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Phase 2 Ecology Surveys

Rev 03

Land West of Tye Lane, Walberton, West Sussex

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Report Summary

1. David Wilson Homes instructed the Ecology Co-op to undertake a Phase 1 Habitat survey and Preliminary Ecological Appraisal on an area of Land to the West of Tye Lane, Walberton, West Sussex. This was completed in February 2018 and based on the findings of this assessment, presence/absence surveys for reptiles, dormice, and breeding birds were recommended, together with activity surveys for bats. This report presents the findings of these surveys, which were carried out between March 2018 and September 2018.

2. In August 2020, an additional parcel of land was added to the original scheme which comprises a small residential garden along the southern boundary. A repeat site walkover was undertaken on the 13th August 2020 to assess the new parcel of land and assess the condition of the land included in the original scheme.

3. The site is approximately 7.4 Ha in area and comprises four fields used for grazing horses and one large arable field (Field 1). There are a number of ditches throughout the site with surrounding dense scrub patches along the boundaries of the site. There are hedgerows bordering all fields and improved grassland makes up the majority of Fields 2, 3, 4 and 5.

4. The surveys confirmed the presence of hazel dormouse, reptiles and seven species of foraging and commuting bats, including the rare barbastelle *Barbastella barbastellus*. The proposed development would potentially result in impacts on these species through habitat loss and disturbance to foraging, flight paths and artificial light.

5. The potential impacts, options for impact avoidance and mitigation measures for bats, breeding birds, reptiles and common dormouse are outlined in this report. However, it is recommended that a detailed Mitigation and Enhancement Report is produced as part of the detailed design for the Scheme to ensure that unacceptable impacts to protected species are avoided.

6. A Biodiversity Impact Calculation (using the DEFRA Metric) will be required to demonstrate net gain in biodiversity and demonstrate compliance with the NPFF. With the retention existing habitats and creation of new habitats (eg. hedgerows, wildflower meadows, ponds) it is considered that a residential development within the site could potentially result in a net-gain in biodiversity.

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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INTRODUCTION

1.1 Background to the Proposed Development

Henry Adams Ltd intend to submit a planning application for the development of an area of land to the west of Tye Lane, Walberton, West Sussex to support up to 155 new residential dwellings. The National Grid Reference for the centre of the site is approximately SU 968 063 and the closest postcode to the site is BN18 0LU. The ecological impact assessments in this report are based on the proposed layout for the Scheme provided by David Wilson Homes.

1.2 The Site

This site is approximately 7.4 Ha in area and comprises a single arable field and four pastoral fields used for grazing of horses. There are numerous ditches running through the land and the fields are divided by a mixture of hedgerows and stock fencing. There are a number of residential properties to the west, south and east whilst there are arable fields, the A27 and ancient woodland to the north.

1.3 Purpose of this Report

A Phase 1 Habitat survey and Preliminary Ecological Appraisal, completed by the Ecology Co-op on the 9th February 2018, identified the potential for reptiles, dormice, bats and breeding birds to be present on the site. As such, Phase 2 surveys for each of these species/taxonomic groups were recommended.

These surveys commenced in March 2018 and were completed by September 2018. This report provides details of the findings from these surveys and an outline of the potential impacts of the proposed development, together with an indication of impact avoidance and mitigation measures likely to be required for the development to proceed.

This work has been overseen by Jess Burkitt, a graduate member of the Chartered Institute for Ecology and Environmental Management (CIEEM) and Paul Whitby, a full member of CIEEM and a Chartered Ecologist (CEcol). This assessment has adhered to the CIEEM Guidelines for Ecological Impact Assessment¹. Reference to this method of impact appraisal can be viewed in Appendix 5 of this report.

These surveys and report were carried out and produced at the request of Henry Adams Ltd.

1.4 Policy and Legislation

Legal protection applying to relevant bird, mammal, herpetofauna and invertebrate species and current nature conservation planning policy is outlined in Appendix 1 of this report.

