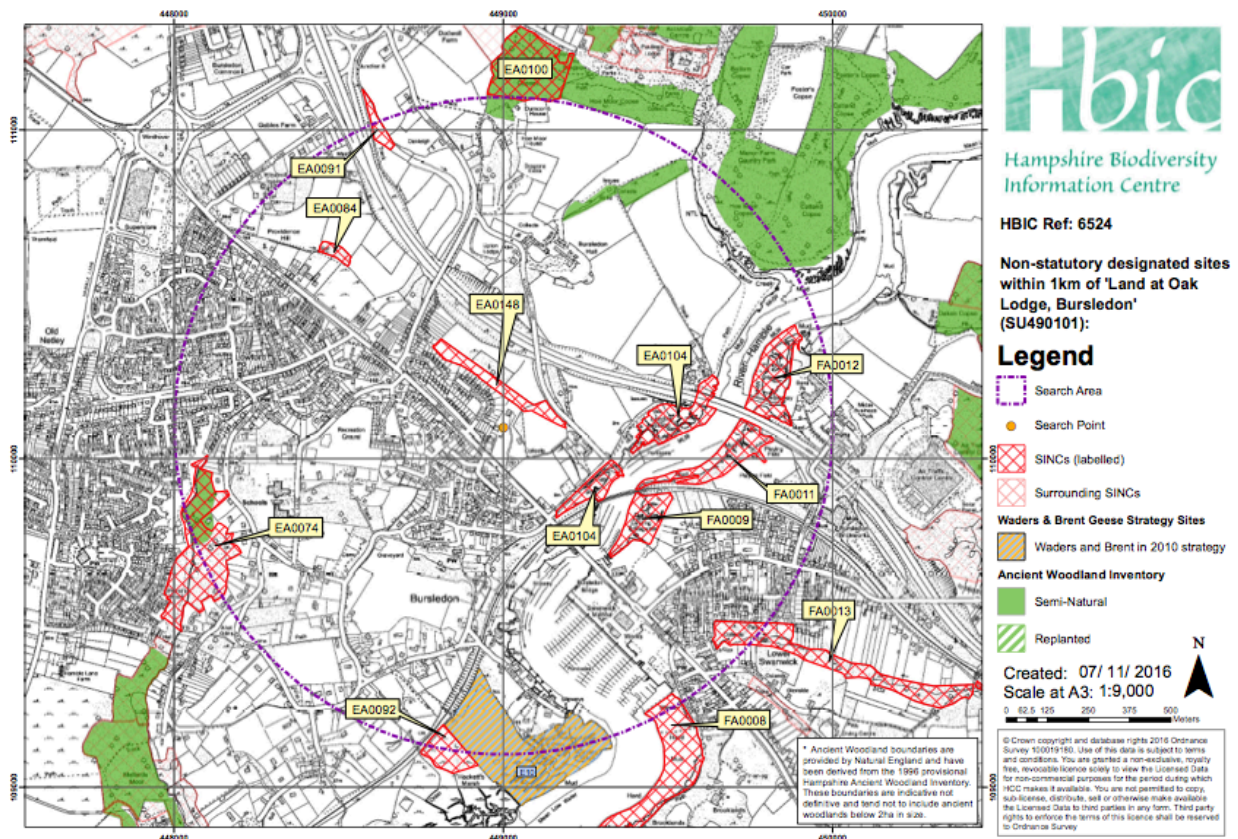
The non-statutory designated sites (SINCs) within 1km of the site are shown in **Fig 7** below. These are described in greater detail in **Table 1**. Only a single land parcel has been identified as supporting waders and Brent Geese (*Branta bernicla*) however this is 0.8 km to the south of the site.

Table 1. Non-statutory designated sites within 1km of the site boundary.

SINC Ref	SINC Name	SINC Criteria	Distance & Direction	Potential Impacts
EA0148	Land North of Bridge Road	2B	Bounds north of site	Edge effects from development along with potential changes in hydrology affecting wetland area.
EA0074	Piland's Wood (Upper)	1A/1Cii	0.9 km SW	Considered unlikely
EA0084	Windmill Fields Wood	1B	0.7 Km NW	Considered unlikely
EA0091	Oakleigh Meadow	2B	0.9 km NW	Considered unlikely
EA0092	Bursledon Meadow	2A	0.9 km S	Considered unlikely
EA0104	Brixedone Saltmarsh & Mudflat	4A/6A	0.4 km E	Considered unlikely
FA0008	River Hamble Mudflats & Saltmarsh - 1	4A	1 km SE	Considered unlikely
FA0009	River Hamble Mudflats & Saltmarsh - 2	4A	0.5 km E	Considered unlikely
FA0011	River Hamble Mudflats & Saltmarsh - 3	4A	0.6 km E	Considered unlikely
FA0012	River Hamble Mudflats & Saltmarsh - 4	4A/6A	0.8 km E	Considered unlikely

SINC Ref	SINC Name	SINC Criteria	Distance & Direction	Potential Impacts
FA0013	Lower Swanwick Woodlands	1A/1Cii/5B	0.9 km SE	Considered unlikely

Figure 7. Map of the non-statutory designated sites located within 1 km of the site as provided by HBIC.



