

BARTONS ROAD, LAND AT CAMP FIELD

Preliminary Ecological Appraisal



ECO01516

Preliminary Ecological Appraisal Report
Version 1

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REPORT

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EXECUTIVE SUMMARY

- RPS was commissioned by Redrow Homes to undertake an updated Preliminary Ecological Appraisal (PEA) at Bartons Road, Land at Camp Field, Havant, PO9 5NB. This comprised a desk study, Phase 1 Habitat Survey and an ecological scoping survey to assess the potential for presence of protected species.
- Development proposals for the site include the construction of 72 properties with associated car parking and public open space including a community orchard.
- Much of the site consists of unmanaged semi-improved grassland, with scattered trees located in the centre of the site.
- The site falls within the Impact Risk Zone (IRZ) of Warblington Meadow SSSI (2.6 km south) and Chichester and Langstone Harbours Special Protection Area (SPA) (3.4 km southwest).
- Several protected species and notable species are recorded within the 2 km search radius of the site. Habitats on site have been assessed as having low potential for roosting bats and nesting birds, with high potential for commuting and foraging bats, badgers and hedgehogs.
- Two bat trapping surveys are recommended for May to investigate the use of the site by Bechstein's bats.
- Trees T1 and T2 had a small amount of loose bark present. No evidence of bats was identified at the time of the survey but trees T1 and T2 hold low potential for supporting roosting bats. Due to the type of features and transient nature of bats, trees T1 and T2 will require soft felling under ecological supervision. A licensed ecologist will be present during the felling where tree limbs with potential to support roosting bats will be removed in a staged process and left on the ground for a 48 hours period.
- Tree T3 had two woodpecker holes present with moderate potential for supporting bats. It is recommended that features in this tree are inspected with an endoscope twice between May and September with at least one visit between May and August.
- Recommendations and mitigation proportionate to the proposed development includes the timing of removal of habitats onsite, including pre-checks by appropriately experienced ecologists if ecologically sensitive periods are not avoidable.
- The proposed development is within the Impact Risk Zone (IRZ) of Warblington Meadow SSSI and Chichester and Langstone Harbours Special Protection Area (SPA) and will therefore require mitigation with respect to nitrate discharge. This has been addressed by RPS in a separate report (RPS, 2021).
- Enhancement recommendations as a result of the updated survey work and from previous survey reports have also been summarised within this PEA (The Ecology Co-op, 2018).

1 INTRODUCTION

1.1 Purpose and scope of this report

- 1.1.1 RPS was commissioned by Redrow Homes to undertake an updating Preliminary Ecological Appraisal (PEA) at Bartons Road, Land at Camp Field, Havant, PO9 5NB.
- 1.1.2 A Preliminary Ecological Appraisal was undertaken by The Ecology Co-op in 2017. Since the original PEA report is more than 18 months old it was considered appropriate to complete an updated PEA.
- 1.1.3 Previous Phase 2 surveys were completed at the site by The Ecology Co-op in 2017/2018 and the aim of this updated PEA was to determine if site conditions remain similar to those previously reported (The Ecology Co-op, 2018).
- 1.1.4 To undertake an initial assessment of the potential ecological impact of the proposals, a desk study, Phase 1 Habitat Survey, and a preliminary protected species assessment were completed. A scoping survey was carried out to assess the potential of the site to support species of conservation concern or other species which could present a constraint to the development of the site. This is termed as a Preliminary Ecological Appraisal (PEA) Report in accordance with CIEEM (2017). This assessment is considered 'preliminary' until any required protected species, habitat or invasive species surveys are completed, and the results incorporated into a final Ecological Appraisal or Ecological Impact Assessment (EclA) which supports the planning application.
- 1.1.5 The PEA aims to:
- undertake a desk-based review of designated sites and records of protected species and other species that could present a constraint;
 - map and assess the habitats present on site;
 - assess the site for potential to support protected species or other species that could present a constraint, and make appropriate recommendations for further survey work if necessary;
 - provide outline options for mitigation measures as appropriate; and
 - make recommendations for appropriate biodiversity enhancements in line with national and local planning policy.
- 1.1.6 This report pertains to these results only; recommendations included within this report are the professional opinion of an experienced ecologist and therefore the view of RPS. The surveys and desk-based assessments undertaken as part of this review and subsequent report including the Ecological Appraisal Notes are prepared in accordance with the British Standard for Biodiversity Code of Practice for Planning and Development (BS42020:2013).

1.2 Study area and Zone of Influence

- 1.2.1 The site is in Havant, Hampshire and consists of land to the north of Bartons Road. The site is approximately 2.5 ha in size. The National Grid coordinates for the centre of the site are SU 7334 0809.
- 1.2.2 The site comprises an arable field with poor semi-improved grassland margins and scattered broadleaved trees. The site is bordered to the west by a line of broadleaved trees and a vegetated bund to the south. A boundary is not present to the north and to the west the site is bound by wire deer fencing.

- 1.2.3 The term Zone of Influence is used to describe the geographic extent of potential impacts of a proposed development. The Zone of Influence is determined by the nature of the development and in relation to designated sites, habitats or species which might be affected by the proposals.
- 1.2.4 For this site, the Zone of Influence is considered to be land on and immediately adjacent to the site.

1.3 Development proposals

- 1.3.1 Development proposals for the site include the construction of 72 properties with associated car parking and public open space including a community orchard.
- 1.3.2 At the time of writing, no formal development plans with respect to the design have been provided.

1.4 Legislation and policy

- 1.4.1 Relevant legislation, policy guidance and both Local and National Biodiversity Action Plans (BAPs) are referred to throughout this report where appropriate. Their context and application are explained in the relevant sections of this report.
- 1.4.2 The relevant articles of legislation are:
- The National Planning Policy Framework (NPPF, 2019);
 - ODPM Circular 06/2005 (retained as Technical Guidance on NPPF 2019);
 - The Conservation of Habitats and Species Regulations 2017;
 - The Wildlife and Countryside Act 1981 (as amended);
 - The Protection of Badgers Act 1992;
 - The Countryside and Rights of Way Act 2000;
 - The Hedgerow Regulations 1997;
 - The Natural Environment and Rural Communities Act 2006; and
 - National / Local Biodiversity Action Plan for Havant.
- 1.4.3 A summary of legislation relevant to protected or other species identified as potential constraints in this report is provided in Appendix A.

2 METHODS

2.1 Desk Study

- 2.1.1 Ecological records within a 2 km radius of the site were requested from Hampshire Biodiversity Information Centre (HBIC) in November 2020. Data requests were limited to records for protected species recorded within the last ten years and sites of nature conservation interest within 2 km of the site. This included a review of existing statutory sites of nature conservation interest, such as Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Special Area of Conservation (SACs) and National Nature Reserves (NNRs), and non-statutory sites, such as Sites of Importance for Nature Conservation (SINCs) and Local Wildlife Sites (LWSs).
- 2.1.2 The Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017) do not set prescribed distances or other parameters for desk study searches but indicate that the scope and area used should be based on professional judgement.
- 2.1.3 Locations of statutory designated sites were accessed via the government 'MAGIC' website (Magic Map, 2020). A 1:25,000 OS map was used to identify nearby features such as ponds or green corridors that could provide habitat or connectivity to other areas.

2.2 Ecological Appraisal

- 2.2.1 The ecological appraisal consisted of two components: A Phase 1 Habitat Survey and a scoping survey for protected species and other species of conservation concern which could present a constraint to development.
- 2.2.2 The Phase 1 Habitat Survey was undertaken by Frances Morris (BSc Hons; ACIEEM; MRSB) on the 10th November 2020.
- 2.2.3 The Phase 1 Habitat Survey followed the standard methodology (JNCC, 2010), and as described in the Guidelines for Preliminary Ecological Assessment (CIEEM, 2017). In summary, this comprised walking over the survey area and recording the habitat types and boundary features present.
- 2.2.4 A protected species scoping survey was carried out in conjunction with the Phase 1 Habitat Survey. The site was assessed for its suitability to support protected species, in particular bats, nesting birds, badger, dormouse, amphibians and common and widespread reptiles.
- 2.2.5 The surveyor looked for evidence of protected species including signs such as burrows, droppings, footprints, paths, hairs, refugia and particular habitat types known to be used by certain groups such as ponds. Any mammal paths were also noted and where possible followed. Fence boundaries were walked to establish any entry points or animal signs such as latrines. Areas of bare earth were inspected for mammal prints. Areas of habitat considered suitable for protected species or those of conservation interest were recorded.

2.3 Impact Appraisal

- 2.3.1 The overall ecological appraisal is based on the standard best practice methodology provided by the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017). The assessment also follows current COVID-19 guidelines (CIEEM, 2020). The assessment identifies sites, habitats, species and other ecological features that are of value based on factors such as legal protection, statutory or local site designations such as SSSIs or LWSs or inclusion on Red Data Book Lists or Biodiversity Action Plans.

- 2.3.2 The assessment also refers to planning policy guidance (e.g. NPPF) where relevant, to relate the value of the site and potential impacts of development to the planning process, identifying constraints and opportunities for ecological enhancement in line with both national and local policy.
- 2.3.3 The methodology for evaluation of the nature conservation value of ecological features affected by development (ecological receptors) is adapted from the current Chartered Institute of Ecology & Environmental Management guidelines for Ecological Impact Assessment (CIEEM, 2016). These guidelines recommend assignment of value (or potential value) to ecological receptors in accordance with the following scale:
1. International;
 2. UK;
 3. National (i.e. England/Northern Ireland/Scotland/Wales);
 4. Regional;
 5. County (or Metropolitan - e.g. in London);
 6. District (or Unitary Authority, City, or Borough);
 7. Local or Parish; and/or
 8. within immediate zone of influence only.
- 2.3.4 Following on from the above, potential constraints to development are identified on that basis, with recommendations for further, more detailed surveys made as appropriate, for example to fully investigate botanical value or to confirm presence / likely absence of a protected species.
- 2.3.5 In appraising any impacts, the review considers the client's site proposals and any subsequent recommendations made are proportionate and appropriate to the site and have considered the Mitigation Hierarchy as identified below:
- **Avoid:** Provide advice on how the development may proceed by avoiding impacts to any species or sites by either consideration of site design or identification of an alternative option.
 - **Mitigate:** Where avoidance cannot be implemented, mitigation proposals are put forward to minimise impacts to species or sites as a result of the proposals. Mitigation put forward is proportionate to the site.
 - **Compensate:** Where avoidance cannot be achieved any mitigation strategy will consider the requirements for site compensatory measures.
 - **Enhance:** The assessment refers to planning policy guidance (e.g. NPPF) to relate the ecological value of the site and identify appropriate and proportionate ecological enhancement in line with both national and local policy.
- 2.3.6 When describing impacts on ecosystem structure and function, reference is made to the following aspects where appropriate:
- i. extent;
 - ii. magnitude;
 - iii. duration;
 - iv. reversibility; and
 - v. timing and frequency.
- 2.3.7 Understanding the nature of the impact enables determination of the effect on the ecological integrity of the ecological receptor. This in turn is assessed against the importance of the receptor to

determine the significance of the effect on nature conservation interests as being (i) not significant, or (ii) a significant positive or adverse impact.

2.4 Limitations

Desk Based Assessment

- 2.4.1 The desk study data is third party controlled data, purchased for the purposes of this report only. RPS cannot vouch for its accuracy and cannot be held liable for any error(s) in these data.

Ecology Surveys

- 2.4.2 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no investigation can ensure the complete characterisation and prediction of the natural environment.
- 2.4.3 Site survey was commissioned in November and therefore could have missed flowering plants on site if present.
- 2.4.4 The protected/notable species assessment provides a preliminary view of the likelihood of these species occurring on the site, based on the suitability of the habitat, known distribution of the species in the local area provided in response to our enquiries and any direct evidence on the site. It should not be taken as providing a full and definitive survey of any protected/notable species group.

Accurate Lifespan of Ecological Data

- 2.4.5 Most ecological data remains valid for only short periods due to the inherently transient nature of the subject. The survey results contained in this report are considered accurate for two years, assuming no significant considerable changes to the site conditions.

3 RESULTS

3.1 Desk Study

Designated Sites

Statutory Designated Sites

- 3.1.1 There are no statutory sites within the site itself. Approximately 1.5 km northeast of the site is the boundary to the South Downs National Park, encompassing part of Southleigh Forest, no other statutory sites are located within 2 km of the site boundary (Figure 3.1).
- 3.1.2 The site falls within the Impact Risk Zone (IRZ) of Warblington Meadow Site of Special Scientific Interest (SSSI), located approximately 2.6 km south of the site and Chichester and Langstone Harbours Special Protection Area (SPA) (3.4 km southwest).
- 3.1.3 The IRZ for the Chichester and Langstone Harbours SPA and Warblington Meadows SSSI lists that for all planning applications the Local Planning Authority should consult Natural England on the likely risks posed to the SSSI from the proposed development if the planning proposal falls into any of the following categories;
1. Infrastructure;
 2. Wind and solar energy;
 3. Minerals, oil and gas;
 4. Rural non-residential;
 5. Any Residential or Rural Residential developments of 500 units or more houses outside existing settlements/urban areas;
 6. Air pollution;
 7. Combustion;
 8. Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management;
 9. Composting;
 10. Discharges of water or liquid that is discharged to ground (i.e. to seep away) or to surface water, such as a beck or stream;
 11. Water supply – Large infrastructure such as warehousing/ industry;
 12. Notes 1 For new residential development in this area financial contributions are required to mitigate increased recreational disturbance on coastal SPAs and Ramsar Sites. Check with Local Planning Authority; and
 13. Notes 2 Solent nutrient impact area. For new development with overnight accommodation Reg 63 of the Conservation of Habitats and Species Regulations 2017 must be applied. LPA to refer to Natural England's Solent Nutrient Neutrality Advice Note June 2019.
- 3.1.4 The site is considered residential but is within the existing urban area of Havant / Emsworth and therefore not associated with any of the above categories and therefore consultation with Natural England is not considered necessary for this application.