¹ CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*

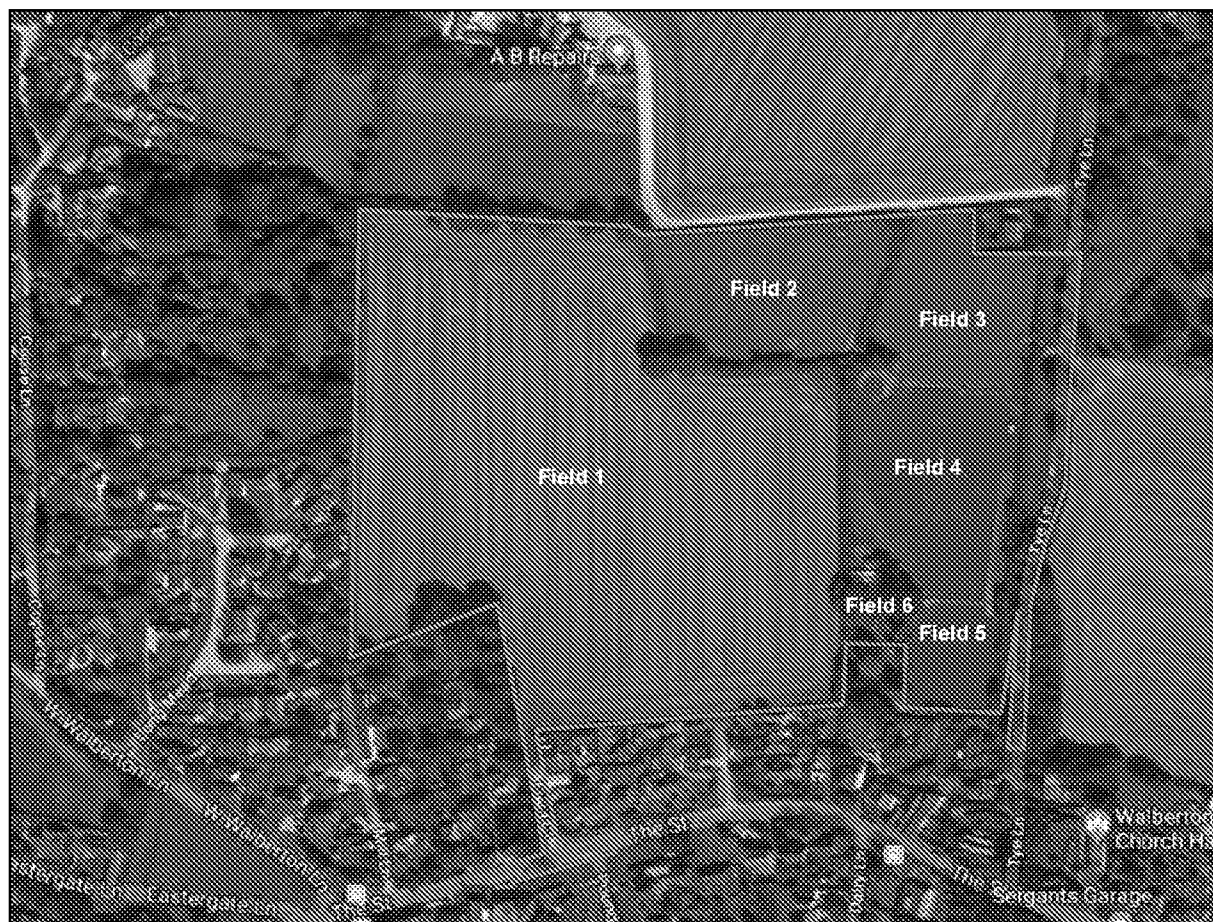


Figure 1. An aerial image showing the location of the site with the site boundary outlined in red. Image produced courtesy of Google Maps (Map data ©2018 Google).