4.2 Vegetation Survey Results

The vegetation within the site has been described below using the broad Phase I habitat classification terminology as described with JNCC (2010). The below species noted should not be considered an exhaustive list and instead refer to dominant, characteristic and other noteworthy species associated with each community within the survey area. The habitat types on site comprise:

- Poor semi improved grassland
- Amenity grassland
- Ornamentals
- Scrub
- Trees/hedges
- Hardstanding
- Buildings

4.2.1 Poor semi-improved grassland

This comprises approximately one third of the habitat and is understood to have previously been used as horse pasture. The species composition included but was not limited to: Cat's-ear (*Hypochaeris radicata*), Daisy (*Bellis perennis*), Corn Mint (*Mentha arvensis*), Ox-eye Daisy (*Leucanthemum vulgare*), Creeping Cinquefoil (*Potentilla reptans*), Rosebay Willowherb (*Chamerion angustifolium*), Yorkshire Fog (*Holcus lanatus*), Yarrow (*Achillea millefolium*), *Agrostis* Spp, Dock (*Rumex spp*), Cocks Foot (*Dactylis glomerata*), Marsh Cudweed (*Gnaphalium uliginosum*), Perennial Rye Grass (*Lolium perenne*), Crested Dogs Tail (*Cynosurus cristatus*), Mouse-ear Chickweed (*Cerastium fontanum*), Scarlett Pimpernel (*Anagallis arvensis*), Redshank (*Persicaria maculosa*), Bristly Oxtounge (*Picris echioides*), Nettle (*Urtica dioica*), Silverweed (*Argentina anserine*), Common Couch (*Elymus repens*), Common comfrey (*Symphytum officinale*) as well as *Juncus spp* in the more marshy areas (Fig 8).

Figure 8. Poor semi-improved grassland to the south west of the site (May 2020).



In addition to the field, there was also a margin of poor semi-improved grassland bordering the north of the Oak Lodge dwelling garden, immediately adjacent to the SINC to the north (Fig 9). This habitat supported a lower forb diversity than the area to the south, with species noted including Foxglove (*Digitalis purpurea*), Common Nettle, Ragwort (*Jacobaea vulgaris*), Creeping Thistle (*Cirsium arvense*), Meadow Buttercup (*Ranunculus acris*), Dandelion (*Taraxacum officinale*), Broadleaf Plantain (*Plantago major*) and Cat's-ear.

Figure 9. Poor semi-improved grassland margin north of the dwelling garden (May 2020).



4.2.2 Amenity grassland

The land surrounding both of the buildings on this site (Oak Lodge and the outbuilding) comprises of amenity grassland dominated by Perennial Rye Grass (*Lolium perenne*), Annual Meadow Grass (*Poa annua*), Buttercup (*Ranunculus spp*), White clover (*Trifolium repens*) and Daisy (*Bellis perennis*) (**Fig 10**).

Figure 10. Managed amenity grassland forming the garden area of the Oak Lodge dwelling (May



2020).

4.2.3 Ornamentals

The north-eastern border of the outbuilding garden consists of a row of (predominantly) non-native ornamentals and scrub including species such as Holly (*Ilex aquifolium*), Bramble (*Rubus fruticosus*), Bracken (*Pteridium spp.*), Hazel (*Corylus avellana*) and Rhododendron (*Rhododendron ponticum*). Ornamentals were also noted bordering the dwelling garden.

4.2.4 Scrub

Scrub habitat was noted encroaching into the poor semi-improved area of grassland to the south west of the site. This was dominated by Bramble (*Rubus fruticosus*) which surrounded some encroaching immature Ash (*Fraxinus excelsior*) (**Fig 8**).

4.2.5 Trees/Hedges

There are a variety of tree species of different ages across the site, the majority of which are found along the site boundaries (**Fig 8**), although hedgerow also borders the drive running through the site (**Fig 11**). The species include mature/ veteran Oaks (*Quercus spp.*), Holly, Field Maple (*Acer campestre*), Elm (*Ulmus spp.*), Sycamore (*Acer pseudoplatanus*), Cypress (*Cupressaceae spp.*), Silver Birch (*Betula pendula*), Hazel, Ash, *Malus spp*, and Norway Spruce (*Picea abies*).

Figure 11. Hedgerow bordering the drive (May 2020).



4.2.6 Hardstanding

The access into the site off Bridge Road comprises of a tarmac track leading to both residential properties (**Fig 11**). A shingle drive was present outside the Oak Lodge dwelling (**Fig 12**).

Figure 12. Shingle drive outside the Oak Lodge dwelling (May 2020).



4.2.7 Buildings

The final habitat type on site is buildings, the Oak Lodge dwelling, the outbuilding to the south, two sheds and a greenhouse. The buildings will be described in greater detail in respect to their bat potential in **Section 4.3.2**.

4.3 Bat Survey Results

4.3.1 Pre-existing data

HBIC provided 40 records of bats from within 1km of the development site comprising unidentified Pipistrelle bat (*Pipistrellus* sp.), Common Pipistrelle (*Pipistrellus pipistrellus*),

Soprano Pipistrelle (*Pipistrellus pygmaeus*), a Long-eared bat species (*Plecotus* sp.); Brown long-eared bat (*Plecotus auritus*); Whiskered bat (*Myotis mystacinus*) / Brandt's bat (*Myotis brandtii*); Serotine (*Eptesicus serotinus*), and Noctule (*Nyctalus noctula*). The majority of these records were for *Pipistrellus* spp.

4.3.2 Buildings

The findings of the Preliminary Roost Assessment of the two sheds is outlined in **Table 2** below.

Table 2. Bat roost assessment of the buildings on site.