- 3.1.5 The site is located within the catchment of the Chichester and Langstone Harbours SPA and therefore as per point 13 above, the potential effects of discharge of additional nitrates from sewerage from the proposed development on the Solent international designated sites is required (as set out in Natural England's guidance note on this subject, NE 2020). Further assessment can be found in the Nitrates Report associated with this development (RPS, 2021).
- 3.1.6 The proposed development will require a financial contribution to mitigate increased activity on coastal SPA and RAMSAR sites (located over 2 km south of the site boundary).

Non-Statutory Designated Sites

- 3.1.7 There were 18 Sites of Importance for Nature Conservation (SINC) within 2 km of the site boundary. The SINC's comprise mainly of woodland blocks, fields surrounding watercourses and parkland, refer to Table 3.1.1 for detailed site descriptions and Figure 3.1 for locations.
- 3.1.8 The largest group of SINC's is a complex of woodland and parkland over 1 km northwest from the site boundary. This consists of three sites with improved grassland and wetland habitats (Thicket Lawn, High Lawn and Lower Beacon Field); four sites of ancient semi natural woodland (Great Copse, Thicket Bottom Woods & Lake, Hammond's Lands Copse, Wakefords Copse); and one site of pasture woodland and wooded commons (Thicket Bottom).
- 3.1.9 The SINC located closest to the site was Bartons Copse & The Slip, situated to the immediate north and east of the site boundary, the eastern boundary bordering the boundary of the SINC for a small section. This SINC comprises of mixed seminatural or ancient woodland (not specified which woodland applies to the SINC) and pasture woodland with considerable biological and historical interest.

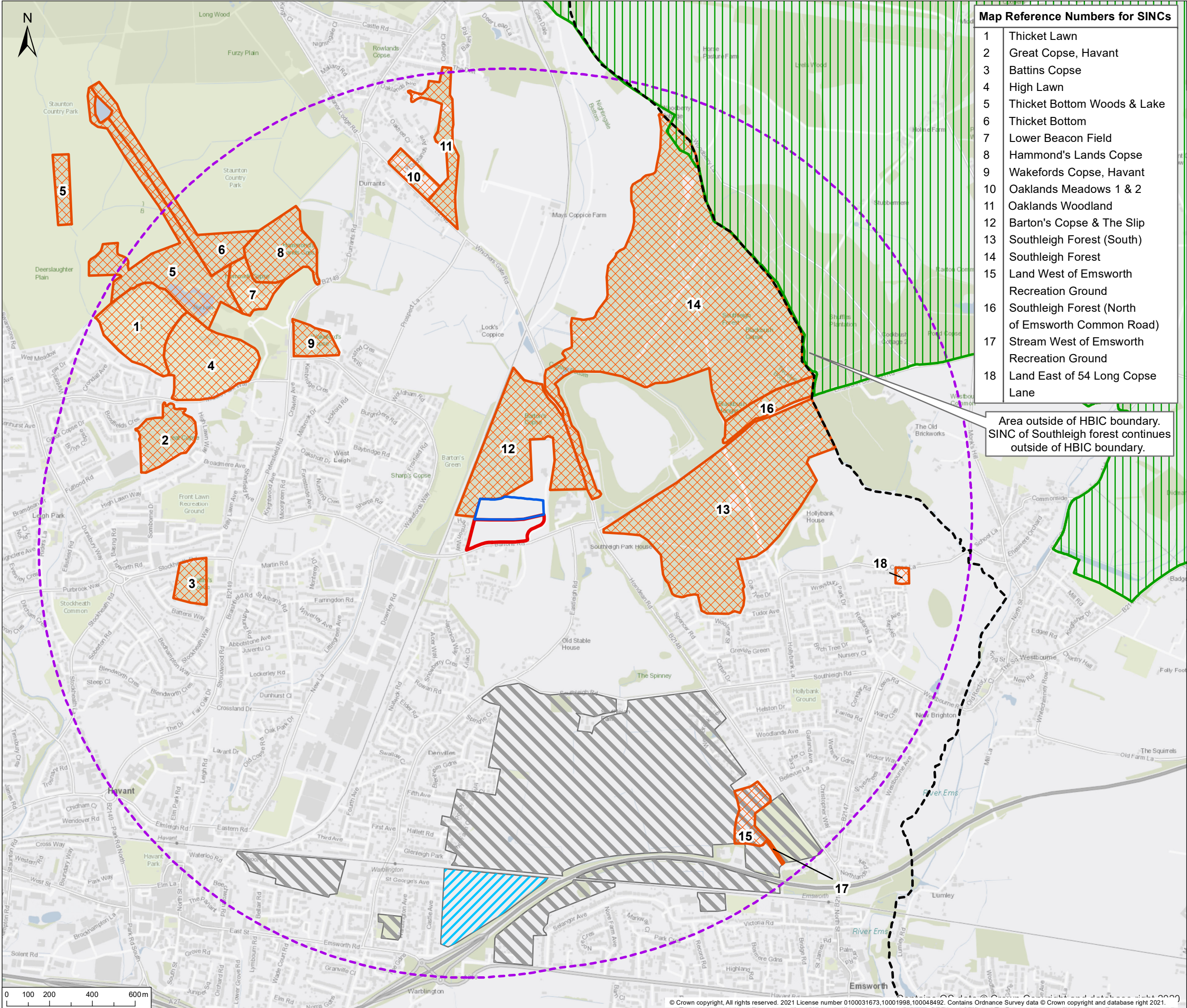
Table 3.1.1 Non-statutory designated sites within 2 km of the site

Site Name and designation	Distance from site	Site Description ¹	Area (ha)
Thicket Lawn SINC	1.66 km NW	(2B/5B) Semi-improved with elements of unimproved grassland. Wetland habitats that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.	10.56
Great Copse, Havant SINC	1.37 km NW	(1A) Ancient semi-natural woodlands	5.71
Battins Copse SINC	1.24 km SW	(1A) Ancient semi-natural woodlands	2.73
High Lawn SINC	1.25 km NW	(2B/5B) Semi-improved with elements of unimproved grassland. Wetland habitats that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.	11.74
Thicket Bottom Woods & Lake SINC	1.54 km NW	(1A) Ancient and semi-natural woodlands	15.72
Thicket Bottom SINC	1.64 km NW	(1D) Pasture woodland and wooded commons.	7.89

¹ SINC sites code has been provided, see full description in Appendix B.

Site Name and designation	Distance from site	Site Description ¹	Area (ha)
Lower Beacon Field SINC	1.41 km NW	(2B/5B) Semi-improved with elements of unimproved grassland. Wetland habitats that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.	3.54
Hammond's Lands Copse SINC	1.33 km NW	(1A) Ancient and semi-natural woodlands	7.64
Wakefords Copse, Havant SINC	1.00 km NW	(1A) Ancient and semi-natural woodlands	2.53
Oaklands Meadows 1 & 2 SINC	1.53 km N	(2B/2D/6A) Semi-improved with elements of unimproved grassland. Impoverished grasslands that retain sufficient elements of relic unimproved grassland to enable recovery.	2.24
Oaklands Woodland SINC	1.4 km N	(1A/2B) Ancient and semi-natural woodlands Semi-improved with elements of unimproved grassland.	5.24
Bartons Copse & The Slip SINC	0-12 m N	(1A/1D) Ancient semi-natural woodlands Pasture woodland and wooded commons.	18.04
Southleigh Forest (South) SINC	0.28 km E	(1D) Pasture woodland and wooded commons.	47.71
Southleigh Forest SINC	0.25 km NE		79.40
Land West of Emsworth Recreation Ground SINC	1.53 km SE	(2B/5B) Semi-improved with elements of unimproved grassland. Wetland habitats that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.	3.17
Southleigh Forest (North of Emsworth Common Road) SINC	0.93 km E	(1D) Pasture woodland and wooded commons.	3.81
Stream West of Emsworth Recreation Ground SINC	1.81 km SE	(6A) Sites which support one or more notable species (see Appendix B for further detail)	0.07
Land East of 54 Long Copse Lane SINC	1.67 km E	(2B) Semi-improved with elements of unimproved grassland.	0.44

Figure 3.1 Designated sites within 2 km of the site



Map Reference Numbers for SINCs

- 1 Thicket Lawn
- 2 Great Copse, Havant
- 3 Battins Copse
- 4 High Lawn
- 5 Thicket Bottom Woods & Lake
- 6 Thicket Bottom
- 7 Lower Beacon Field
- 8 Hammond's Lands Copse
- 9 Wakefords Copse, Havant
- 10 Oaklands Meadows 1 & 2
- 11 Oaklands Woodland
- 12 Barton's Copse & The Slip
- 13 Southleigh Forest (South)
- 14 Southleigh Forest
- 15 Land West of Emsworth Recreation Ground
- 16 Southleigh Forest (North of Emsworth Common Road)
- 17 Stream West of Emsworth Recreation Ground
- 18 Land East of 54 Long Copse Lane

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Notes

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Legend

- Phase 1 - Red line boundary
- Phase 2 boundary
- 2 Km Search area
- Sites of Importance for Nature Conservation (SINC)
- Solent Waders and Brent Goose Strategy Classification - Low use
- Solent Waders and Brent Goose Strategy Classification - Negative results/ no presence recorded
- Hampshire Biodiversity Information Centre (HBIC) - Boundary line
- South Downs National Park Authority

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Project Barton's Road, Land at Camp Field

Title Designated Sites Map

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Species

- 3.1.10 Records of protected species were obtained from Hampshire Biodiversity Information Centre (HBIC). Several species of conservation importance or otherwise notable were recorded within the 2 km search radius of the site. Due to the large number of bat records present in the desk study, data pertaining to bat species have been summarised separately from other protected species and are provided below in Table 3.1.1. A summary of other mammal, reptile and amphibian records is provided in Table 3.1.2 overleaf. The full list of all species records can be found at Appendices C-E.
- 3.1.11 No European Protected Species Mitigation Licences (EPSML) were found within the site or within 2 km of the site boundary. The closest registered EPSMLs are two licences for bats (common pipistrelle and soprano pipistrelle) and a great crested newt (GCN) licence all located approximately 2 km north of the site boundary (first bat licence number 2015-15396-EPS-MIT dated: 06/10/2015 - 24/12/2017; second licence number 2015-15396-EPS-MIT-1 dated: 19/10/2017 - 31/12/2017). Great crested newt licence number 2014-3400-EPS-AD2 dated 21-08-2025 – 31-07-2025.
- 3.1.12 In order to simplify the results, only records of species from the last 10 years are shown. In addition, exact locations of data for certain species is classified as sensitive and not listed in the table overleaf.

Plants

- 3.1.13 The plant species returned on the desk study were mainly over 10 years old and not considered as part of this report. Of the records provided, there were 11 notable species recorded. No records were present within the site boundary, the closest plant species was Butcher's Broom recorded 0.3 km north of the site boundary within the Bartons Copse & The Slip SINC.

Mammals – Bats

- 3.1.14 The desk study produced records for 15 bats identified to species level, three at genus level and some recorded unidentified bats. The total number of records for bats was 896, a summary of each species and peak count is provided below in Table 3.2.
- 3.1.15 The greatest number of records provided were for common pipistrelle with 220 records for between 2010 and 2019, with a peak count of 13 individuals. The largest number of bats counted per record was 58 Bechstein's bats in 2018, 750 m northeast of the site boundary within Southleigh Forest SINC. All other records for Bechstein's held one or two counts per record.

Table 3.1.2 Summary of desk study bat records in the last 10 years.

Scientific Name	Common Name	Year of Records	No. of Records	Peak Count of bats per record	Grid Reference (of peak count)
<i>Myotis alcathoe</i>	Alcathoe Bat	2018	1	1	SU733081
<i>Myotis bechsteinii</i>	Bechstein's Bat	2016 - 2018	31	58	SU737088
<i>Myotis brandtii</i>	Brandt's bat	2017 - 2018	2	1	SU749080
<i>Plecotus auritus</i>	Brown Long-eared Bat	2011 - 2019	16	6	SU728099
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	2010 - 2019	220	13	SU749078
<i>Myotis daubentonii</i>	Daubenton's Bat	2014 - 2017	4	2	SU720090

Scientific Name	Common Name	Year of Records	No. of Records	Peak Count of bats per record	Grid Reference (of peak count)
<i>Nyctalus leisleri</i>	Leisler's bat	2010 - 2019	11	1	SU731080
<i>Plecotus sp.</i>	Long-eared Bat species	2010 - 2019	38	1	SU732097
<i>Pipistrellus nathusii</i>	Nathusius' Pipistrelle	2014 - 2019	32	1	SU730063
<i>Nyctalus noctula</i>	Noctule Bat	2010 - 2019	88	1	SU730063
<i>Pipistrellus sp.</i>	Pipistrelle Bat species	2010 - 2018	21	50	SU718067
<i>Eptesicus serotinus</i>	Serotine	2010 - 2019	78	5	SU722089
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	2010 - 2019	167	11	SU7106
Chiroptera	Unidentified bat	2010 - 2018	125	34	SU732097
<i>Barbastella barbastellus</i>	Western Barbastelle	2014 - 2019	26	2	SU721094
<i>Myotis mystacinus</i>	Whiskered Bat	2014 - 2019	15	3	SU723095
<i>M. mystacinus</i> / <i>M. brandtii</i>	Whiskered/Brandt's Bat	2010	1	1	SU734096
<i>Myotis nattereri</i>	Natterer's Bat	2010 - 2019	20	3	SU728099

Mammals – Badgers

- 3.1.16 The desk study provided no records of badger *Meles meles* within the last 10 years. The last records of badger were from 2006 located approximately 1.5 km south of the site boundary.