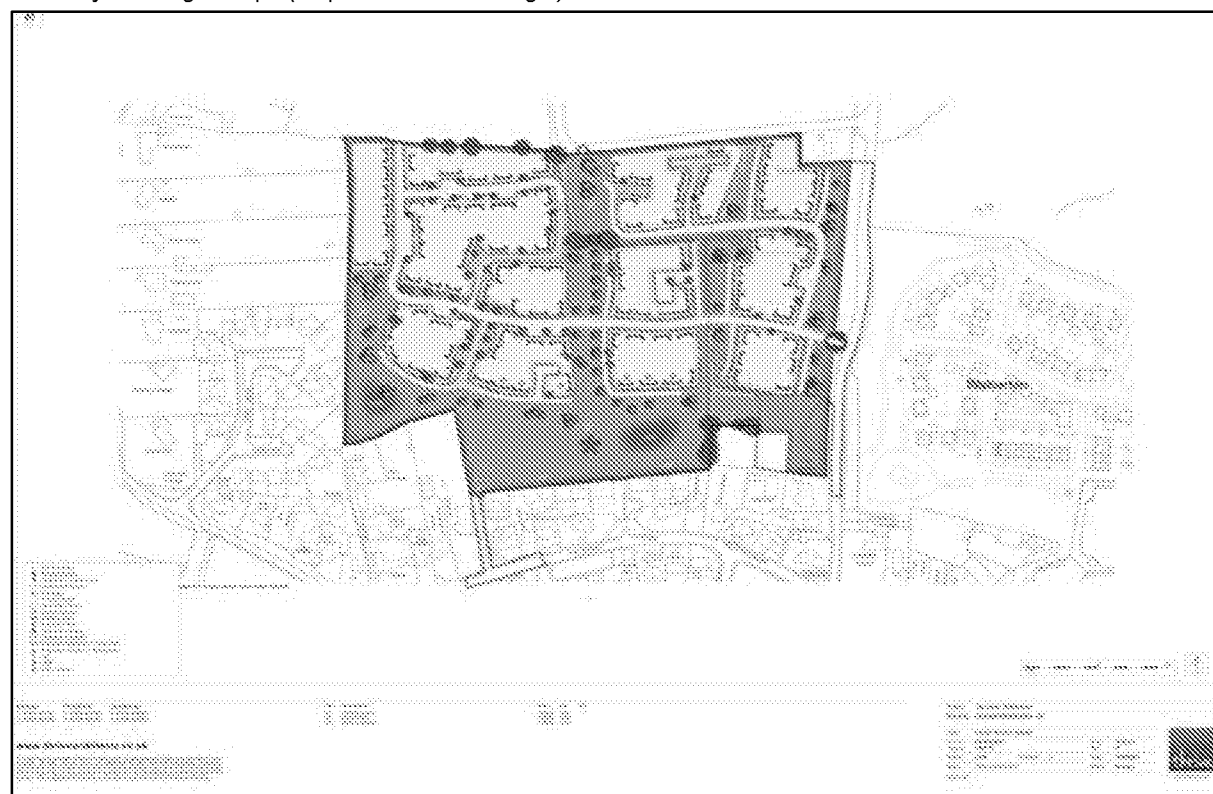


Figure 2. The proposed layout within the Land West of Tye Lane, Walberton. Plans provided by Barratt Homes Ltd.



2 SURVEY METHODOLOGY

All methodologies used in the Phase 2 surveys are in accordance with current best practice guidance for the respective specie/taxonomic groups, as detailed below.

2.1 Bats

2.1.1 Natural Roosting Habitats - Trees

The Phase 1 PEA identified a number of trees exhibiting potential roost features and suggested that there may be more trees with potential roost features that were not visible at the time of the initial site visit. Therefore, an additional walkover survey was conducted on 26th March 2018 to assess all trees within the site. Each tree was inspected from the ground using binoculars for features which could potentially support roosting habitat for bats. Features of interest include woodpecker holes, loose bark, cracks and splits in limbs, natural holes and hollows and cavities were noted.