Building	Fig	Description of Construction	PRFs / Evidence of Occupation	Assessed Roost Potential
Oak Lodge Dwelling-ground floor extension	Figure 13. External view of the Oak Lodge dwelling ground floor extension.  Figure 14. Internal loft space of the extension. 	A red brick construction with corrugated concrete roof tiles and concrete ridge tiles. A PVC soffit surrounds the perimeter of the extension. The extension (and the rest of the dwelling) were relatively new constructions and the roof/surrounding soffit were found to be in good condition (Fig 13). The internal loft space was underlined with intact bitumen felt and was entirely sealed with no gaps from the externals noted. The loft space was uncluttered and clear of cobwebs (Fig 14).	No PRFs were noted and no evidence of bat presence was found.	Negligible

Outbuilding	Figure 15. External view of the outbuilding. The location of the missing mortar is identified by the red circle (May 2020).  Figure 16. View of the internal loft space of the outbuilding (May 2020). 	A single-storey red brick 'L-shaped' construction with a concrete-tiled roof. The building was a relatively modern construction with the roof and surrounding soffit largely in good condition (Fig 15). The internal loft space was underlined with intact bitumen felt, uncluttered and clear of cobwebs (Fig 16).	A missing air vent cover in the soffit in the north western corner (Fig 17); missing mortar underneath a roof tile in the southern corner (Fig 15). No internal evidence of bat presence was found.	Low
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	Figure 17. Missing air vent in the soffit (May 2020). 			
Shed 1	Figure 18. Shed within the garden of the Oak Lodge dwelling (May 2020). 	Wooden structure with a bitumen felt roof. The presence of windows creates high light levels in the internals (Fig 18).	No PRFs were noted and no evidence of bat presence was found.	Negligible

Shed 2	Figure 19. Shed within the garden of the outbuilding (May 2020). 	Wooden structure with a wooden board roof. The presence of windows creates high light levels in the internals (Fig 19).	No PRFs were noted and no evidence of bat presence was found.	Negligible
Greenhouse	Figure 20. Greenhouse in the garden of the Oak Lodge dwelling (May 2020). 	Open metal and glass construction (Fig 20).	Structure has extremely high light levels in internals and a poorly thermoregulated environment.	Negligible

4.3.3 Trees

Referring to the most recent proposed site plan, it is currently understood the majority of trees are to be retained as part of the new development (**Fig 2**). The trees that will be removed are largely either ornamental trees or immature/shrubby species and were considered to hold **negligible** potential for roosting bats. In the garden of the outbuilding, a single dead tree of unknown species (T9) (**Fig 21**) supported peeling bark and small splits in the trunk and is therefore considered to hold **low** potential for roosting bats.

Figure 21. Dead tree of unknown species to the south of the outbuilding (May 2020).



4.3.4 Emergence Survey

4.3.4.1 Results

As per the relevant guidelines (BCT, 2010) a dusk emergence survey was completed on the outbuilding. **Table 3** below provides the relevant information about the conditions during the survey whilst **Table 4** provides a summary of the results.

Table 3. Dates and environmental information of the surveys.

Date	Building Surveyed	Temp (°C)	Cloud Cover (%)	Wind (Beaufort Scale)	Start Time	Finish Time	General Information
04/06/2020	Outbuilding	13	100	3	20:58	22:43	Dry, overcast

Table 4. Results of the emergence and re-entry surveys completed on the extension and the summerhouse. HNS=Heard Not Seen.

Survey Date	Recorded Bat Roost	General Bat Activity on Site		
04/06/2020	No emergences	Species	First Pass	Last Pass
		Common Pipistrelle	21:08	22:31
		Noctule	21:37	22:05
		Soprano Pipistrelle	22:00	22:06
		Long-eared Bat	21:52	21:55
		Activity levels were high throughout the survey around the Oak tree to the north of the outbuilding, with activity levels in the garden to the south of the outbuilding relatively low. Registrations were dominated by Common Pipistrelles with only occasional brief passes of Noctules, Soprano Pipistrelles and Long-eared Bats on both sides of the building. The large number of Common Pipistrelle passes observed travelling from south to north before and around sunset indicated the likely presence of a Common Pipistrelle roost nearby.		

4.3.4.2 Evaluation

Overall, the levels of foraging and commuting bats recorded on-site during the survey was considered to be **low** (south of the outbuilding)-**high** (around the Oak tree to the north of the outbuilding) and mostly comprised of common species (Common and Soprano Pipistrelles, and Long-eared Bats) although an occasional rarer bat species was noted (Noctule).

Based on the results of the PRA and follow up emergence survey, the dwelling and the outbuilding are not considered to be supporting roosting bats and, as such, are not subject to any further surveys.