Mammals – Hazel dormouse

- 3.1.17 One record for hazel dormouse *Muscardinus avellanarius* was located approximately 1.6 km north of the site boundary. There is suitable connecting habitat between the record location and Southleigh Woodland SINC and associated tree lines.

Mammals – European hedgehog

- 3.1.18 The desk study held 23 records of European hedgehog *Erinaceus europaeus*, no records were provided for within the site itself. However, records were provided for the wider area with suitable habitat connecting to the application boundary, the closest located 0.25 km northwest of the development site.

Birds

- 3.1.19 Bird species recorded within the site boundary were song thrush *Turdus philomelos* and marsh tit *Poecile palustris*. All other records were located outside of the site boundary.

- 3.1.20 Due to the large number of records for bird species, the bird records have been omitted from Table 3.2 overleaf. A total of 70 bird species were recorded within 2 km of the site boundary, including 25 Schedule 1² species, 30 red list and 19 Amber List species of conservation concern³.
- 3.1.21 Additional bird records within the HBIC desk study included data from the Solent Waders & Brent Goose Strategy 2019 and Hampshire Swifts group. The Solent Waders & Brent Goose Strategy 2019 area H19 was classified as a 'low use' site and is located 1.8 km south of the site boundary, the remaining data held only negative records.
- 3.1.22 The Hampshire Swifts Group have extracted records from the Hampshire Ornithological Society, The Royal Society for the Protection of Birds. Only records where breeding is deemed, probable or possible by 'Hampshire Swifts' have been included, such as known nesting sites or screaming parties.
- 3.1.23 Two breeding sites were recorded for swifts, one in a house located 1.3 km south of site boundary (in 2010); the second was a record of low screaming 7 birds located 1.5 km south of the site boundary (in 2012). No other records for swift were found within the search area or site boundary.

Great crested newt

- 3.1.24 No records of great crested newt *Triturus cristatus* were found within 2 km of the site boundary and no European Protected Species Mitigation Licences (EPSML) were found within the site or within 2 km of the site boundary.

Common and widespread reptiles

- 3.1.25 Three records were provided for common reptile species, grass snake *Natrix helvetica*, slow-worm *Anguis fragilis* common lizard *Zootoca vivipara*, all records were located in Staunton Country Park 1.25 km northwest from the site boundary.

Invertebrates

- 3.1.26 No invertebrate records were located within the site boundary. The desk study records for invertebrates consisted of 36 records of stag beetle *Lucanus cervus*; 8 butterfly and 23 moth species from the Lepidoptera order; and one record of large black slug *Arion ater*.
- 3.1.27 Of the butterfly species recorded there were several nationally uncommon UKBAP priority species and some regionally uncommon and nationally rare; such as Pearl-bordered Fritillary *Boloria euphrosyne*, White Admiral *Limenitis camilla* and Purple Emperor *Apatura iris*.

Table 3.2 Species⁴ records from the last 10 years within 2 km of the site.

Taxon Name	Common Name	OS Grid Refence	Location	Date	No. of Records	Max Count
Mammals (excluding bats)						
<i>Erinaceus europaeus</i>	West European hedgehog	SU71450859	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU71450859	West Leigh, Bedhampton	2019	1	Present
		SU72470832	Not Given - Ptes Big Hedgehog Map	2018	2	Present

² Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)

³ Birds of Conservation Concern Red List and Amber List

Taxon Name	Common Name	OS Grid Reference	Location	Date	No. of Records	Max Count
		SU72580680	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU72650667	Denvilles, Bedhampton	2019	1	Present
		SU72650667	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU72680678	Denvilles, Bedhampton	2019	1	Present
		SU72680678	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU72700637	Warblington School	2019	1	1
		SU727063	Southleigh Road, Warblington	2014	1	1
		SU72820849	Not Given - Ptes Big Hedgehog Map	2018	2	Present
		SU72820849	West Leigh, Bedhampton	2019	1	Present
		SU72980828	Not Given - Ptes Big Hedgehog Map	2018	6	Present
		SU72980828	West Leigh	2019	1	Present
		SU72990729	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU73000729	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU73630626	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU74450739	Not Given - Ptes Big Hedgehog Map	2018	1	Present
		SU74450741	Not Given - Ptes Big Hedgehog Map	2018	5	Present
		SU74520699	Horndean Road, Havant	2019	1	Present
		SU74520699	Not Given - PTES Big Hedgehog Map	2018	1	Present
		SU75000817	Westbourne	2019	1	2
		SU75190760	Emsworth	2019	1	2
<i>Muscardinus avellanarius</i>	Hazel dormouse	SU732097	Sensitive	2017	1	1
Reptiles and Amphibians						
<i>Anguis fragilis</i>	Slow-worm	SU719089	Staunton Country Park	2018	1	1
<i>Bufo bufo</i>	Common toad	SU7109	Havant Thicket	2018	1	1
<i>Natrix helvetica</i>	Grass snake	SU720091	Staunton Country Park	2018	1	1
<i>Zootoca vivipara</i>	Common lizard	SU719089	Staunton Country Park	2018	1	1

3.2 Phase 1 Habitat Survey

3.2.1 The survey results are presented in the Phase 1 Habitat Survey Map (Figure 3.2) with the habitat types and boundary features marked. Photographs can be found at Appendix C. Descriptions of the habitat types and boundary features are detailed below. Habitat descriptions are defined by broad habitat types (JNCC, 2010).

Semi-improved grassland

3.2.2 Much of the site consists of unmanaged semi-improved grassland. Scattered trees were located in the centre of the site and described in more detail below.

3.2.3 Species include fleabane sp. *Erigeron* sp., common nettle *Urtica dioica*, white clover *Trifolium repens*, creeping buttercup *Ranunculus repens*, yarrow *Achillea millefolium*, figwort sp. *Scrophularia* sp., perennial rye grass *Lolium perenne*, cock's foot grass *Dactylis glomerata*, common mouse ear *Cerastium fontanum* and spear thistle *Cirsium vulgare*.

3.2.4 There was a vegetated bund to the south of the site covered with the semi-improved grassland assemblage described above.

Scattered Trees

3.2.5 A total of two mature oak trees were located within the site boundary, with a third adjacent to the northern part of the site, outside the redline boundary. Both trees within the site are located in the centre of the site in a row from north to south. Trees T1 and T2 were mature oak trees. A number of broken limbs and patches of loose bark were present on both trees T1 and T2 on Figure 3.2.

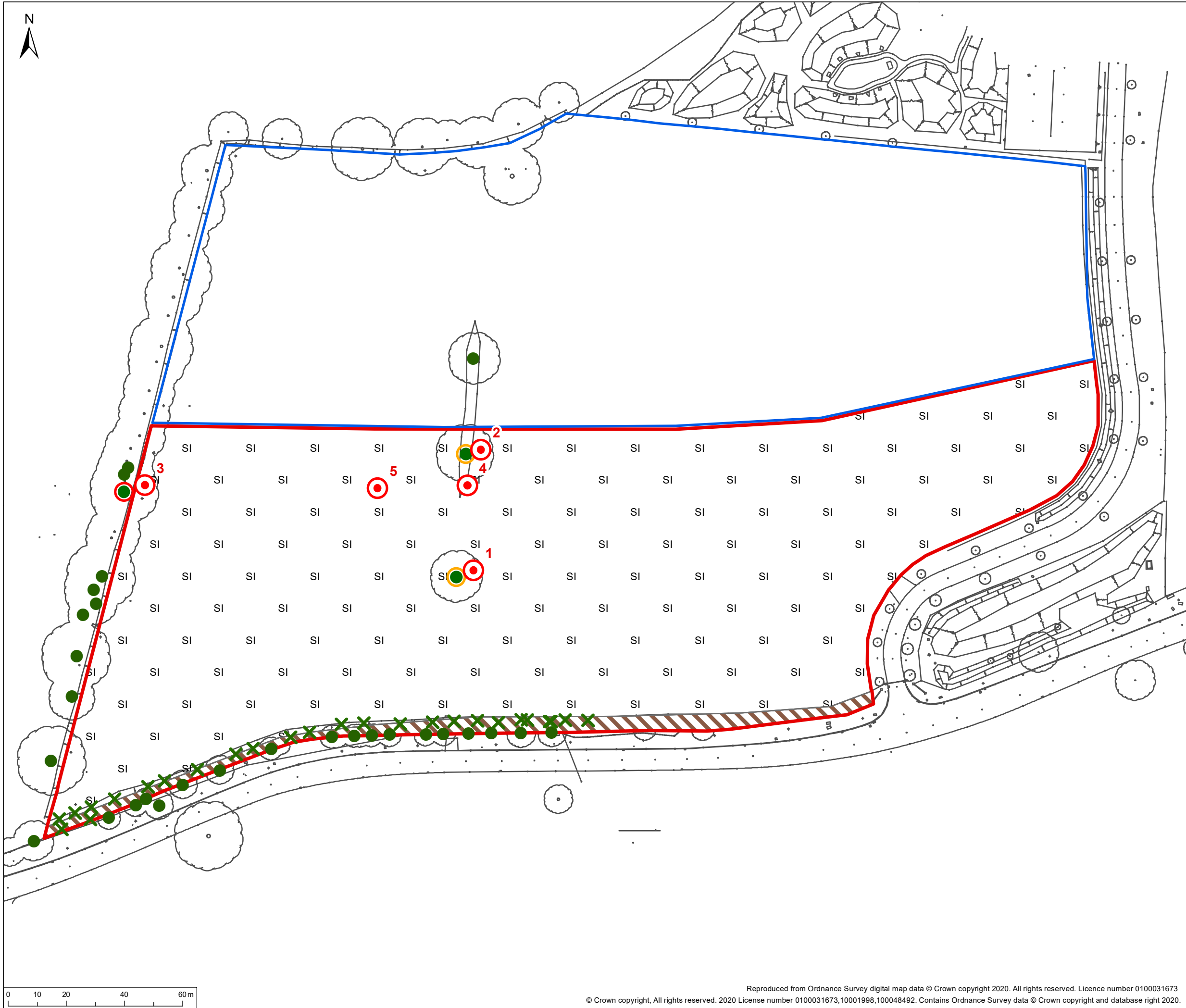
Boundaries

3.2.6 The northern boundary of the site had no formal border and continued into agricultural fields until meeting Bartons Copse SINC approximately 100 metres to the north. The eastern boundary was bordered with a mesh wire fence, the southern boundary was bordered with a vegetated bund and scattered semi-mature trees. Species include holly *Ilex aquifolium* and sycamore *Acer pseudoplatanus*.

3.2.7 The western boundary comprised a row of mature/semi mature trees with limited understorey. Species include oak, hawthorn *Crataegus monogyna* and sycamore. Several woodpecker holes were present on these mature trees and lifted bark/broken limbs throughout.

Figure 3.2 Phase 1 Habitat Survey Plan

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Notes

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- Legend**
- Phase 1 - Red line boundary
 - Phase 2 boundary
 - Semi-improved grassland
 - Tall ruderals on vegetated bund
 - Scattered scrub
 - Target notes
 - Broadleaved scattered trees
 - Tree with high potential for roosting bats
 - Tree with moderate potential for roosting bats

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Rev	Description	By	CB	Date

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Client Redrow Homes

Project Barton's Road, Land at Camp Field

Title Phase 1 Habitat Map

Status	Drawn By	PM/Checked By
Draft	LW	FM
Project Number	Scale @ A3	Date Created
ECO01516	1:1,250	18/11/20
Figure Number		Rev
ECO01516-001-A		A

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3.3 Ecological Scoping Survey

Mammals

Bats

- 3.3.1 As per the previous Preliminary Ecological Appraisal (The Ecology Co-op, 2017), several trees within the site have potential for supporting roosting bats. The locations of these can be seen in the previous PEA report (The Ecology Co-op, 2017) and are also displayed in Figure 3.2 (TN1 and TN2). Details of features with potential to support roosting bats are described in more detail below in Table 3.3.

Table 3.3 Details of trees with features suitable for supporting roosting bats.