Where access allowed, trees with potential roost features were subject to a climbing inspection to look for signs of occupation by bats and categorise the trees according to their potential to support roosting bats in accordance with Collins 2016². Each tree was climbed, and each feature was inspected with the use of an endoscope for evidence of use by roosting bats, or for the suitability of the feature to potentially support roosting bats. Each feature was categorised as supporting a high, medium, low or negligible suitability to support roosting bats in accordance with Collins (2016) (see Table 1 below). Each tree supporting a moderate or high classification was tagged in the field.

The climbing inspections were undertaken on the 26th March 2018 by Dr Ryan Walker, MCIEEM, CEnv (Natural England license holder: 2015-16736-CLS-CLS- Bat Survey Level 2. Dr Walker is also qualified to access trees using ropes and harnesses through a City and Guilds qualification.

Table 1. Characterising Potential roost features in trees.

Category	Description
Negligible	A tree with negligible roosting habitat features likely to be used by bats.
Low	A tree of sufficient size to potentially support roosting features, but with none seen from the ground or features identified of limited roosting potential.
Medium	A tree with one or more potential roost sites that could be used by bats due to their size, conditions and surrounding habitat, but unlikely to support a roost of high conservation status such as a maternity or hibernation roost.
High	Trees with one or more potential roost sites that appear suitable for large numbers of bats or use as maternity or hibernation roosts.

2.1.2 Bat Activity Surveys – Walked Transects

Bat activity surveys followed current standard best practice guidelines (Collins 2016). Six bat activity surveys were undertaken by three ecologists across the site who each walked a specific assigned route across the site to collect bat activity data from the whole of the site (see Figures 3,4 & 5). The transect routes were walked at a slow pace during the period from sunset to 2 hrs after sunset by a team of surveyors such that each part of the route was passed approximately every 15 minutes. Assigned

² Collins, J.(ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.



'stopping points' were marked on each transect and each surveyor stopped at each point for around 5 minutes and recorded bat activity at that location.

All surveys were undertaken during weather conditions suitable for bat activity and at ambient temperatures above 10°C. Weather conditions, timings and temperature during each survey visit is presented in Table 15 in Appendix 2. The surveyors recorded bat activity using 'Echo Meter Touch' bat detectors featuring auto-identification of bat species and automatically triggered recording for later review. The locations of all bat 'registrations' was recorded onto a field map during the survey to correspond with all sound recordings.

During all six bat activity surveys, the assigned routes had to be altered due to access restrictions created by the landowners sectioning off certain areas of Fields 2, 3 and 4 with electric fencing. These routes are depicted in Figures 3, 4 and 5.