4.3.5 Activity Surveys

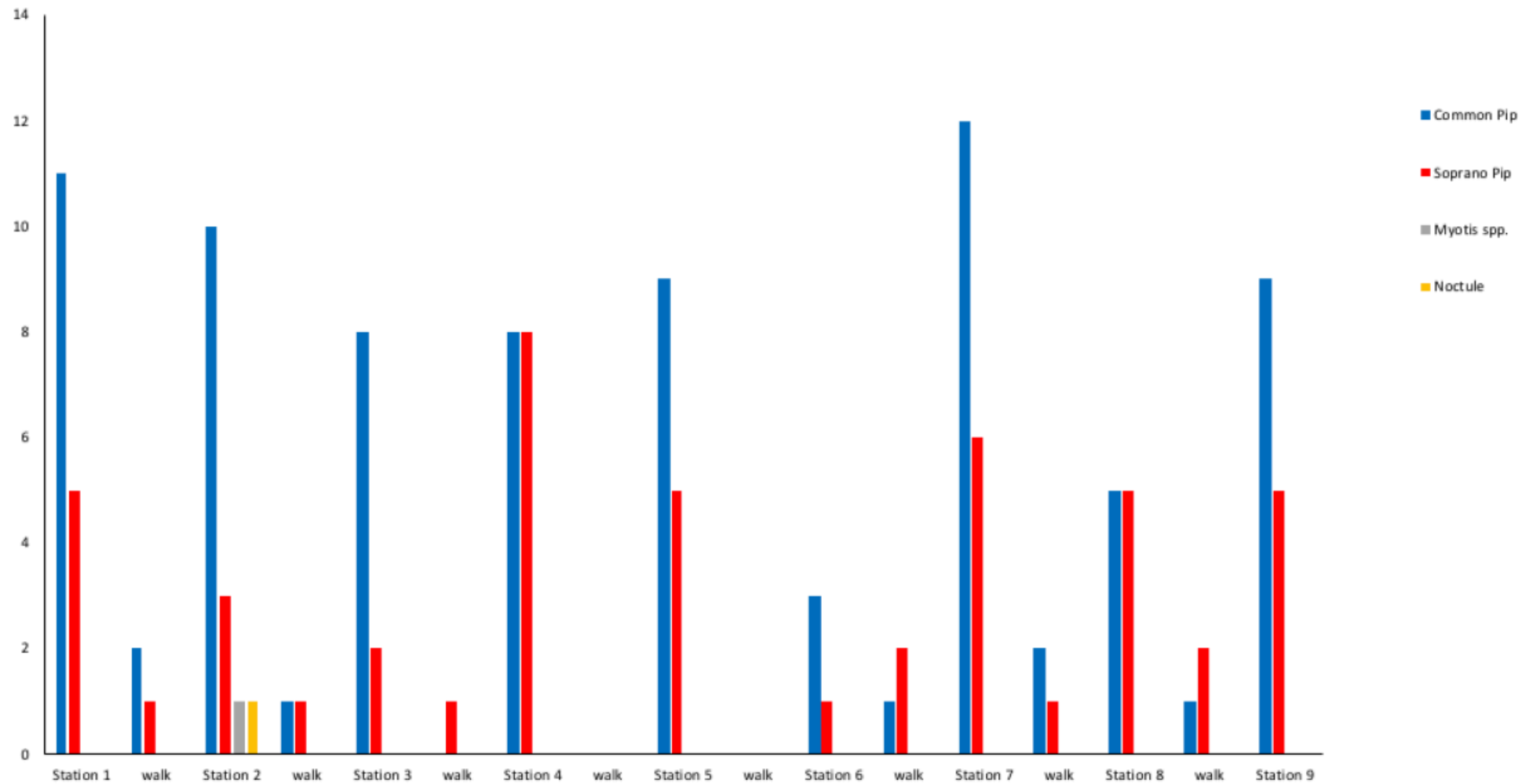
4.3.5.1 Transect Surveys

Table 5 below indicates the dates and other relevant information recorded during the transect surveys whilst the results from the transect if presented in **Fig 22**.

Table 5. Relevant information recorded during the transect surveys. Wind speed is approximated in the Beaufort Scale.

Date	Start time	Wind (Beaufort scale)	Temperature (°C)	Start point	Direction of travel
21/5/18	20:56	0	16	1	CW
04/06/18	21:12	2	16	9	CCW
19/7/18	21:10	1	23	5	CCW
20/7/18	03:14	0	16	4	CW
13/8/18	20:28	2	16	1	CW
25/0918	18:57	1	12	7	CW

Figure 22. Graphical representation of the number and species composition of bat recordings noted during the walked transects (n=8) at the different listening points (along with walks in-between) from all the surveys (April-October results totalled).



Foraging activity was most frequently recorded at point 7 around the dwelling to the east of the site and the hedgerow bordering the north east of the site. The majority of activity consisted of a mixture of Common Pipistrelles and Soprano Pipistrelles. Point 4 was the next busiest point of the transect but point 2 had the largest number of species recorded, with Common Pipistrelles, Soprano Pipistrelles, a *Myotis* spp and a Noctule. This point was situated next to the hedgerow bordering the south west of the site and the unmanaged semi-improved grassland.

4.3.5.2 Static Monitoring

The results of the static detector monitoring carried out during April-October are provided in **Table 6** below.

Table 6. Analysis from Anabat Express static deployment from April- October 2018 (see Fig 3 for approximate locations of statics).

Location	Date	Species	Total passes	Average passes per night	Average passes per hour
A	May	C.pip	91	18.2	2.14
		S.pip	234	46.8	5.51
		Serotine	18	3.6	0.42
		Noctule	1	0.2	0.02
		<i>Myotis</i> spp	2	0.4	0.05
		<i>Plecotus</i> spp	5	1	0.12
B	June	C.pip	183	36.6	4.88
		S.pip	597	119.4	15.92
		Serotine	7	1.4	0.19
		<i>Myotis</i> spp	15	3	0.4
		<i>Plecotus</i> spp	3	0.6	0.08
C	July	C.pip	203	40.6	4.92
		S.pip	127	25.4	3.08
		Serotine	10	2	0.24
		Noctule	5	1	0.12
		<i>Plecotus</i> spp	6	1.2	0.15
D	August	C. pip	43	8.6	0.88
		S. pip	22	4.4	0.45

		Noctule	5	1	0.1
		<i>Myotis</i> spp	4	0.8	0.01
		<i>Plecotus</i> spp	1	0.2	0.02
E	September	C. pip	35	7	0.57
		S. pip	40	8	0.65
		Serotine	1	0.2	0.01
		<i>Myotis</i> spp	1	0.2	0.01

As with the walked activity transects, the majority of the registrations on the Anabat statics were from Common and Soprano Pipistrelles, which dominated all deployments particularly at locations A, B and C. Other species included occasional Serotine, Noctule, *Myotis* spp and *Plecotus* spp.

From the static data (and as observed on the emergence survey), it appears the mid-section of the eastern hedgerow has the highest bat activity, with the largest number of Pipistrelle calls heard at this point in both the transects and the static data. The south west corner of the site was another area with a high number of bat calls, with it being the second busiest during the transects and having the highest species diversity in the static data.

4.3.5.3 Evaluation

Small numbers of Pipistrelles were recorded along with Serotines, Noctules, *Myotis* spp and *Plecotus* spp (with these species considered common and rarer in England). Guidance on valuing bat foraging and commuting habitat is provided by Wray *et al* (2010) which uses a points-based system. Using this system, the site scores **22 points** for commuting and **21 points** for foraging bats (see **Table 7**) and is correspondingly considered to be of **District/Local value** for bats.