Target noted tree	Description of features with potential to support roosting bats	Assessment of potential for supporting roosting bats
TN1	Loose bark south east facing approximately 5 metres.	Low potential
TN2	Loose bark approximately 5 metres north east and south east facing.	Low potential
TN3	Oak tree with two south east facing woodpecker holes at approximately 4 metres	Moderate potential

- 3.3.2 Grassland habitats on site and surrounding habitats, particularly Bartons Copse SINC to the north of the site provide suitable commuting and foraging habitat for bats. The tree line to the west of the site is considered suitable for supporting commuting and foraging bats and is a connecting feature between suitable surrounding habitats. Records of Bechstein's bats roosting in Bartons Copse are present and therefore connecting features may be important for this bat species. Habitats on site therefore have **high potential for supporting commuting/foraging bats** and **low/moderate potential for supporting roosting bats in trees**.

Badgers

- 3.3.3 No evidence of badger was found within the site boundary. The boundary habitats and surrounding habitat in the wider landscape provided suitable foraging areas for badgers, however no records of badger were provided from the desk study. It is therefore considered that there is **low potential for the site to support badgers**. Badgers may commute through or forage within the application site and appropriate mitigation has been recommended to protect badgers that may utilise the site boundaries.

Hazel dormouse

- 3.3.4 As per the previous Preliminary Ecological Appraisal (The Ecology Co-op, 2017) and the previous Phase 2 surveys (The Ecology Co-op, 2018), suitable habitat for supporting hazel dormouse is located surrounding the site. However, signs of hazel dormouse were not discovered during the Phase 2 surveys conducted in 2017/2018 (The Ecology Co-op, 2018). Boundary features are in the same conditions as previous surveys and therefore further survey is not considered necessary. The site is considered to have **negligible potential for supporting hazel dormouse**.

Other Mammals

- 3.3.5 The desk study provided records for European hedgehog and the boundary habitats, such as the hedgerows and surrounding woodland, provide suitable habitat for supporting European hedgehog. It is therefore considered that there is **low potential for the site to support European hedgehog**.

Birds

- 3.3.6 Trees and boundary vegetation on site provide suitable habitat for nesting and foraging birds.
- 3.3.7 Records of swifts were provided within the data search, however habitats on site are not suitable for nesting. The habitats are suitable for foraging swifts and therefore swifts may pass through the site to reach suitable surrounding nesting habitat. Recommendations have been made in Section 5 to enhance the site for this species.
- 3.3.8 The Solent Waders & Brent Goose Strategy 2019 area H19 was classified as a 'low use' site and is located 1.8 km south of the site boundary, the remaining data held only negative records. Brent geese were not identified on the site at the time of the updating survey and the site is considered unsuitable for Brent Geese due its proximity to the coast. The site is at least two kilometres from the coast line and one kilometre from the nearest strategy site (which has a negative results/no data).
- 3.3.9 Bird species provided in the desk study included common species that would utilise habitat typically found within the boundary vegetation for nesting and foraging, in particular hedgerow, scrub and trees. Also, ground nesting birds such as skylark have been recorded within the 2 km search radius however were not identified on site during the site survey. In its current condition, the site is considered unsuitable for supporting ground nesting birds. It is considered that there is **high potential for impacts to common garden species of birds**. Further recommendations are made below in Section 5 to mitigate impacts and enhance the site for birds.

Amphibians

- 3.3.10 As per the previous surveys (The Ecology Co-op, 2017 and 2018), there are no ponds on site and terrestrial habitat is of low suitability for supporting great crested newt. Previous surveys did not find evidence of great crested newts during eDNA surveys in nearby suitable ponds (The Ecology Co-op, 2018). One record of a great crested newt licence is located 2 km to the north of the site however a number of road and railway networks are present between the sites and it is considered unlikely that great crested newts would utilise this site given the barriers and distance between them. It is therefore considered that there is **negligible potential for the site to support great crested newts**.
- 3.3.11 The boundary habitat to the west of the site has some potential to support common species of amphibian such as common toad *Bufo bufo* within the understory and therefore the site is considered to have **low potential for supporting common species of amphibian**.

Common and widespread reptiles

- 3.3.12 Grassland on site provides some low-quality habitat for common and widespread reptile species. However, previous Phase 2 surveys in 2018 did not record any evidence of reptiles within the site or boundary habitat (The Ecology Co-op, 2018). It is therefore considered that there is **negligible potential for common and widespread reptiles on site**.

Invertebrates

- 3.3.13 Trees and woodpiles onsite provide limited habitat for invertebrates including stag beetles. Mitigation for the loss of this habitat is therefore included as well as recommended enhancement planting to support species found in the desk study, one of which is nationally and regionally rare.

4 EVALUATION OF POTENTIAL IMPACTS AND MITIGATION RECOMMENDATIONS

4.1 Designated sites

- 4.1.1 The site falls within the Impact Risk Zone (IRZ) of Warblington Meadow SSSI (2.6 km south) and Chichester and Langstone Harbours Special Protection Area (SPA) (3.4 km southwest).
- 4.1.2 Therefore, the potential effects of discharge of additional nitrates from sewerage from the proposed development on the Solent international designated sites is required (as set out in Natural England's guidance note on this subject, NE 2020).
- 4.1.3 The proposed development will therefore require a financial contribution to mitigate increased activity on coastal SPA and RAMSAR sites (located over 2 km south of the site boundary). Further information can be found in the Nitrates Report (RPS, 2021).
- 4.1.4 Good practice guidelines would be adhered to during the construction phase to control impacts such as contamination and dust to surrounding habitats during the build of the proposed development.

4.2 Habitats

- 4.2.1 The trees on site have low/moderate potential to support roosting bats and nesting birds, this is discussed further in the species section below.

4.3 Species

Mammals - Bats

- 4.3.1 All species of bat present in the UK receive full protection under The Conservation of Habitats and Species Regulations 2010, and the Wildlife and Countryside Act 1981 (as amended). Several bat species are also listed in Section 41 of the NERC Act 2006. These include the widespread species soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared bat *Plecotus auritus*, and the rarer woodland species such as Bechstein's *Myotis bechsteinii* and barbastelle *Barbastella barbastellus*.

Trees

- 4.3.2 Trees T1 and T2 had a small amount of loose bark present. No evidence of bats was identified at the time of the survey but trees T1 and T2 hold low potential for supporting roosting bats. Due to the type of features and transient nature of bats, trees T1 and T2 will require soft felling under ecological supervision. A licensed ecologist will be present during the felling where tree limbs with potential to support roosting bats will be removed in a staged process and left on the ground for a 48 hours period.
- 4.3.3 In the unlikely event that a bat is found during the soft felling of trees T1 and T2, works will cease, and the advice of a bat licensed ecologist will be followed.
- 4.3.4 Tree T3 had two woodpecker holes present with moderate potential for supporting bats. It is recommended that features in this tree are inspected with an endoscope twice between May and September with at least one visit between May and August. If any evidence of bats is found a Natural England European Species Licence (EPS) will be required before the tree is removed once the roost type has been characterised.

Commuting/foraging

- 4.3.5 Habitats on site are considered suitable for commuting/foraging bats. The boundary hedgerow to the west of the site is considered an important connectivity feature for bats to suitable surrounding habitat, particularly for Bechstein's bats known to roost in Bartons Copse SINC. As such this hedgerow must be protected from impacts and additional lighting. Please see the Biodiversity Mitigation and Enhancement Plan in Appendix D (The Ecology Co-op, 2018).
- 4.3.6 It is recommended that two further bat trapping surveys are completed in May to investigate the possible use of the site by Bechstein's bats early in the season.

Mammals - Badger

- 4.3.7 Badgers and their setts are protected by the Protection of Badgers Act 1992. This makes it a criminal offence to kill/injure a badger, interfere with or damage a sett or disturb a badger occupying a sett. If a sett is likely to be disturbed or destroyed a licence will be required from Natural England and options to minimise impact to the species should be considered.
- 4.3.8 Due to the potential of badgers commuting and foraging through site, precautionary measures are required during construction to avoid trapping badgers in trenches or holes. These will include covering any steep sided holes or trenches or leaving a sturdy ramp or plank within to provide an escape route. Any temporary fencing during the construction phase will leave a gap of 20 cm at the base to ensure that permeability of the site remains in place (if this is not considered viable, due to the possibility for owners pets to escape, badger gates will be installed).

Birds

- 4.3.9 Breeding birds are protected by the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to intentionally kill, injure or take the birds or their eggs, or to intentionally destroy or disturb a nest, when it is in use or being built.
- 4.3.10 The removal of any trees will avoid the bird nesting season (March to August inclusive). If this is not possible, removal will occur under the supervision of a suitably qualified ecologist who will check for any active nests. If found to be present, a buffer zone, where no development activities will occur, will be cordoned off by the supervising ecologist until the young have fledged. Provided the above recommendations are adhered to, the proposed development of the site will not contravene any legislation or planning policy pertaining to breeding birds.

Other Species

- 4.3.11 Any spoil or mixed material piles created during clearance and construction should be removed from site immediately to avoid creating habitat or refuge for any species.

5 ENHANCEMENT RECOMMENDATIONS

- 5.1 The NPPF requires that the local planning authority should aim to enhance biodiversity when determining planning applications and opportunities to incorporate biodiversity in and around developments should be encouraged. Please see the previous Phase 2 survey report for recommended enhancements for the site (The Ecology Co-op, 2018). These include;
- Native shrub planting;
 - Designing and planting of SuDS;
 - Creation of wildflower habitat;
 - Planting of an orchard;
 - Tree and shrub planting; and
 - Inclusion of bat and bird boxes.
- 5.2 Further recommendations for enhancing the biodiversity of the site are as follows:
- 5.1.1 The provision of Habibat 001 bat bricks, or Schwegler 1FF bat boxes (if the incorporation of bat bricks into the build is unfeasible) will be provided as ecological enhancement. These will be either installed on buildings within the proposed development or mounted on retained trees, at a height of at least three metres, with an unobstructed access point and on a southerly aspect where possible, facing away from the prevailing winds.
- 5.1.2 The boundary/linear features around the site can be strengthened by planting native species-rich tree lines or hedgerows, as these landscape features can be used by bats as navigational aids when commuting across the landscape.
- 5.1.3 The landscaping proposals for the development will include native planting of fruit or nectar –bearing plants and trees, to encourage a greater diversity of insects for bats to feed on.
- 5.1.4 The provision of at least two swift, and two sparrow bird boxes will provide additional nesting/roosting opportunities on site. The placement of these will be designed to encourage use of new habitat features that result from the development. Swift boxes will need a drop of at least three metres and can be added to existing residential property outside of the application boundary but within the client land ownership.
- 5.1.5 Wood habitat piles and hibernacula can be created from wood fallen or felled on site in appropriate locations within the landscaping scheme as this will provide habitat for a range of species including reptiles, amphibians and saproxylic invertebrates and small mammals.
- 5.1.6 Any new fences to be installed as part of the proposed development will have a gap at the bottom of 20 cm, or a hole of 15 cm x 15 cm, to allow for habitat connectivity (foraging routes) throughout the garden and into wider habitat for mammals (such as hedgehog) and reptile species.

6 CONCLUSIONS

- 6.1.1 Much of the site consists of unmanaged semi-improved grassland. There was a vegetated bund to the south of the site, covered with semi-improved grassland.
- 6.1.2 Following this updated PEA, it has been reconfirmed that the site has limited potential to support nesting birds and commuting/foraging bats. Trees T1 and T2 have low potential to support roosting bats and tree T3 has moderate potential for supporting roosting bats.
- 6.1.3 Nesting bird checks by an appropriately experienced person are recommended prior to vegetation clearance or demolition between April and October (inclusive) and if any active nests are found, an appropriate buffer installed until eggs have hatched and chicks fully fledged to avoid disturbance.
- 6.1.4 Due to the potential of badgers foraging and commuting through site, precautionary measures are required and provided in this report for during construction to avoid trapping badgers in trenches or holes.
- 6.1.5 The proposed development is within the Impact Risk Zone (IRZ) of Warblington Meadow SSSI and Chichester and Langstone Harbours Special Protection Area (SPA) and will therefore require mitigation with respect to nitrate discharge. This has been addressed by RPS in a separate report (2021).
- 6.1.6 The relocation of any created spoil and brash piles (by hand) will be carried out immediately and mixed material will not be left onsite.
- 6.1.7 Enhancements measures for ecology have been recommended in this report and by the previous consultants (The Ecology Co-op, 2018).

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A large, light beige graphic on the left side of the page, shaped like a stylized hand holding a pen. The 'hand' part is a large, rounded shape, and the 'pen' part is a smaller, darker maroon shape that fits into the hand. The word 'APPENDICES' is written in maroon capital letters on the right side of the hand.

APPENDICES

Appendix A

Relevant Legislation

Bats

All British bat species are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. All British bats are also included on Schedule 2 of The Conservation of Habitats and Species Regulations 2017 as European Protected Species. It is an offence to:

- intentionally or recklessly kill, injure or capture bats;
- deliberately or recklessly disturb bats (whether in a roost or not); and
- damage, destroy or obstruct access to bat roosts

A roost is defined as 'any structure or place which [a bat] uses for shelter or protection'. As bats tend to reuse the same roosts, legal opinion is that a roost is protected whether or not bats are present at the time of survey.

A licence will therefore be required by those who carry out any operation that would otherwise result in offences being committed.

The following bat species are listed as being of principal importance for the conservation of biodiversity in England, (commonly referred to as UKBAP Priority species): Barbastelle, Bechstein's, Noctule, Soprano Pipistrelle, Brown Long-eared, Greater Horseshoe, and Lesser Horseshoe.