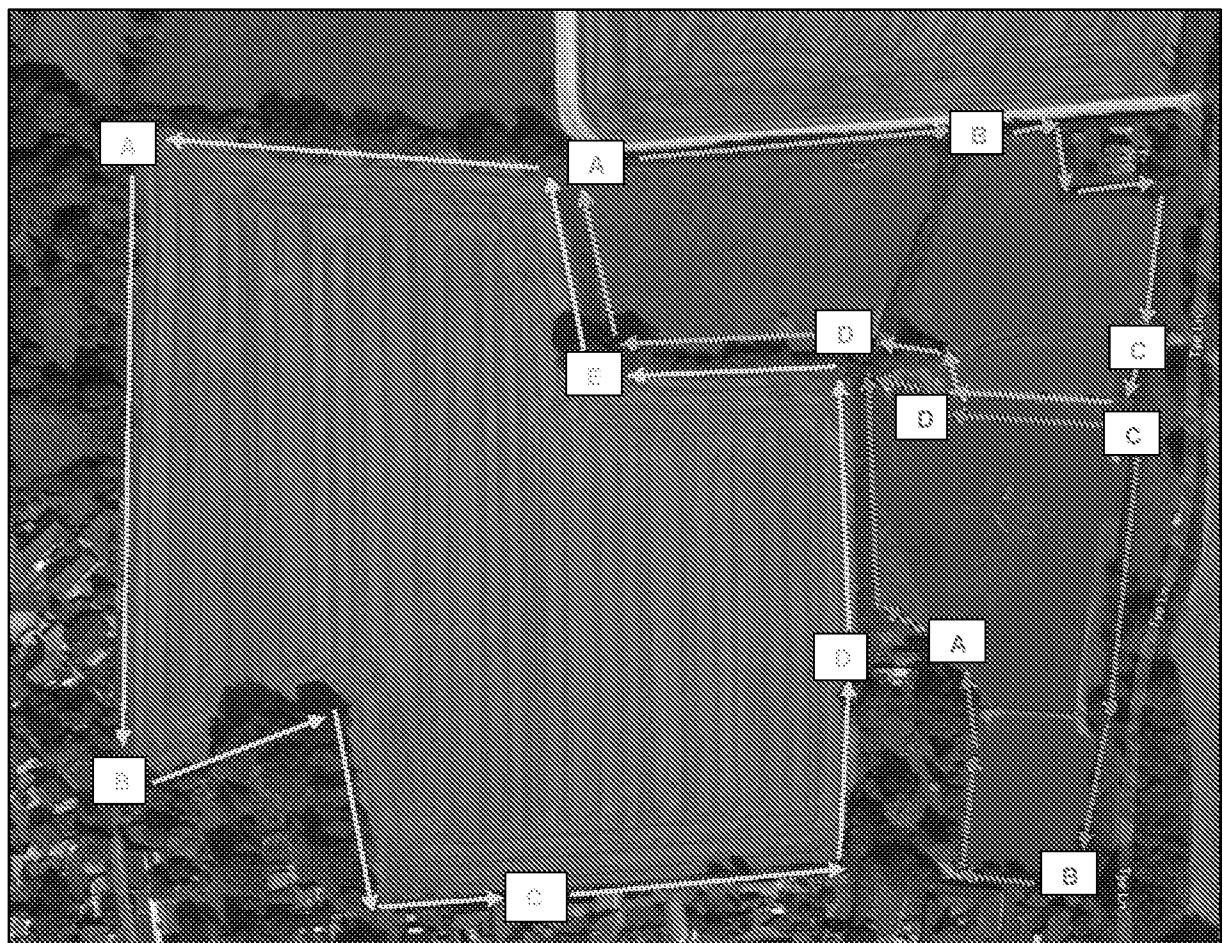


Figure 3. Transect routes walked with stopping points during all bat activity surveys around Fields 1 (yellow arrows), Field 2 and 3 (blue arrows) and Fields 4 and 5 (red arrows) in April and May 2018. Images produced courtesy of Google maps (Map data ©2018 Google).



Figure 4. Transect routes walked and stopping points during all bat activity surveys around Fields 1 (yellow and blue arrows), Field 2 (yellow arrows) and Fields 3, 4 and 5 (red arrows) in June 2018. Images produced courtesy of Google maps (Map data ©2018 Google).



Figure 5. Transect routes walked and stopping points during all bat activity surveys around Fields 1 (yellow and blue), Field 2 (blue arrows) and Fields 3, 4 and 5 (red arrows) in July, August and September 2018. Images produced courtesy of Google maps (Map data ©2018 Google).



produced courtesy of Google maps (Map data ©2018 Google).

2.1.3 Bat Activity Surveys – Static Bat Loggers

Three static bat detectors (Batlogger A+ and Peersonic Detector Full Spectrum Recorder RPA2 enclosed within a waterproof IP67 box) were deployed across the site on three separate occasions, the 9th May 2018, the 16th July 2018 and 27th September 2018. These were left in the field for a minimum of 5 days, which is the expected maximum lifetime of the battery. These are passive recording devices with real-time full spectrum recording of calls that can be viewed in detail once downloaded on analysis software, allowing accurate identification of most bat calls to species level (or genus level in the case of *Myotis* and *Plecotus spp.*).