Table 7. Valuation of habitat for (a) commuting and (b) foraging bats after Wray et al. (2010). The points scored by the site are indicated in bold type.

Species	Number of bats	Roosts nearby	Habitat features
(a) Commuting habitat			
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
		Small number (3)	Un-vegetated fences and large field sizes (2)
Rarer (5)	Small numbers (10)	Moderate number/not known (4)	Walls, gappy or flailed hedges, isolated well grown hedges, moderate field sizes (3)
		Large number of roosts or close to a SSSI for the species (5)	Well grown and well connected hedges, small field sizes (4)
Rarest (20)	Large numbers (20)	Close or within a SAC for the species (20)	Complex network of well-established hedges, small fields and rivers/streams (5)
(b) foraging habitat			
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established legislation (1)
		Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small numbers (10)	Moderate number/not known (4)	Isolated woodland patches, less intensive arable and/or small towns/villages (3)
		Large number of roosts or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large numbers (20)	Close or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

4.4 Badgers

4.4.1 Pre-existing information

HBIC provided three records of Badger within 1km of the site. The records do not provide the full grid reference (due to their sensitive nature) although they both from within Bursledon.

4.4.2 On-site Habitat Assessment

No evidence of foraging or commuting Badgers was noted on-site during the survey and no mammal burrows/suspected Badger setts were encountered. Despite this, the site is considered to hold **low** potential for foraging and commuting Badgers.

4.5 Reptiles

4.5.1 Pre-existing Information

Grass Snakes HBIC hold records for the following reptile's species from within 1km; Slow Worms (*Anguis fragilis*) (4 records) and (*Natrix natrix*) (1 record).

4.5.2 Reptile Survey Results

On completion of the walkover survey the poor semi-improved grassland was assessed as holding moderate potential for reptiles and, as such, a suite of reptile surveys were completed. The results of the reptile presence/likely absence survey carried out on site are provided below in **Table 1**.

Table 8. Reptile survey results and relevant information on conditions during each of the checks.

Date	Time	Temp (°C)	Weather Conditions	Reptiles Recorded
15/05/18	16:15	18	Dry, calm with passing clouds	-
17/05/18	11:15	12	Damp, calm and sunny	-
21/05/18	16:45	17	Dry, windy, overcast	-
23/05/18	08:30	14	Damp, windy, overcast	-
25/05/18	10:50	14	Scattered showers	-
29/05/18	08:30	15	Dry, calm with passing clouds	-
01/06/18	11:10	17	Dry, calm with passing clouds	-

4.5.2 Evaluation

Based on the absence of any reptiles recorded or observed during the survey undertaken, it is considered reptiles are likely absent and therefore no further work is considered necessary prior to site commencement.

4.6 Great Crested Newts

4.6.1 Pre-existing Information

HBIC only hold records of GCN (*Triturus cristatus*) from within the Bursledon nature haven (which is understood to have been introduced) with no known records for the species from

any other ponds within 500m of the site (despite these having been surveyed in support of other applications).

4.6.2 On-site Assessment

With only a single record within 1km of the site, and no evidence of GCN found in ponds within 500m for neighbouring applications, the site is considered to hold **negligible** potential for GCN.

4.7 Hazel Dormouse

4.7.1 Pre-existing Information

There were only 2 records of Dormice (*Muscardinus avellanarius*) held by HBIC from within 1 km of the site (which are from along the northern embankment of the M27). Despite this, recent work on neighbouring sites found no evidence of Dormouse presence.

4.7.2 On-site Habitat Assessment

The habitats on-site were considered to be sub-optimal for supporting Dormice. The hedgerows were either poorly managed (and, as a result, were largely shading out beneficial shrubby species) or were largely comprised of ornamental/non-native species. Considering this, and the absence of Dormice on neighbouring sites, the site is considered to hold **negligible** potential for Dormice.

4.8 Nesting and Breeding Birds

4.8.1 Pre-existing Information

The HBIC data did provide a number of records for Birds of Conservation Concern (BOCC) in the local area including Lesser Redpoll (*Acanthis cabaret*), Lesser Spotted Woodpecker (*Dendrocopos minor*), Yellowhammer (*Emberiza citronella*), Nightingale (*Luscinia megarhynchos*), Redwing (*Turdus iliacus*), Marsh Tit (*Poecile palustris*), Starling (*Sturnus vulgaris*) and Song Thrush (*Turdus philomelos*). The majority of these records are from within Manor Farm Country Park where optimal habitats for the species are located.

4.8.2 Site Assessment

The habitats present on site (which include mature trees and ornamental shrub) will be potentially suitable for some of the above listed species, though given their limited extent the site is only considered to be of **low – moderate** potential.

5.0 LIKELY ECOLOGICAL IMPACTS IN ABSENCE OF MITIGATION

5.1 Introduction

The CIEEM guidelines (CIEEM 2018) require that the potential impacts of the proposals should be considered in absence of mitigation. In order for a significant adverse effect to occur, the feature being affected must be at least of local value. However, in some cases, features of less than local value may be protected by legislation and/or policy and these are also considered within the assessment. Although significant effects may be identified at this stage of the assessment, it is often possible to provide appropriate mitigation.

5.2 Site Preparation and Construction

5.2.1 Impacts to Habitats

The majority of the development will take place within areas of amenity grassland, with only a minor loss in poor semi-improved grassland for the construction of the new access road. Although some small trees and a small area of scrub will be lost to make way for the construction of the access road between the development and Bridge Road, and some of the dwellings to the south, they are largely either immature/shrubby or ornamental. Despite this, these habitats have been noted for supporting low-moderate levels of foraging and commuting bats. Therefore, the impact to these habitats is considered to be of significance at the **local** level.