Badger

Badgers *Meles meles* are protected under the Protection of Badgers Act 1992. This act is based on the need to protect badgers from baiting and deliberate harm or injury. The act makes it an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so;
- Intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.

A sett is defined as "any structure or place that displays signs indicating current use by a badger".

Birds

All birds, their nests and eggs are afforded protection under the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. Schedule 1 birds cannot be intentionally or recklessly disturbed when nesting and there are increased penalties for doing so. Licences can be issued to visit the nests of such birds for conservation, scientific or photographic purposes but not to allow disturbance during a development even in circumstances where that development is fully authorised by consents such as a valid planning permission.

It is an offence to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- intentionally take or destroy the egg of any wild bird.

Reptiles

All common UK reptile species (Adder *Vipera berus*, Grass Snake *Natrix natrix*, Common Lizard *Zootoca vivipara* and Slow Worm *Anguis fragilis*) are protected through part of Section 9(1 and 5) of the Wildlife & Countryside Act 1981 (as amended). This prohibits:

- Intentional or reckless injuring or killing;

REPORT

- Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild animal or any part of, or anything derived from, such an animal; or
- Publishing or causing to be published any advertisement likely to be understood as conveying buying or selling, or intending to buy or sell, any of those things.

HBIC Records' Conservation Status Codes and Abbreviations

Code	Description
EU_Bird_1	Annex I of the Birds Directive
EU_Hab_2	Annex II of the Habitats Directive (priority species)
EU_Hab_2np	Annex II of the Habitats Directive (non-priority species)
EU_Hab_4	Annex IV of the Habitats Directive
EU_Hab_5	Annex V of the Habitats Directive
IAS_EU	Listed in the List of invasive alien species of union concern More information can be found here- http://ec.europa.eu/environment/nature/invasivealien/index_en.htm
IUCN_GB_pre94	See IUCN (pre 1994) guidelines, covering Great Britain
IUCN_GB_1994	See IUCN (1994) guidelines, covering Great Britain
IUCN_GB_2001	See IUCN (2001) guidelines, covering Great Britain
IUCN_EN_2014	See IUCN (2001) guidelines, covering England
BOCC_Red	Birds of Conservation Concern Red list
BOCC_Amber ⁵	Birds of Conservation Concern Amber list
NR	Nationally rare (occurring in 15 or fewer 10km squares in Great Britain)
NS	Nationally scarce (occurring in 16 - 100 10km squares in Great Britain)
NN	Nationally notable (occurring in 16 - 100 10km squares in Great Britain or less than 20 Vice Counties)
NNS_Port	Listed in The Non-native Species Secretariat, Non-native Species Information Portal http://www.nonnativespecies.org/factsheet/index.cfm
HBAP	Hampshire Biodiversity Action Plan species
NERC_s41	Priority Species listed under Section 41 of the Natural Environment and Rural Communities Act 2006
WCA_s1p1	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended)
WCA_s5s91(k)	Schedule 5 Section 9 Part 1 (killing/injuring) of the Wildlife and Countryside Act 1981 (as amended)
WCA_s5s91(t)	Schedule 5 Section 9 Part 1 (taking) of the Wildlife and Countryside Act 1981 (as amended)
WCA_s5s94a	Schedule 5 Section 9 Part 4a of the Wildlife and Countryside Act 1981 (as amended)
WCA_s5s94b	Schedule 5 Section 9 Part 4b of the Wildlife and Countryside Act 1981 (as amended)
WCA_s5s94c	Schedule 5 Section 9 Part 4c of the Wildlife and Countryside Act 1981 (as amended)
WCA_s8	Schedule 8 of the Wildlife and Countryside Act 1981 (as amended)
WaCA9_1	Listed in the Wildlife and Countryside Act Schedule 9 Part 1 http://www.legislation.gov.uk/ukpga/1981/69/schedule/9 with the year the species was listed.
WaCA9_2	Listed in the Wildlife and Countryside Act Schedule 9 Part 2 http://www.legislation.gov.uk/ukpga/1981/69/schedule/9 with the year the species was listed.
HabReg_2	Schedule 2 of Conservation of Habitats and Species Regulations 2010 (European Protected Species animal)
HabReg_5	Schedule 5 of Conservation of Habitats and Species Regulations 2010 (European Protected Species plant)
Plantlife	Listed in the Plantlife list: Here today, here tomorrow? Horizon scanning for invasive non-native plants Only species with the categories 'Critical' OR 'Moderate Risk' OR 'Urgent' were used.
PBA	Protection of Badgers Act 1992
NI	National Interest
CI	County Interest

⁵ Not recognised by HBIC, but identified by RPS ecologists from Eaton et al, (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746.

REPORT

Code	Description
CR	County Rare
CS	County Scarce
NE_Horizon	Listed in the Natural England - <u>Horizon scanning for new invasive non-native animal species in England</u> Only species with the categories 'A, Black List' OR 'B, Watch List' were used.
nHR	North Hampshire Rare (VC12)
sHR	South Hampshire Rare (VC11)
nHS	North Hampshire Scarce (VC12)
sHS	South Hampshire Scarce (VC11)
Hant resp.	Hampshire responsible, with the percentage of the total England population within Hampshire shown
Hants decl.	Hampshire declining, percentage decrease in Hampshire's population between 1986 and 2019
EAList	Listed in the MOA between EA and HBIC.
Criteria for selecting Sites of Importance for Nature Conservation in Hampshire	
1A	Ancient semi-natural woodlands Ancient - refers to woodlands which have developed particular ecological characteristics as a result of their long continuity. Those identified to date which are over 2ha are included on the Hampshire Inventory of Ancient Woodlands (Provisional). Semi-natural - modified types of vegetation in which the dominant and constant species are accepted natives to Britain and that locality, and the structure of the community conforms to the range of natural vegetation types.
1D	Pasture woodland and wooded commons, not included in any of the above, which are of considerable biological and historical interest.
2B	Semi-improved grasslands which retain a significant element of unimproved grassland.
2D	Grasslands which have become impoverished through inappropriate management, but which retain sufficient elements of relic unimproved grassland to enable recovery.
5B	Wetlands - Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions. Semi-improved grasslands which retain a significant element of unimproved grassland. Wetlands - Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.
6A	Sites which support one or more notable species ⁴ . Notable species include Red Data Book species, Nationally Scarce species, species covered under Schedules 1,5 and 8 of the Wildlife & Countryside Act 1981, Annex 1 of the EC Bird Directive 79/409 and Annex II & 1V of the EC Directive 92/43/EEC 'The Habitats Directive', and those covered by the Bern, Bonn and Ramsar Conventions. Notable species will also include species which are considered 'County Rare' or 'County Scarce'. County Rare = those species recorded in 1% or less tetrads in Hampshire or either of the two vice-counties (11 & 12) separately. County Scarce = 4% or less tetrads.

Appendix C

Site Photographs



Plate 1: Southern boundary looking west



Plate 2: View from east to west



Plate 3: Tree T1 looking south to north



Plate 4: Tree T2 looking south to north



Plate 5: Western boundary looking south



Plate 6: Deadwood pile in centre of site



Plate 7: Western boundary of the site looking south



Plate 8: Tree T3 within the western site boundary

Appendix D

Biodiversity Mitigation and Enhancement Plan



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Biodiversity Mitigation and Enhancement Plan

Camp Field, Bartons Road, Havant

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16th November 2018

Project No: 2602

The Ecology Co-operation Ltd
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Report Summary

1. The Ecology Co-op was commissioned by Wessex Environmental Planning to outline necessary mitigation and enhancements for land proposed for development at Camp Field in Havant, where it was determined that the site is located in close proximity to Ancient Woodland, supports a high diversity of foraging bats (including barbastelle and three *Myotis* sp. recorded on site through trapping) and six green listed breeding bird species.
2. Standard national guidance states that a buffer of at least 15m is created around Ancient Woodland, however in this instance an 18m buffer will be established along the northern and western boundary which meet the Ancient Woodland. This buffer will be planted to create high-value scrub habitat.
3. To prevent inadvertent damage to the western tree line during the construction phase, heras fencing, or similar, will be erected at the boundaries of the construction zone, outside of root protection areas. All machinery and materials must operate and be stored only within the fenced construction area.
4. During the construction phase, measures will be put in place to minimise potential harm to badgers. In addition, site staff must be briefed prior to the commencement of construction on the importance of contacting an ecologist in the unlikely event that any protected species are identified within the construction zone.
5. A sensitive lighting scheme, in line with the Bat Conservation Trusts Guidelines will be important and must include a 'no light zone' along the north or western boundary where a tree line is present that has been identified to support commuting and foraging bats.
6. Habitat enhancement measures are proposed for wider wildlife benefits including the creation of new high-value scrub habitat within the 18m buffer to the Ancient Woodland, an orchard and wildflower meadows, the native planting of SuDS, scattered tree planting and enhancement of the southern tree line. These new habitats will be beneficial for a variety of invertebrates and in turn provide value for foraging birds and bats.
7. The Biodiversity Metric Calculation in Section 5.2.8 has established that there will be an increase in the sites biodiversity value based on the proposed habitat creation detailed.
8. The installation of integral bat roosting features and bird nest boxes into buildings are also detailed to provide a net increase in bat and bird roosting habitat.
9. Post construction management is detailed in section 4.



Camp Field – Mitigation Statement

This report has been prepared by The Ecology Co-operation Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client. This report only becomes the property of the client once payment for it has been received in full.

We disclaim responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.



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1 INTRODUCTION

1.1 Background to the Scheme

Wessex Environmental Planning intend to submit a planning application for the residential development of an area of land at Camp Field in Havant, Hampshire. This proposal includes the development of the southern part of the site, which is likely to include approximately 72 properties with public open space and community orchard. An open green space will be created across the northern portion of the site. There is the potential for the northern portion of the site to be developed in the future should more housing be allocated by East Hants District Council and therefore consideration has been made to a wider development proposal at this site.

In November 2017, The Ecology Co-op undertook a Phase 1 Habitat survey and Preliminary Ecological Appraisal of the site. This was followed by Phase 2 protected species surveys completed across 2017 and 2018. The results of these surveys are presented in separate report¹ and ² submitted as part of the planning application.

In summary the surveys identified high bat diversity at the site with common pipistrelle, soprano pipistrelle, nathusius pipistrelle, common noctule, serotine, brown long-eared, barbastelle and the following *Myotis* sp. Natterer's bat, whiskered and Brandt's bat recorded on site and *Alcathoe* just off site through trapping. In addition, six green listed bird species were confirmed as breeding. Badger push throughs were identified along the northern boundary but no setts were identified upon or within close proximity to the site. The surveys have concluded the likely absence of great crested newts, reptiles and dormice.

Further to the findings of all ecological surveys at this site, Wessex Environmental Planning have commissioned the Ecology Co-op to develop ecological mitigation and habitat compensation measures for the proposed scheme.

1.2 The Site

The National Grid Reference for the centre of the site is approximately SU 7333 0811 and the closest postcode to the site is PO9 5NA. This site is approximately 6.2 Ha in area. It comprises an arable field with poor semi-improved grassland margins and a strip of improved grassland which supports scattered broadleaved trees in the centre of the field. On the western boundary of the site is a native species-rich hedgerow with trees which connects directly to Ancient Semi-natural Woodland located directly adjacent to part of the sites western and northern boundaries. The other half of the northern boundary is marked with wire mesh fencing and meets the grounds of the adjacent crematorium. Along the southern boundary is a mixture of species poor defunct hedgerow with trees and fencing beyond which is Bartons Road. Finally, on the eastern boundary is high wire mesh fencing beyond which is the access road to the crematorium. Dry ditches are also present along the western boundary and part of the northern boundary.

¹. The Ecology Co-op (2017) *Preliminary Ecological Appraisal, Phase 1 Habitat Assessment – Land North of Bartons Road, Havant.*

². The Ecology Co-op (2018) *Phase 2 Ecology Surveys – Camp Field, Bartons Road, Havant.*



Figure 1. An aerial image showing the location of the site. The approximate site boundary is outlined in red. Images produced courtesy of Google maps (Map data ©2018 Google).



Figure 2. Master plan for Camp Field produced by Stainsby Architect and provided by email on 31st October 2018.



1.3 Purpose of the Report

This document has been produced to demonstrate how a residential development upon land at Camp Field in Havant, Hampshire will minimise its impact upon protected species, wider biodiversity and provide targeted enhancement measures to create a net gain in biodiversity in line with the requirements of National Planning Policy Framework (NPPF) paragraphs 7 and 118. It outlines all mitigation and compensation measures that are designed to ensure that valuable habitats are either protected, replaced or enhanced at the above named site.

All of the prescribed mitigation measures described within this document will be issued to relevant works contractors to ensure that they are carried out in full. Implementation of this will be overseen by a suitable ecological consultancy, and the works contractor will be given contact details for an ecologist so that any issues can be resolved promptly.

1.4 Policy and Legislation

Legal protection applying to relevant bird, mammal, herpetofauna and other species and current nature conservation planning policy is outlined in Appendix 1 of the Phase 2 Ecology Surveys Report.

2 BIODIVERSITY OFFSETTING CALCULATION

Biodiversity metric calculations were made to determine the degree of biodiversity offsetting possible through this development proposal. This involved calculating the current site value and the future target site value in line with guidance produced by Natural England and Department for Environment Food and Rural Affairs ³.