These two methodologies complement each other with the transect surveys providing information on foraging and commuting patterns across the site and automated static detector surveys giving more extensive coverage over the whole of the active foraging period for bats, thus increasing the likelihood of detecting scarce species.

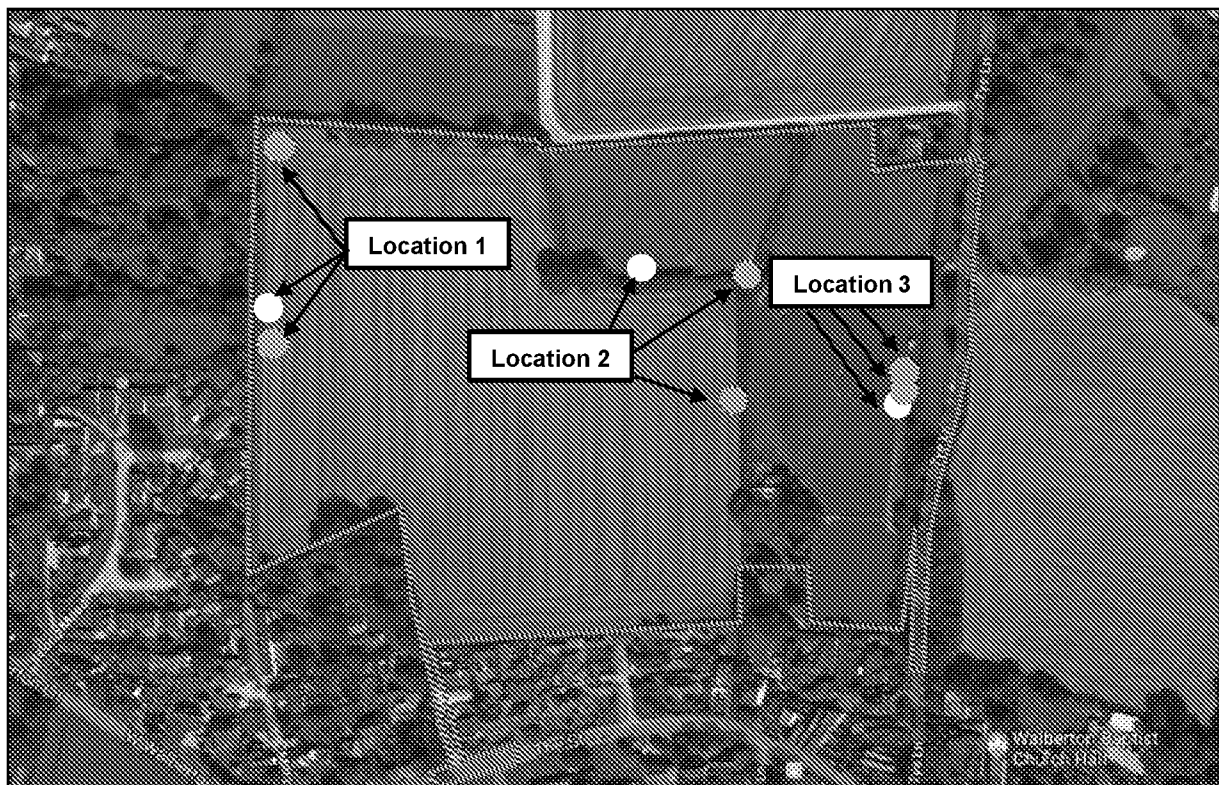


Figure 6. The locations of the static loggers deployed within the site on the 9th May (blue dots), 16th July (orange dots) and 27th September 2018 (yellow dots). Images produced courtesy of Google maps (Map data ©2018 Google).

2.2 Breeding Birds

The method used in this survey is based on the Breeding Bird Survey (BBS) methodology, designed by the British Trust for Ornithology (BTO) as an accessible means of monitoring British bird population trends over the UK using volunteers and is frequently adapted for ecological impact assessments. Three survey visits were undertaken to provide an accurate ‘snapshot’ of the bird assemblages present at the site.