The dead tree in the outbuilding garden will also be lost to make way for the development. Due to the assessed low potential to support roosting bats, it is considered the loss of this habitat will have a significant impact at the **local** level.

The development also proposes the renovation/extension of the outbuilding and partial demolition of the dwelling. As these buildings are considered unlikely to be supporting roosting bats it is considered there will be an adverse impact to habitats of **negligible** value.

5.2.2 Impacts to Wildlife

The scrub and hedgerow habitats on site have been identified as holding low-moderate potential for both breeding and nesting birds, and low-moderate value for local foraging and commuting bats. With reference to the most recent plan, whilst the development retains the majority of these habitats on site, it does propose some level of impact through the removal of trees in the south western hedgerow to make way for the new access, small areas of trees around the outbuilding and plots 2-3, and the removal of larger ornamental trees around plots 5-6. Clearance of these habitats, if undertaken during the nesting season, is likely to result in the disturbance to and/or destruction of bird nests and, in combination with the loss of on-site grassland habitats, could result in a permanent reduction of suitable foraging and commuting bat habitat. Therefore, an **adverse impact is likely**.

The removal of the dead tree to the rear of the outbuilding has the potential to result in direct impacts to roosting bats through disturbance and the potential direct killing/injuring of individuals. As such, it is considered an **adverse impact is likely** if roosting bats are present.

The site is assessed as holding low potential for foraging and commuting Badgers (as well as other nocturnal mammals). Uncovered excavations during the construction phase could lead to the trapping of nocturnal animals. Therefore, it is considered there will be a **potential minor adverse impact** upon local foraging and commuting mammals (including Badgers).

5.3 Site Operation

5.3.1 Impacts to Wildlife

The development will result in an increase in lighting within the general area from street lights and external lights on the dwellings. This can affect the behaviour, particularly foraging, of nocturnal wildlife. Therefore, an **adverse impact is likely** on nocturnal species.

5.3.2 Loss of Breeding and Nesting Bird Habitat

The works will involve the selective removal of scrub/hedgerow across the site, despite this new tree planting as part for the landscaping for the proposed development will compensate for this loss in habitat. Therefore, it is considered there will be a **neutral impact** upon local breeding and nesting birds.

5.3.3 Increased Visitor Pressure on Designated Sites

As the site resides within the 5.6km zone of influence, and there will be a net gain in dwellings on site, it is considered possible there will be an impact to the Solent SPAs/Ramsars through increased recreational disturbance (Bird Aware Solent, 2017). Therefore, it is considered an **adverse impact is likely**.

It is not considered a development of this scale will result in a significant increase to the baseline recreational disturbance upon local SINC. In addition, the northern boundary of the development will consist of a fenced off 15m buffer planted with additional tree species to act as a shield between the development and the SINC to the north. It is therefore considered the impact of the development on local SINC will be **negligible**.

6.0 MITIGATION & RECOMMENDATIONS

6.1 Introduction

The below sections outline a number of recommendations for further survey work required to fully assess the potential ecological impacts of the development and ensure proposed mitigation and compensation appropriate and proportionate. In addition to this, measures are outlined to protect the existing features of value and provide enhancements post development.

6.2 Bats

6.2.1 Foraging and Commuting

6.2.1.1 Sensitive Lighting Strategy

A new document (Guidance Note 08/18 Bats and Artificial Lighting in the UK) has recently been produced via a collaboration between the Institute of Lighting Professionals (ILP) and the Bat Conservation Trust (BCT), which outlines the latest recommendations to minimise the impacts of increased artificial lighting on bats. The key recommendations within this document have been outlined below and will be implemented provided there are no conflicts with any legal limits of illumination (in which case a suitable compromise should be reached).

'Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires:

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used. LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use should only be as directed by the lighting professional.
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.

- Any external security lighting should be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed (**Fig 23**).

Figure 23. (a) Shield 'barn doors' (b) cowl hood; (c) shield and; (d) external louvre Images from ILP (2018).



Where possible introduced artificial light should be directed away from important habitats features (particularly trees T2, T8, T11, T12 and T13 and T15). Where this is not possible light sources should be adequately spaced apart to reduce the intensity of light within these areas with horizontal hoods to direct light downwards and prevent light spill above the horizontal plain.

6.2.1.2 Site Design

A buffer strip (**Fig 2**) has been designed into the northern and north eastern boundaries which will act as 'dark corridors' for commuting bats. These buffers of new planting and the retention of existing vegetative linear features will ensure local commuting bats can still travel through the site to the SINC to the north (**Fig 24**).

Figure 24. Retained bat commuting corridor with 'dark corridor' to the north and north-east of the site.



6.2.2 Roof underlining

In-line with Natural England (2015) guidance roofing felt should be utilised as opposed to Breathable Roof Membrane (BRM) for all roofing works as there is considerable evidence to suggest that BRM poses a threat to bats occupying a structure due to entanglement in the fibres (Natural England, 2015).

6.2.3 Soft-felling of T9

Based on the considered **Low** roost potential of T8, it is recommended a process of soft-felling is used as per guidelines (2016). The arborists will be alerted to the possibility of bats being present and the need for vigilance during activities. This will involve careful cutting and lowering of limbs to the ground. Any holes/lifted bark/splits in the trunk will be left clear. Limbs and trunk sections will then be left for 24 hours before being removed from site.

6.3 Birds

To avoid disturbance of nesting birds or damage to their nests, removal of the trees and shrubs should be undertaken outside of the bird-nesting season (typically March – August, dependant on weather). If this is not possible, the area to be cleared should be thoroughly checked by an ecologist immediately prior to clearance. If any active nests are found they should be left undisturbed with a suitable buffer of undisturbed vegetation (ca. 5m) until nestlings have fledged.