3 PROTECTED HABITAT MITIGATION

Standard national guidance states that a buffer of at least 15m is created around Ancient Woodland. An 18m buffer will be established along the parts of the northern and western boundary which meet the Ancient Woodland. This buffer will be planted with species recommendations detailed within section 4.2.1.

To prevent inadvertent damage during the construction phase, heras fencing, or similar, must be erected at the boundaries of the construction zone, outside of root protection areas. All machinery and materials must operate and be stored only within the fenced construction area.

4 PROTECTED SPECIES MITIGATION AND ENHANCEMENTS

4.1 Badgers

4.1.1 Mitigation

The following mitigation measures must be put in place to minimise any potential harm to badgers.

³ Natural England and Department for Environment Food and Rural Affairs (Defra), (2012). *Biodiversity Offsetting Pilots. Technical Paper: the metric for the biodiversity offsetting pilot in England*



Camp Field – Mitigation Statement

- No food or waste will be left out overnight and tools will be locked away after each day.
- Any excavations more than 50cm deep will either be covered up overnight or have ladders put in place to provide an escape route.
- All chemicals and potentially hazardous substances must be stored securely in a structure such as a shipping container.

If any digging by large mammals is identified then an ecologist should be contacted for advice. If any active setts are established within the construction zone, specific mitigation measures are likely to be required that may include obtaining a licence from Natural England.

4.2 Bats

4.2.1 Mitigation

Bright external lighting can have a detrimental impact upon foraging and commuting bats, but importantly can also cause bats to be fooled into thinking that the light is from the sun, causing them to remain in their roosts for longer. A large proportion of bat activity was associated with the boundaries of the Ancient Woodland along part of the north and western boundaries and along the western tree line. There was relatively high species diversity and high levels of activity along these features with the following species recorded; common pipistrelle, soprano pipistrelle, *Myotis spp.*, long-eared bat, serotine, common noctule and barbastelle. Barbastelle bats and *Myotis* bats are particularly sensitive to artificial lighting.

As a result, the site boundaries must be protected from artificial lighting with no street lamps or outside lights to face towards these boundaries. In particular, a 'no light zone' must be established along the western boundary, whilst the development lies sufficiently far from the woodland to the north that light pollution is not considered to be a risk as long as bare bulb lighting is not used and the general lighting guidance below is incorporated.

Guidelines issued by the Bat Conservation Trust must be incorporated into the lighting scheme at Camp Field. These are outlined within Appendix 4. Overall the following measures must be implemented into the site design:

1. No 'upward pointing' or bare bulb lights will be installed anywhere on the development.
2. Column heights of external lights should be as low as reasonably possibly to limit light spill. Shields should be installed to focus light towards footpaths and roads only (See figure 3). No light will be allowed to emit light past horizontal (90 degrees from the ground).
3. A no-light zone to protect western boundaries from any artificial light. No lamp posts or other artificial lights should be positioned within 15 metres of these boundaries and no lights should be positioned to face towards these boundaries.
4. No external lights will be installed on new buildings above a height of 2 metres and all external lights will have shields to prevent light splash beyond horizontal.
5. A restriction on luminaires so that they lack UV elements or metal halide fluorescent sources, use of a warm white spectrum that is <2700 Kelvin and feature wavelengths higher than 550nm.



Figure 3. An example of suitable downward shielded street lighting

4.2.2 Enhancements

As a measure to enhance roosting opportunities for bats, 'built in' roosting features will be incorporated into the new buildings. It is recommended that 15 built in roosting features are installed. These must be located upon the buildings in close proximity to boundary tree lines or standing water. The boxes should be installed on the south or eastern elevations approximately 5 meters in height.

The following built in roosting features are recommended:

- Five 2FR Schwegler Bat Tubes (<https://www.nhbs.com/2fr-schwegler-bat-tube>). These can be incorporated into the fabric of the building. The bat tubes can be connected together in a module form
- Five Bat Access Tile sets (<https://www.nhbs.com/bat-access-tile-set>). Where access tiles are installed will not use a Tyvek type underlay, which has a tendency to fray and pose and entanglement risk to bats, but instead a must consist only of bitumen roofing felt or a similar material.
- Five 1FQ Schwegler Bat Roost (For External Walls) (<https://www.nhbs.com/1fq-schwegler-bat-roost-for-external-walls>). These can be attached directly to the external wall following construction.

Figure 4 shows proposed locations of these bat roosting features.



Bat Access Tile Set

2FR Schwegler Bat Tube

1FQ Schwegler Bat Roost

In addition, five Schwegler woodcrete bat boxes (two 2F, one 2FN, one 1FF and one 1FS Schwegler bat boxes) will be hung on suitable mature trees upon the western and northern site boundaries. The boxes would be hung by a suitably qualified ecologist to ensure that this positioning is most suitable, but generally locations above 3.5 metres in the most south easterly facing aspect of a tree is best. Proposed locations are indicated in Figure 4.



2F Schwegler Bat Box

2FN Schwegler bat box

1FF Schwegler Bat Box

1FS Schwegler Large Colony



Figure 4. Proposed locations of new bat roosting opportunities overlaid on the master plan produced by Stainsby Architect and provided by email on 25 September 2018. Bat boxes are indicated with yellow dots and 'built in' roosting features with orange dots.

4.3 Nesting Birds

4.3.1 Mitigation

Any scrub or trees to be cleared must be removed outside of the nesting bird season (1st March to 31st August) unless features are first hand-searched by a suitably qualified ecologist and declared clear of any active bird nests. In the event that any active nests are identified a buffer of at least 5 meters will need to be created and the nest must be left undisturbed until the young have fledged.

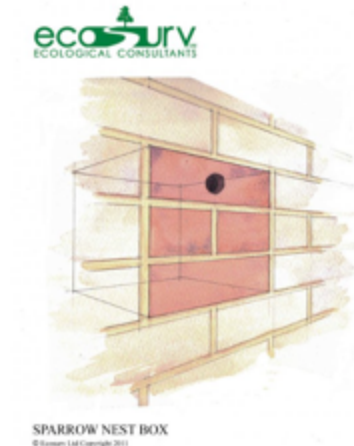
4.3.1 Enhancements

In order to enhance the site for nesting birds, ten nesting bird boxes (Five 1B, three 1N and two 3S Schwegler bird boxes) which can be purchased from <https://www.nhbs.com> will be put up across the site. Nest boxes should be installed high on trees along the western, northern and southern boundary. The 1B nest boxes should be installed at a height of 1.5metres whilst 1N and 3S boxes should be positioned at least 3m in height.

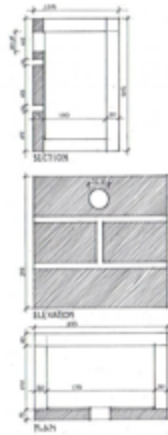
New nesting opportunities for house sparrows will be provided on four of the buildings. Two recommended boxes can be purchased from these links <https://www.nhbs.com/sparrow-box-smooth-brick> and <https://www.nhbs.com/1sp-schwegler-sparrow-terrace>. If individual sparrow boxes are used groups of 2 individual boxes would be recommended per building. If 1SP schwegler sparrow terrace are used 1 should be installed per building. Both examples can be incorporated into the fabric of the building. These boxes must be positioned at a minimum of 3 meters above the ground. Figure 5 indicates



proposed locations.

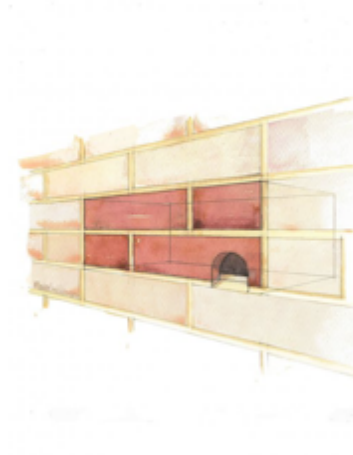


Sparrow Box – smooth brick

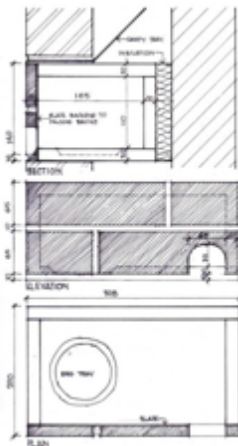


1SP Schwegler Sparrow Terrace

It is recommended that 8 new nesting opportunities are provided for swifts on 4 buildings. Two recommended boxes can be purchased from these links <https://www.nhbs.com/swift-box-smooth-brick> and <https://www.nhbs.com/schwegler-lightweight-swift-box-type-1a>. These boxes can be incorporated into the fabric of a building as it is built. They should be positioned at a minimum of 5 meters above the ground with clear unobstructed access to the entrance. They should be located within shaded areas out of direct sunlight or prevailing winds. Figure 5 indicates proposed locations.



Swift Box – Smooth Brick



Schwegler Lightweight Swift Box Type 1A



Figure 5. Proposed locations new bird nesting opportunities. House Sparrow boxes are indicated with red dots and swift boxes with purple dots. Bird boxes to be installed upon trees are shown with blue dots. These are subject to adjustment according to local circumstances to maximize their probability of uptake.

5 BIODIVERSITY CHANGE

5.1 Existing

The site presently supports low overall biodiversity value, with the arable habitat including a mixture of no more than 14 plant species (including the wheat crop), the majority of which are restricted only to the cultivated margins of the field where cultivation and herbicides will have had the least effect. It is therefore likely that at least 90% of the field by area supports less than 5 plant species. The total area of the arable field is 5.32Ha.

The poor semi-improved grassland margins that border the arable field includes 31 plant species and measure approximately 0.63Ha in area, representing a much greater biodiversity value and an improved grassland strip within the field that borders a row of mature trees includes 10 plant species and measures 0.16Ha in area.

Given the buffer areas that are proposed around the boundaries of the site and around the mature trees running through the middle of the site, the biodiversity change calculation for this site has focussed purely upon the change as a result of the development of the arable field and reversion of part of this field for wildlife benefit and proposed enhancements to the buffer strips.



5.2 Proposed Habitat Creation

5.2.1 Native Shrub Planting – Ancient Woodland buffer

The 18m buffer for the Ancient Woodland will be planted with shrubs and low trees. This will provide increased foraging habitat for bats plus nesting areas for birds once it becomes established and also to reduce public access to the Ancient Woodland and reduce the impact of degradation. Thorny species should be incorporated to reduce public access along with species identified within the woodland to retain consistency with the surrounding landscape. The recommended planting density is 1 tree per 1sqm. A minimum of 10 species should be chosen from the species recommended below:

- Hawthorn *Crataegus monogyna*
- Blackthorn *Prunus spinosa*
- Dog rose *Rosa canina*
- Sweet briar *Rosa rubiginosa*
- Butchers broom *Ruscus aculeatus*
- Wild cherry *Prunus avium*
- Hazel *Corylus avellana*
- Field maple *Acer campestre*
- Alder buckthorn *Rhamnus frangula*
- Dogwood *Cornus sanguinea*
- Rowan *Sorbus aucuparia*
- Elder *Sambucus nigra*
- Crab apple *Malus sylvestris*
- Wayfaring tree *Viburnum lantana*
- Guelder rose *Viburnum opulus*

5.2.2 Native Shrub Planting – Bund

Native shrubs and trees will be planted along the bund at the eastern boundaries of the site. This will create greater value habitat for a variety of birds and invertebrates and provide screening. Given the arrival of ash dieback, it is not recommended that any ash saplings are planted anywhere on the site. The recommended planting density is 1-2 tree per 1sqm. A minimum of 7 species should be chosen from the species recommended below:

- English Oak *Quercus robur*
- Field maple *Acer campestre*
- Hazel *Corylus avellana*
- Hawthorn *Crataegus monogyna*
- Wild Cherry *Prunus avium*
- Bird Cherry *Prunus padus*
- Rowan *Sorbus aucuparia*
- Elder *Sambucus nigra*
- Crab apple *Malus sylvestris*
- Dogwood *Cornus sanguinea*
- English Whitebeam *Sorbus aria*
- Wayfaring tree *Viburnum lantana*



It is best to plant while the trees are dormant between November and March in the absence of heavy frost. Guards to protect these hedge trees from rabbits and deer will be necessary for the first 3-5 years.

5.2.3 Wildflower Meadow Creation

A strip of wildflower habitat should be established on the inner face of the earth bund proposed at eastern corners of the site. The bund will be created with subsoil which will be a suitable growing base given its lower nutrient content. This will run the length of the bund, approximately 285m and be a minimum of 1.5m in width.

Wildflower habitat should also be established in other selective areas across the site such as around the sustainable drainage systems (SuDS) features. This will increase the value of this area as foraging habitat for bats and birds as well as pollinating insects.

To establish this as a wildflower area a process of light rotavating and seeding should be employed with good ground preparation essential to the success of the wildflower meadow. The sowing process is best undertaken between late August and the end of September during mild and wet weather best suited to seedling establishment or during mid-March to mid-May when the ground has sufficient moisture and there is very little risk of frosts. The rotavating process is to create an area of largely bare ground to allow the wildflower seed mix to establish. Sampling of soil nutrients should also be undertaken to establish the growing conditions present and ensure that nutrient levels are within the correct parameters for wildflower meadow propagation.