A standardised transect was walked on each visit, during which the surveyor recorded all birds encountered. As recommended in the BTO guidelines, all bird survey visits were carried out between 6am and 9am and were only undertaken during favourable weather conditions for bird activity. Periods of persistent or heavy rain, high winds or fog were avoided. The transect route follows the boundary of the proposed development site. This was walked at a constant slow pace by a competent bird observer, recording all birds detected either by sight or call/song. The transect route was split into numbered sections and birds were counted within each of these sections.

Notes about the behaviour of birds identified were made to determine their breeding status. Birds were said to be 'confirmed as breeding' if they were observed carrying nesting material, food, faecal pellets or nests, eggs, or recently fledged young were discovered. Birds recorded were 'likely breeding' if observed singing or displaying, repeatedly visiting the same locations and showing agitated or distracted behaviour.

A summary of the weather conditions for these surveys is shown in Table 2 below.

Table 2. Details of the breeding bird surveys undertaken at Land West of Tye Lane, Walberton.

Survey date	Survey time	Weather notes	Surveyor
17 th April 2018	07:30-08:30	12 degrees Celsius and 10-15 mph wind, 90% cloud cover	Paul Whitby BSc, MCIEEM, CEcol
10 th May 2018	07:10 – 08:05	13 degrees Celsius and 0-5 mph wind, 10% cloud cover, sunny	Paul Whitby BSc, MCIEEM, CEcol
14 th June 2018	05:15-06:30	10 degrees Celsius, overcast, 10-15 mph wind, 100% cloud cover	Dr Ryan Walker PhD, MCIEEM, CENv

In the UK, the conservation status of birds is recorded by the Royal Society for the Protection of Birds (RSPB) under a traffic-light system. Birds that regularly occur in the UK are recorded as 'green', birds with an unfavourable conservation status are recorded as 'amber' and birds that are globally threatened or showing severe decline in the UK are recorded as 'red'³.

2.3 Common Dormouse

Dormouse surveys are undertaken by attaching purpose built 'nest tubes' on trees and shrubs in suitable habitat such as woodland, scrub and hedgerows. Nest tubes are used by dormice as places of shelter and they will often construct their nests within them during their periods of activity (typically between April and November). In accordance with current best practice guidelines⁴, a minimum of 50 nest tubes are deployed approximately 20m apart and left *in situ* for the survey season. These are checked on a monthly basis for a set period for presence of animals and evidence of dormouse presence (distinctively woven nests). Since the likelihood of use by dormice varies through the year, an index of probability score is used to determine confidence in a particular survey (see Table 3 below) comprising checks over several months. A minimum score of 21 is normally accepted to establish 'likely

³ The details for this classification can be seen on the RSPB website at:

<http://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-guides/status-explained.aspx>

⁴ Bright, B., Morris, P., Mitchell-Jones, A.J. and Mitchell-Jones, T (1997) The Dormouse Conservation Handbook. English Nature.



absence' in the event that no signs of dormice are found during the survey. The scores may be doubled if the site is large enough to accommodate 100 or more nest tubes.

Table 3. Allocation of points for each month during the Dormouse survey.

Month of check	Index of Probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

For this survey, a total of 80 dormouse nest tubes were installed along hedgerows and in the dense bramble scrub across the site (see Figure 7). Dormice checks were undertaken in the mornings and commenced one month after the nest-tubes were positioned. Surveys were undertaken under the supervision of licenced surveyor Paul Whitby.



Figure 7. Dormouse nest tube locations across all suitable habitat for dormice. Images produced courtesy of Google maps (Map data ©2018 Google).

2.4 Reptiles

Standard reptile presence/likely absence surveys involve setting out artificial refugia (reptile 'mats') in



potentially suitable habitat for reptiles. Reptile mats are either pieces of roofing bitumen felt or corrugated metal sheets, which absorb heat from the sun more rapidly than the surroundings and provide cover and basking places attractive to reptiles. These are then checked for the presence of animals under suitable weather conditions. There are no up to date guidelines for reptile surveys, but a minimum of seven survey visits under suitable weather conditions is generally considered to be sufficient to determine their presence/likely absence.