6.4 Badgers

During the construction phase, any open excavations left overnight should either be covered to prevent commuting Badgers (or other nocturnal mammals) falling in or escape ladders should be used to prevent them from becoming trapped. Any open pipework should be checked and then capped nightly.

6.5 Protection of Hedgerows and Trees

All the existing hedgerows and trees that will be retained and trees should be protected from damage during the works. All the hedgerows should be fenced using Heras fencing or similar to prevent access by machinery. Where large mature trees are present, they should be protected using standard arboricultural tree protection measures which include protection of the canopy and prevents root compaction.

6.6 Solent Recreation Mitigation Strategy

The site lies within the vicinity of the Solent SPAs. In order to mitigate for the likely increases in residential pressure upon this SPA, due to the high densities of wildfowl and waders for which the area is predominantly protected, the Solent Recreation Mitigation Strategy (SRMS) has been introduced in collaboration with Natural England, comprising a partnership of all local councils. Mitigation towards the SPA must be provided for all new recreational developments within the 5.6km disturbance zone of the SPA.

The simplest method of providing a necessary suitable and appropriate level of mitigation towards the SPAs associated with the Solent is via financial contributions. These contributions are used to enable the continued use of the coastline in a way that reduces the risks to the bird species of international importance that use the area, for example funding a team of rangers and implementing initiatives to encourage responsible dog walking (Solent Recreation Mitigation Partnership, 2014). It is considered that the contribution, in compliance with the recommendations presented within the SDMP, provides a suitable level of mitigation for the potential adverse impacts associated with the proposed scheme upon the Solent SPA.

In April 2020 a sliding scale of contribution, based upon the number of dwellings per residential unit, was introduced:

- £356 for 1 bedroom dwelling
- £514 for 2 bedroom dwelling
- £671 for 3 bedroom dwelling
- £789 for 4 bedroom dwelling

- £927 for 5 bedrooms or more

Therefore, a contribution will be made either prior to planning permission being granted, by completing the Agreement and sending the completed form along with mitigation contribution to the Planning Agreements Officer at the Local Planning Authority or by completing a Unilateral Undertaking before planning permission is granted with the per dwelling payment made before the development is implemented.

6.7 Design Consideration & Ecological Enhancements

6.7.1 Bat and Bird Bricks

To act as biodiversity enhancement, 4 of the newly built dwellings will incorporate one Swift brick and one bat brick. The Ibstock 'Eco Home for Swifts' bricks will be installed (**Fig 25**) as they are a discreet and attractive box ideal for new dwellings. The boxes should be installed under the eaves or in high walls in shaded areas out of direct sunlight and away from windows. The installation of such boxes has also been shown to be beneficial for House Sparrows (*Passer domesticus*) which are a nationally declining species. The bat bricks used should be the Ibstock Bat Brick B as they are available in a variety of different brick colours and requires no maintenance (**Fig 26**). Both types of boxes should be positioned as close to the eaves as possible and away from windows.

Figure 25. Ibstock eco home for swifts that will be incorporated into the newly built dwellings.



Figure 26. The Ibstock bat brick 'B' that will be incorporated into the newly built dwellings.



6.7.2 Bird & Bat Boxes on Trees

The erection of nest boxes in trees will provide further enhancements. Using nest boxes of varying designs would maximise the species complement attracted to the site, and where possible these could be tailored to provide opportunities for red listed/BAP species known from the local area.

One each of the Schwegler 1B, 2H and 2M bird boxes will be used (3 No in total). The 1B is the most popular box for garden birds and appeals to a wide range of species. The 2H is attractive to Robins, Pied Wagtails, Spotted Flycatcher, Wrens and Black Redstarts whilst the 2M is an example of a general-purpose design.

In addition to the integrated boxes, one Schwegler 2F (with double front panel), one Schwegler 2FN and one Schwegler 1 FS (large colony) bat boxes will be erected (3 No in total) within retained trees. The front panel of the 2F has a second inner wooden panel fitted to it to create a cavity wall. This provides an ideal roost for bats that inhabit crevices, such as Pipistrelles. It has been designed as a summer roosting space for bats. The 2FN Bat Box is larger and more suited to larger species of bat. It has two entrances - one at the front and one at the rear against the tree. It has a domed roof to allow the bats to form roosting clusters for warmth, and an increased internal height. The 1 FS box provides bats with a large internal space within which high numbers of bats can congregate (making it popular for accommodating maternity colonies over summer).

All are manufactured from long-lasting Woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects. Woodcrete is breathable and maintains a stable temperature inside the box. They are painted black to absorb warmth.

6.7.3 Hedgehogs

All garden fences in the new and retained dwellings will also ensure at least 2 gaps are present within the gravel boards / bases of each fence line to allow for movement of Hedgehogs between gardens and into the wider area. The gaps should be at least 15 cm high by 15 cm wide with permeability for small mammals.

Small signage could be installed at these points to ensure they remain open upon completion of the development. The People's Trust for Endangered Species provide such signage, the purchase of which also supports conservation efforts (**Fig 27**).

Figure 27. Hedgehog habitat connectivity (PTES, 2017).



6.7.4 Planting

The gardens and area of retained amenity grassland to the north of the bungalow should be planted with a wildflower lawn mix such as the EM1 general purpose meadow mixture (available from Emorsgate). This contains 14 species and will provide mown grassland habitat with a greater diversity of invertebrates.