A suitable seed mixture containing not less than 25 wildflower and grass species should be sown across the ground at a density of four grams per square metre. The species included must all be of native British origin. A recommended seed mixture is EM5 – Meadow mixture for loamy soils, which is available from Emorsgate seeds (www.wildseed.co.uk). Table 1 details the composition of this mixture. Other commercial seed mixes are available.

As part of on-going management, the sward should be cut and gathered to a height of approximately 5cm at least three times in its first year of establishment to control the flush of annual weeds which will grow during the first growing season. Thereafter the sward should be cut (with all cuttings removed and composted) between mid-August and late September every year. Cutting in the spring (March/April) should be included if the sward grows too vigorously.

Table 1 – Composition of EM5 – Meadow mixture for loamy soils to be sown in areas across the site.

Wildflowers		
%	Latin name	Common name
0.5	<i>Achillea millefolium</i>	Yarrow
3	<i>Centaurea nigra</i>	Common Knapweed
1	<i>Daucus carota</i>	Wild Carrot
2.5	<i>Galium verum</i>	Lady's Bedstraw
0.3	<i>Geranium pratense</i>	Meadow Cranesbill
1.2	<i>Knautia arvensis</i>	Field Scabious
0.5	<i>Lathyrus pratensis</i>	Meadow Vetchling
0.4	<i>Leontodon hispidus</i>	Rough Hawkbit



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0.5	<i>Leucanthemum vulgare</i>	Oxeye Daisy
0.5	<i>Lotus corniculatus</i>	Birdsfoot Trefoil
1	<i>Malva moschata</i>	Musk Mallow
0.5	<i>Plantago lanceolata</i>	Ribwort Plantain
0.5	<i>Plantago media</i>	Hoary Plantain
1	<i>Primula veris</i>	Cowslip
1	<i>Prunella vulgaris</i>	Selfheal
2	<i>Ranunculus acris</i>	Meadow Buttercup
1	<i>Ranunculus bulbosus</i>	Bulbous Buttercup
1.5	<i>Rhinanthus minor</i>	Yellow Rattle
1	<i>Rumex acetosa</i>	Common Sorrel
0.1	<i>Trifolium pratense</i>	Wild Red Clover
Grasses		
8	<i>Agrostis capillaris</i>	Common Bent
3	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass (w)
3	<i>Briza media</i>	Quaking Grass (w)
32	<i>Cynosurus cristatus</i>	Crested Dogtail
10	<i>Festuca ovina</i>	Sheep's Fescue
20	<i>Festuca rubra</i>	Slender-creeping Red-fescue
3	<i>Phleum bertolonii</i>	Smaller Cat's-tail
1	<i>Trisetum flavescens</i>	Yellow Oat-grass (w)

5.2.4 SuDS Planting

One SuDS pond will be created upon the site. This will measure approximately 590m². This feature will be designed to provide ecological benefits through shaping and planting with native species.

A small area in the centre should be designed to retain water throughout the year. Ideally it will retain at least 20cm of water throughout the year (thus ensuring successful breeding by a number of amphibian and invertebrate species), though some drying of the pond can potentially have benefits for biodiversity. This would be best achieved through incorporating bentonite clay in to the pond bed within the centre of the feature, or meeting the natural groundwater level by excavating to the right depth. This will allow a natural earth bottom to be present for planting and to increase its wildlife value.

Aquatic plants will be introduced and must include a combination of marginal aquatic plants and oxygenating plants. This should include the following:

- Hornwort *Ceratophyllum derersum*,
- Curled pondweed *Potamogeton crispus*
- Water crowfoot *Ranunculus aquatica*
- Water mint *Mentha aquatica*,
- Water forget-me-not *Myosotis palustris*
- Purple loosestrife *Lythrum salicaria*
- Brooklime *Veronica beccabunga*
- Amphibious bistort *Polygonum amphibium*
- Yellow iris *Lysimachia vulgaris*

The plants listed above are available in early autumn and spring, dependent upon species, and should



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be planted as soon as possible following the establishment of this pond and settling period (where the pond finds its natural water level).

The gently sloping banks of the SuDS features should be sown with pond edge seed mixture to maximise its ecological value. A suitable seed mixture containing not less than 20 wildflower and grass species should be sown in this area at a density of four grams per square metre. The species included must all be of native British origin. A recommended seed mixture is EP1 – Pond Edge Mixture, which is available from Emorsgate Seeds (www.wildseed.co.uk). Table 2 details the composition of this mixture.

This wildflower habitat establishment and management can be carried out under the same methodology as detailed in section 4.2.2.

Table 2 – Composition of EP1 – Pond Edge Mixture to be sown on the banks of the SuDS basin

Wildflowers		
%	Latin name	Common name
1	<i>Achillea ptarmica</i>	Sneezewort
2.3	<i>Angelica sylvestris</i>	Wild Angelica
0.1	<i>Caltha palustris</i>	Marsh Marigold
0.6	<i>Eupatorium cannabinum</i>	Hemp Agrimony
3	<i>Filipendula ulmaria</i>	Meadowsweet
1	<i>Geum rivale</i>	Water Avens
0.4	<i>Hypericum tetrapterum</i>	Square-stalked St John's Wort
4	<i>Iris pseudacorus</i>	Yellow Iris
1	<i>Lotus pedunculatus</i>	Greater Birdsfoot Trefoil
0.8	<i>Lycopus europaeus</i>	Gypsywort
0.6	<i>Lythrum salicaria</i>	Purple Loosestrife
0.1	<i>Mentha aquatica</i>	Water Mint
0.1	<i>Pulicaria dysenterica</i>	Common Fleabane
2.5	<i>Ranunculus acris</i>	Meadow Buttercup
0.1	<i>Scrophularia auriculata</i>	Water Figwort
1	<i>Silene flos-cuculi</i> - (<i>Lychnis flos-cuculi</i>)	Ragged Robin
1	<i>Succisa pratensis</i>	Devil's-bit Scabious
0.4	<i>Vicia cracca</i>	Tufted Vetch
Grasses		
10	<i>Agrostis capillaris</i>	Common Bent
2	<i>Alopecurus pratensis</i>	Meadow Foxtail (w)
2	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass (w)
2	<i>Briza media</i>	Quaking Grass (w)
32	<i>Cynosurus cristatus</i>	Crested Dogstail
1	<i>Deschampsia cespitosa</i>	Tufted Hair-grass (w)
24	<i>Festuca rubra</i>	Slender-creeping Red-fescue
1	<i>Hordeum secalinum</i>	Meadow Barley (w)
6	<i>Schedonorus pratensis</i> - (<i>Festuca pratensis</i>)	Meadow Fescue (w)



5.2.5 Swale Planting

Swales will be located along much of the southern boundary of the site and along the access road. These will cover an area of approximately 660m². This feature will be designed to provide ecological benefits through shaping and planting with native species.

The gently sloping banks of the swales should be sown with wetland seed mixture to maximise the ecological value of these features. A suitable seed mixture containing not less than 20 wildflower and grass species should be sown in this area at a density of four grams per square metre. The species included must all be of native British origin. A recommended seed mixture is EM8 – Meadow mixture for wetlands, which is available from Emorsgate Seeds (www.wildseed.co.uk). Table 3 details the composition of this mixture.

This wildflower habitat establishment and management can be carried out under the same methodology as detailed in section 4.2.2.

Table 3 – Composition of EM8 – Meadow mixture for wetlands to be sown within the swales.

Wildflowers		
%	Latin name	Common name
0.5	<i>Achillea millefolium</i>	Yarrow
0.2	<i>Achillea ptarmica</i>	Sneezewort
1	<i>Betonica officinalis</i> - (<i>Stachys officinalis</i>)	Betony
2.5	<i>Centaurea nigra</i>	Common Knapweed
2	<i>Filipendula ulmaria</i>	Meadowsweet
1.5	<i>Galium verum</i>	Lady's Bedstraw
0.4	<i>Geum rivale</i>	Water Avens
0.6	<i>Leucanthemum vulgare</i>	Oxeye Daisy
0.8	<i>Lotus pedunculatus</i>	Greater Birdsfoot Trefoil
1	<i>Plantago lanceolata</i>	Ribwort Plantain
0.2	<i>Primula veris</i>	Cowslip
1.5	<i>Prunella vulgaris</i>	Selfheal
2.5	<i>Ranunculus acris</i>	Meadow Buttercup
1.5	<i>Rhinanthus minor</i>	Yellow Rattle
1.5	<i>Rumex acetosa</i>	Common Sorrel
1	<i>Sanguisorba officinalis</i>	Great Burnet
0.2	<i>Silene flos-cuculi</i> - (<i>Lychnis flos-cuculi</i>)	Ragged Robin
0.6	<i>Succisa pratensis</i>	Devil's-bit Scabious
0.5	<i>Vicia cracca</i>	Tufted Vetch
Grasses		
10	<i>Agrostis capillaris</i>	Common Bent
2	<i>Alopecurus pratensis</i>	Meadow Foxtail (w)
2	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass (w)
1	<i>Briza media</i>	Quaking Grass (w)
32	<i>Cynosurus cristatus</i>	Crested Dogstail
1	<i>Deschampsia cespitosa</i>	Tufted Hair-grass (w)
24	<i>Festuca rubra</i>	Slender-creeping Red-fescue
1	<i>Hordeum secalinum</i>	Meadow Barley (w)



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7	<i>Schedonorus pratensis</i> - (<i>Festuca pratensis</i>)	Meadow Fescue (w)
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5.2.6 Orchard Planting

A community orchard is proposed at the north east corner of the site. Orchards are a Biodiversity Action Plan (BAP) habitat and are important for a range of species. This habitat will provide greater value for a variety of birds and invertebrates and in turn foraging bats. A mixture of different fruit species should be considered:

- Apple *Malus spp.*
- Pear *Pyrus spp.*
- Plum *Prunus spp.*
- Damson *Prunus spp.*
- Cherry *Prunus spp.*
- Quince *Cydonia spp.*

Trees should be spaced with a minimum of 7m between them to allow them to establish to their potential and reduce the susceptibility and spread of pests and disease.

Bare root trees should be planted between November and March. Potted trees can be planted out at any time of the year although if this is timed within the summer it must be kept well-watered. Planting should avoid times of drought, hard frost or waterlogged conditions.

Tree will require supports stakes which should be driven into the ground prior to planting to prevent damage to roots.

These orchard trees will need to be protected from rabbits and deer. This could be achieved through deer fencing the orchard or using guards on each individual tree which would likely be necessary for the first 3-5 years.

5.2.7 Enhancement of Southern Tree Line

The southern tree line is defunct and species poor and should be enhanced through the planting of native shrubs. Currently ash *Fraxinus excelsior* is dominant here with some sycamore *Acer pseudoplatanus*, hawthorn *Crataegus monogyna*, pedunculate oak *Quercus robur*, holly *Ilex aquifolium*, blackthorn *Prunus spinosa*, rose *Rosa spp.* and bramble *Rubus fruticosus* present.

A mixture of the following species should be planted at a density of no less than one tree per two linear metres to enhance this feature:

- Blackthorn *Prunus spinosa*
- Hawthorn *Crataegus monogyna*
- Spindle *Euonymus europaeus*
- Dogwood *Cornus sanguinea*
- Wayfaring-tree *Viburnum lantana*
- Field or dog rose *Rosa arvensis/ Rosa canina*
- Guelder rose *Viburnum opulus*
- Field maple *Acer campestre*
- Wild privet *Ligustrum vulgare*



- Hazel *Corylus avellana*

5.2.8 Biodiversity Metric Calculation

Table 3 and 4 below detail the biodiversity unit for each of the habitats based on the habitat distinctiveness and condition and the area of habitat present. These have been calculated for the current site and the future target. The conditions of the future proposed habitats have been assumed as good based on the proposed management detailed within this document. The exception is where the condition of the improved grassland has been assumed as moderate as this is expected to have high use by residents.

The current site biodiversity value is calculated as: 7.60. The future target value is calculated as: 11.06. Therefore, there will be a proposed increase in the site biodiversity value of 3.46.

There is a low establishment risk associated with creating the traditional orchard and pond (SuDS) and a low risk factor associated with restoration of the hedgerow³. The risk factor associated with creating species rich drains, ryhnes and ditches or neutral grassland (wildflower habitat) is unknown and not provided in the guidance used. Based on these there is a low risk associated with the creation of these habitats and the increase in biodiversity anticipated can be considered at face value as the multiplier associated stands at 1. Therefore, mitigation to manage risk involved are not deemed necessary.

There will be a mismatch between the timing of the impact and the offset. Therefore, it is recommended that the creation of the traditional orchard and enhancement of the hedgerow is completed ahead of the impact/development. All other habitats will be created during and post construction due to the practicality of this and the risk of construction activity impacting these habitats during their more sensitive establishment phase.

Table 4. Calculation table for total current site biodiversity value

Habitat	Distinctiveness	Condition	Biodiversity units per hectare	Area of habitat (ha)	Total biodiversity unit
Cereal crop	Low (2)	Poor (1)	2	2.65	5.30
Grassland probably improved	Low (2)	Moderate (2)	4	0.32	1.28
Improved grassland	Low (2)	Moderate (2)	4	0.06	0.24
Non-important hedgerow	High (6)	Poor (2)	6	0.13	0.78
Total current site biodiversity metric					7.60

Table 5. Calculation table for total future target site biodiversity value

Habitat	Distinctiveness	Condition	Biodiversity units per hectare	Area of habitat (ha)	Total biodiversity unit
Traditional orchard	High (6)	Good (3)	18	0.36	6.48



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Pond – BAP priority pond (SuDS)	High (6)	Good (3)	18	0.06	1.08
Species rich drains, rhynes and ditches (Swales)	High (6)	Good (3)	18	0.06	1.08
Other neutral grassland (wildflower meadow)	Medium (4)	Good (3)	12	0.08	0.96
Non-important hedgerow	High (6)	Good (3)	18	0.13	2.34
Improved grassland	Low (2)	Moderate (2)	4	0.17	0.68
Total future target site biodiversity metric					11.06

6 POST CONSTRUCTION MANAGEMENT

6.1 Management Plan Operations

6.1.1 Wildflower Habitat

The sward should be cut and gathered to a height of approximately 5cm at least three times in its first year of establishment to control the flush of annual weeds that will grow during the first growing season and suppress faster growing grass species. This will subsequently encourage the establishment of less competitive flowering species.

The cuttings must be gathered after each mowing to prevent soil from becoming nutrient-rich.

As part of on-going management, the wildflower meadow should be cut and gathered each year to a height of approximately 60mm after flowering in July and August. This process can be carried out through, strimming or tractor mowing. This is important to ensure that species diversity of the area is maintained, and grass species do not become dominant. Where necessary, a second cut could be taken in March each year if the sward is growing too coarsely. The grassland should not be cut between the mid-April and mid-August so that plants are given the opportunity to flower.

The cuttings must be gathered after each mowing to prevent soil from becoming too nutrient rich. These can be collected and composted or used to build hibernacula that will support hibernating amphibians on a patch of ground that will remain dry throughout the year and well away from the pond or watercourses.

6.1.2 Planted Trees and Shrubs

Weeds must be controlled at the base of the trees during the first three years.

Tree guards to protect the new saplings from rabbits and deer should be inspected yearly for first 3-5 years and then removed if well established.



Replacement planting will be required where trees fail to establish or where signs of disease are identified.

All planted trees and shrubs must only be cut outside the bird nesting season (1st March to 31st August) and where possible hedges shouldn't be cut until February, so that valuable winter food associated with fruiting hedge trees is retained for over-wintering birds.

6.1.3 Orchard Trees

A 1m diameter circle from the tree base should be kept free from vegetation for the first 3 years. This can be achieved through mulching.

Where tree guards are used these should be inspected yearly for first 3-5 years and then removed if planting well established.

Replacement planting will be required where trees fail to establish.

6.1.4 Bat and Bird Boxes

Bat and bird boxes on trees would be inspected to check they had not become detached or damaged each year.

Should you need any further advice on the information provided above, please do not hesitate to contact The Ecology Co-op.

7 APPENDIX 1 –Wildlife Legislation and National Planning Policy

Introduction

The following text is intended for general guidance only and does not constitute comprehensive professional legal advice. It provides a summary of the current legal protection afforded to wildlife in general and certain species. It includes current national planning policy relevant to nature conservation.

The ‘Birds Directive’, ‘Habitats Directive’ and ‘Natura 2000 Sites’.

The Council Directive 79/409/EEC on the Conservation of Wild Birds (“the Birds Directive”) sets a framework for the protection of wild birds. Under the directive, several provisions are made including the designation and protection of ‘Special Protection Areas’ (SPAs) – areas which support important bird populations, and the legal protection of rare or vulnerable species.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the “Habitats Directive”) directs member states of the EU to take measures to maintain favourable conservation status of important habitats and species. This requires the designation of a series of sites which contain important populations of species listed on Annex II of the directive (for example Bechstein’s bat *Myotis bechsteinii*, Barbastelle bat *Barbastella barbastellus* and white-clawed crayfish *Austropotamobius pallipes*. Together with ‘Special Areas of Conservation’ (SPAs), designated under the Birds Directive, SACs form a network across Europe of protected areas known as the ‘Natura 2000 sites’.

Annex IV lists species in need of more strict protection, these are known as “European Protected Species (EPS)”. All bat species, common dormice *Muscardinus avellana*, otter *Lutra lutra* and great crested newts *Triturus cristatus* are examples of EPS that are regularly encountered during development projects.

The ‘Habitats Regulations’

The Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) is the principle means of transposing the Habitats Directive and the Birds Directive, and updates the Conservation (Natural Habitats, &c.) Regulations 1994 (“the 1994 regulations”) in England and Wales.

‘Natura 2000’ sites receive the highest level of protection under this regulation which requires that any activity within the zone of influence of these sites would be subject to a Habitats Regulations Assessment (HRA) by the competent authority (e.g. planning authority), leading to an Appropriate Assessment (AA) in cases where ‘likely significant effects on the integrity of the site are identified.

For European Protected Species, Regulation 41 makes it a criminal offence to;

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb wild animals of such species;
- Deliberately take or destroy their eggs (where relevant);
- Damage or destroy a *breeding or resting place* of such an animal;
- Possess, control, sell or exchange any live or dead animal or plant, of such species;
- Deliberately pick, collect, cut, uproot or destroy a wild plant of such species.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for



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specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the ‘three derogation tests’) are met:

- A licence can be granted for the purposes of “preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment” (Regulation 53 (2) (e)).
- A licence can be granted if “there are no satisfactory alternatives” to the proposed action.
- A licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Wildlife and Countryside Act (1981) as amended.

This remains one of the most important pieces of wildlife legislation in the UK. There are various schedules to the Act protecting birds (Schedule 1), other animals including insects (Schedule 5), plants (Schedule 8), and control of invasive non-native species (Schedule 9).

Under the Wildlife and Countryside Act (WCA) 1981, all wild birds (with the exception of those listed on Schedule 2), their eggs and nests are protected by law and it is an offence to:

- Take, damage or destroy the nest of any wild bird while it is in use or being built.
- Take or destroy the egg of any wild bird.
- Disturb any bird listed on Schedule 1, while it is nest building, or at a nest with eggs or young, or disturb the dependant young of any such bird.

Schedule 5 lists all non-avian animals receiving protection to a varied degree. At its strongest, the Act makes it an offence to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturb animals while occupying such places. Examples of species with *full protection* include all EPS, common reptile species, water vole *Arvicola amphibius*, white-clawed crayfish *Austropotamobius pallipes* and Roman snail *Helix pomatia*. Other species are protected from sale, barter or exchange only, such as white letter hairstreak *Satyrrium w-album*.

The Act makes it an offence to intentionally pick, uproot or destroy any plant or seed, and sell or possess any plant listed on Schedule 8. It is also an offence to intentionally uproot any wild plant not listed on Schedule 8 unless authorised [by the land owner]. Species on Schedules 5 and 8 are reviewed every 5 years when species can be added or removed.

Measures for the prevention of spreading non-native species which may be detrimental to native wildlife is included in the Act, which prohibits the release of animals or planting of plants into the wild of species listed on Schedule 9 (for example Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandifera*, New Zealand Pygmyweed *Crassula helmsii*).

The Wildlife and Countryside Act 1981 (as amended) also prohibits certain inhumane methods of traps and devices for the capture or killing of wild animals and certain additional methods such as fixed trap, poisoning with gas or smoke, or spot-lighting with vehicles for killing species listed on Schedule 6 of the Act (this includes all bat species, badger, otter, polecat, dormice, hedgehog and red squirrel).

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

The NERC Act (2006) created the statutory nature conservation body Natural England, and places a



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statutory duty on all public bodies, including planning authorities, under Section 40, to take, or promote the taking by others, steps to further the conservation of *habitats and species of principal importance for the conservation of biodiversity* in England (commonly referred to as the 'Biodiversity Duty'). This duty extends to all public bodies the biodiversity duty of Section 74 of the Countryside and Rights of Way (CROW) Act 2000, which placed a duty only on Government and Ministers. Section 41 of the NERC Act lists the habitats and species of principle importance. This includes a wide range of species from mosses, vascular plants, invertebrates through to mammals and birds. It originates from the priority species listed under the UK Biodiversity Action Plan (UK BAP) with some omissions and additions.

Protection of Badgers Act (1992)

The Badger *Meles meles* is afforded specific legal protection in Britain under the Protection of Badgers Act (1992), and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) (see above).

Under this legislation, it is a criminal offence to:

- intentionally kill, injure, take, possess, or cruelly ill-treat, a Badger, or to attempt to do so;
- interfere with a sett, by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

A licence may be obtained from Natural England to permit certain prohibited actions for a number of defined reasons including interference of a sett for the purpose of development, provided that a certain number of conditions are met. Note that licenses are not normally granted for works affecting badgers between the end of November and the start of July.

National Planning Policy Framework

The National Planning Policy Framework (NPPF 2012) sets out the Government's view on how planners should balance nature conservation with development and helps ensure that Government meets its biodiversity commitments with regard to the operation of the planning system.

The NPPF states that the wider benefits of an ecosystem should be recognised, and the presence of a protected species is a material consideration for a development proposal (Circular 06/2005, 2005).

In accordance with the NPPF, it is important that developments should contribute to and enhance the natural and local environment by:

- Minimising impacts on existing biodiversity and habitats,
- Providing net gains in biodiversity and habitats, wherever possible,
- establishing coherent ecological networks that are more resilient to current and future pressures.

UK Post-2010 Biodiversity Framework

The UK Biodiversity Action Plan (UK BAP), first published in 1994, was the UK's response to the commitments of the Rio Convention on Biological Diversity (1992) until 2010, when the UK BAP was replaced by the UK Post-2010 Biodiversity Framework. This framework covers the period 2011 to 2020 and forms the UK government's response to the new strategic plan of the United Nations Convention on Biodiversity (CBD) published in 2010. This promotes a focus on individual countries delivering target for protection for biodiversity through their own strategies.



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The most recent biodiversity strategy for England, 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' was published by Defra (2011), and a progress update was provided in July 2013 (Defra 2013).

'Biodiversity 2020' builds on the Natural Environment White Paper for England – 'The Natural Choice', published on 7 June 2011, and sets out the strategic direction for biodiversity policy for the next decade. Biodiversity 2020 deliberately avoids setting specific targets and actions for local areas and species because the Government believes that local people and organisations are best placed to decide how to implement the strategy in the most appropriate way for their local area or situation.

In Havant, development must:

- Protect and where possible enhance the borough statutory and non-statutory designated landscapes, habitats and features of hydrological and geological interest. Which can be achieved by appropriate mitigation measures including creation of new habitats and water bodies/courses or planting of new trees and woodlands. Attention should be paid to: SPAs, SACs, SSSIs, NNRs, SINC and LNRs.
- Support an ongoing programme of survey of habitats and species and designation of Sites of Importance for Nature Conservation.
- Ensure partnership working with landowners to ensure land management practices restore and enhance where possible new valued landscapes, habitats and their soil structure, particularly the ancient woodland remnants of the Forest of Bere.
- Protect wildlife corridors to prevent the fragmentation of existing habitats and to allow species like Brent Geese to respond to the local affects of climate change⁴

Birds of Conservation Concern (BoCC)

In 1996, the UK's leading non-governmental bird conservation organisations listed the conservation status of all bird species in the UK against a series of criteria relating to their population size, trends and relative importance to global conservation. The lists, known as the 'Red', 'Amber' and 'Green' lists (in order of decreasing concern) are used to inform key conservation policy and decisions. The lists are reviewed every 5 years and are a useful reference for determining the current importance of a particular site for birds. The most recent review was undertaken in 2015 (Eaton et al, 2015), which provides an up to date assessment of the conservation status of birds in the UK.

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⁴ Havant Borough Council – Havant Borough Council Core Strategy Local Development Framework (March 2011) [Currently forming a Local Plan stretching to 2036]



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8 APPENDIX 4 Reducing impacts of artificial light

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts on other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness. Guidelines issued by the Bat Conservation Trust⁵ should be considered while designing the lighting scheme. This includes the following measures:

Do not:

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

Avoid:

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

Do:

- consider employing a competent lighting designer who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- minimise the spread of light to at, or near horizontal and ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required.
- consider the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures.
- consider no lighting solutions where possible such as white lining, good signage, and LED cats eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times.
- use temporary close-boarded fencing until vegetation matures, to shield sensitive areas from lighting.
- limit the times that lights are on to provide some dark periods. The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.

⁵ Bat Conservation Trust (2014) Artificial Lighting and Wildlife - Interim Guidance: Recommendations to help minimise the impact artificial lighting. Available at: http://www.bats.org.uk/pages/bats_and_lighting.html

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Further reading:

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Royal Commission on Environmental Pollution (2009) *Artificial light in the environment*. HMSO, London.
Available at: <https://www.gov.uk/government/publications/artificial-light-in-the-environment>

Rich, C., Longcore, T., Eds. (2005) *Ecological Consequences of Artificial Night Lighting*. Island Press.
ISBN 9781559631297.

CPRE (2014) *Shedding Light: A survey of local authority approaches to lighting in England*. Available
at: <http://www.cpre.org.uk/resources/countryside/dark-skies/item/3608-shedding-light>

Planning Practice Guidance guidance (2014) *When is light pollution relevant to planning?* Available
at: <https://www.gov.uk/guidance/light-pollution>

Institution of Lighting Professionals (2011) *Guidance Notes for the Reduction of Obtrusive Light*
GN01:2011. Available at: <https://www.theilp.org.uk/resources/free-resources/>