Both the southern and northern boundaries will be 'gapped up' offering the opportunity of increasing tree and shrub species on site contributing towards a biodiversity net gain. As a general enhancement, any landscape planting will aim for a 70:30 ratio in favour of native species over non-natives and ornamentals (in line with the CIEEM guidance outlined within Smith & Day (2012)). Species that can be considered within any planting include: Rowan (*Sorbus aucuparia*), Alder (*Alnus glutinosa*), Hazel (*Corylus avellana*), Holly (*Illex aquifolium*), Silver Birch (*Betula pendula*), Small-leaved Lime (*Tilia cordata*) and Willow (*Salix* spp.). Non-natives and ornamentals should only be given a bias in formal locations where aesthetics is a priority.

Native species and pollen rich ornamentals can greatly increase the assemblage of invertebrates on site, in turn encouraging further species such as reptiles and foraging bats. Planting a mixture of flowering plants, trees (including fruit trees) and shrubs encourages a diversity of insects to sustain bats. It is beneficial that the flowers vary in colour (although pale flowers that are more easily seen in poor light and so attract insects at dusk), fragrance, shape, amount of nectar and time of flowering. (It is important to provide native flowering plants, shrubs and trees throughout spring, summer and autumn). Flowers with 'landing platforms' for insects (i.e. flowers from the Daisy and Carrot families) increase opportunities for insects and in turn foraging bats.

Any planting on site will seek to make use of species of known benefit to bats following recommendations within the BCTs Landscape and Urban Design for Bats and Biodiversity (Gunnell *et al*, 2012) (**Fig 28**).

Figure 28. Screenshot from appendix within Gunnell *et al* (2012) indicating plant species of known benefit to bats that will form the basis of on site planting.

Plant species	Common name	Native (N)	Type	Benefit	Soil	Light	Extensive Green Roofs	Living walls	Rain gardens	Hedges /Trees	Beds /Borders
<i>Acer campestre</i>	Field maple	N	T/S	C	Any	Sun/shade				Y	
<i>Acer platanoides</i>	Norway maple		T	S	Well drained / alkaline	Sun/shade				Y	
<i>Acer saccharum</i>	Sugar maple		T	S	Any	Sun/shade				Y	
<i>Achillea millefolium</i>	Yarrow	N	HP	C/F	Well drained	Sun	Y				
<i>Ajuga reptans</i>	Bugle	N	HP	C/F	Any	Sun/shade	Y		Y		
<i>Anthyllus vulneraria</i>	Kidney vetch	N	HP	F	Well drained	Sun	Y				
<i>Aubrieta deltoidea</i>	Aubrieta		H	F	Well drained	Sun/shade		Y			
<i>Betula pendula</i>	Silver birch	N	T	C	Sandy/Acid	Sun				Y	
<i>Cardamine pratensis</i>	Cuckoo-flower	N	HP	F	Moist	Sun/shade			Y		Y
<i>Carpinus betulus</i>	Hornbeam	N	T	C	Clay	Sun				Y	
<i>Centaurea nigra</i>	Common knapweed	N	HP	C/F	Dry, not acid	Sun	Y				Y
<i>Centranthus ruber</i>	Red valerian		HP	F	Well drained / alkaline	Sun	Y				Y
<i>Clematis vitacea</i>	Old man's beard	N	C	F	Well drained / alkaline	Sun				Y	
<i>Corylus avellana</i>	Hazel	N	S	C	Any dry	Sun/shade		Y		Y	
<i>Crataegus monogyna</i>	Hawthorn	N	S	S,C	Any	Sun/shade				Y	
<i>Daucus carota</i>	Wild carrot	N	Bi	S,C,F	Any	Sun	Y				Y
<i>Dianthus spp.</i>	Pinks	N	A-Bi	F	Well drained	Sun	Y	Y			Y
<i>Digitalis purpurea</i>	Foxglove	N	Bi	C	Well drained	Shade / partial shade				Y	Y
<i>Erica cinerea</i>	Bell heather	N	S	F	Sandy	Full sun					Y
<i>Erysimum cheiri</i>	Wallflower		Bi-P	F	Well drained	Sun		Y			
<i>Eupatorium cannabinum</i>	Hemp agrimony	N	H	F	Moist	Sun/shade			Y		Y
<i>Fagus sylvatica</i>	Beech	N	T	C/R	Well drained alkaline	Sun/shade				Y	
<i>Foeniculum vulgare</i>	Fennel		H	F	Well drained	Sun					Y
<i>Fraxinus excelsior</i>	Common ash	N	T	C/R	Any	Sun/shade				Y	
<i>Hebe spp.</i>	Hebe species		S	F	Well drained	Sun/shade				Y	Y
<i>Hedera helix</i>	Ivy	N	C	F,C	Any	Sun/shade		Y	Y	Y	Y
<i>Hesperis matronalis</i>	Sweet rocket		H	F	Well drained / dry	Sun/shade					Y
<i>Hyacinthoides non-scripta</i>	Bluebell	N	B	F	Loam	Shade/ partial shade		Y		Y	Y
<i>Ilex aquifolium</i>	Holly	N	T	C	Any	Sun/shade				Y	
<i>Jasminum officinale</i>	Common jasmine		C	F	Well drained	Sun		Y			Y
<i>Lavandula spp.</i>	Lavender species		S	F	Well drained / sandy	Sun		Y			Y
<i>Linaria vulgaris</i>	Toadflax	N	HP	C	Well drained /alkaline	Sun	Y				Y
<i>Lonicera periclymenum</i>	Honeysuckle	N	C	F	Well drained	Sun		Y		Y	
<i>Lotus corniculatus</i>	Bird's foot trefoil	N	HP	F	Well drained /dry	Sun	Y				Y

6.7.5 Log Piles

Two log piles will be in the 15m SINC buffer to the north of the development. This will form ideal places of shelter for important species such as Hedgehogs, and a significant habitat resource for invertebrates, which in turn will benefit local foraging birds and bats.

7.0 REFERENCES

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APPENDIX 1- Habitats Map