A total of 39 roofing felt mats were used in this survey and placed along the field edges and around patches of bramble scrub in sunny locations around the site (see Figure 8 below). The mats were left *in situ* for a minimum of one week to 'bed in' and allow reptiles to locate them before the first check.



Figure 8. Location of reptile refuges within the proposed site. Images produced courtesy of Google maps (Map data ©2018 Google).

2.5 Constraints/Limitations to Surveys

These surveys record any fauna that is present at the time of the survey visits. It is therefore possible that some species may not have been present during the survey but may be evident at other times of the year and may appear or disappear from the site if habitat conditions change. For this reason, the surveys are considered valid for up to 18 months for bats, 2 years for reptiles and three years for



dormice. If the habitat conditions change significantly beyond that time, it is recommended that the surveys are updated.

Great Crested Newts

It was not possible to obtain access to undertake a HSI assessment on Pond 13 located approximately 185m from the proposed development.

3 RESULTS

3.1 Bats

3.1.1 Natural Roosting Habitats – Trees

The ground-based walkover assessment carried out during the Phase 1 Habitat Survey revealed a number of trees with potential roost features for bats, including split limbs with multiple cracks, dead branches and significant ivy cover. However, all trees climbed and assessed within the proposed development site were deemed to have negligible potential to support roosting bats and no evidence of roosting bats was identified.

3.1.2 Bat Activity Surveys – Walked Transects

Since each survey was conducted over the same period around sunset, the number of passes per survey date for each species can be used as an indicator of general activity for comparison across the site. The surveys followed best practice techniques as outlined by the Bat Conservation Trust. Six bat activity surveys were undertaken by three ecologists across the whole site, who each walked a specific assigned route to collect bat activity data from the whole of the site (see Figures 3,4 and 5).

The surveyors recorded bat activity using Echo Meter Touch bat detectors featuring auto-identification of bat species and automatically triggered recordings for later review. The number of bat passes along the transect were recorded, together with the species and time of detection. All bats were identified to species level, where possible, on site. Echolocation calls were analysed using Kaleidoscope computer software which facilitates species identification. Where possible, additional notes on type of flight (for example, commuting and foraging) and direction of flight were also recorded.

Key to Bat Activity Maps

- | | |
|--|---|
| | = Bat foraging activity |
| | = Bat commuting activity and direction of flight observed |
| | = Bat heard, but not observed in flight. |

18th April 2018

Bat activity was recorded between 20:28 and 21:53 by six species; common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, serotine *Eptesicus serotinus*, noctule *Nyctalus noctule*, a bat from the myotis group *Myotis spp.* and brown long-eared *Plecotus auritus*. These species were recorded commuting and foraging along the north, east and west boundaries of the site with little to no activity along the southern boundaries bordering residential properties. Common pipistrelle bats formed the majority of observations, whilst there was also a number of soprano pipistrelle observations,



particularly in the eastern half of the site. The results of the surveys are detailed in Figure 9.



Figure 9. Bat activity recorded within Land West of Tye Lane, Walberton on the 18th April 2018, with blue representing common pipistrelle bats, yellow representing *Myotis spp.*, purple representing brown long-eared bats, pink representing soprano pipistrelle, red representing serotine bats and orange representing noctule bats. Thicker lines represent greater activity observed. Images produced courtesy of Google maps (Map data ©2018 Google).

16th May 2018

Bat activity was recorded between 21:19 and 22:27 by four species; common pipistrelle, soprano pipistrelle, *Myotis spp.*, and serotine. These species were recorded commuting and foraging mainly along the northern, western and eastern boundaries, with common pipistrelle bats forming the majority of observations. A concentration of activity was recorded in the southwestern corner of Field 1, with common pipistrelle, serotine and myotis bats observed here. The results are detailed in Figure 10.

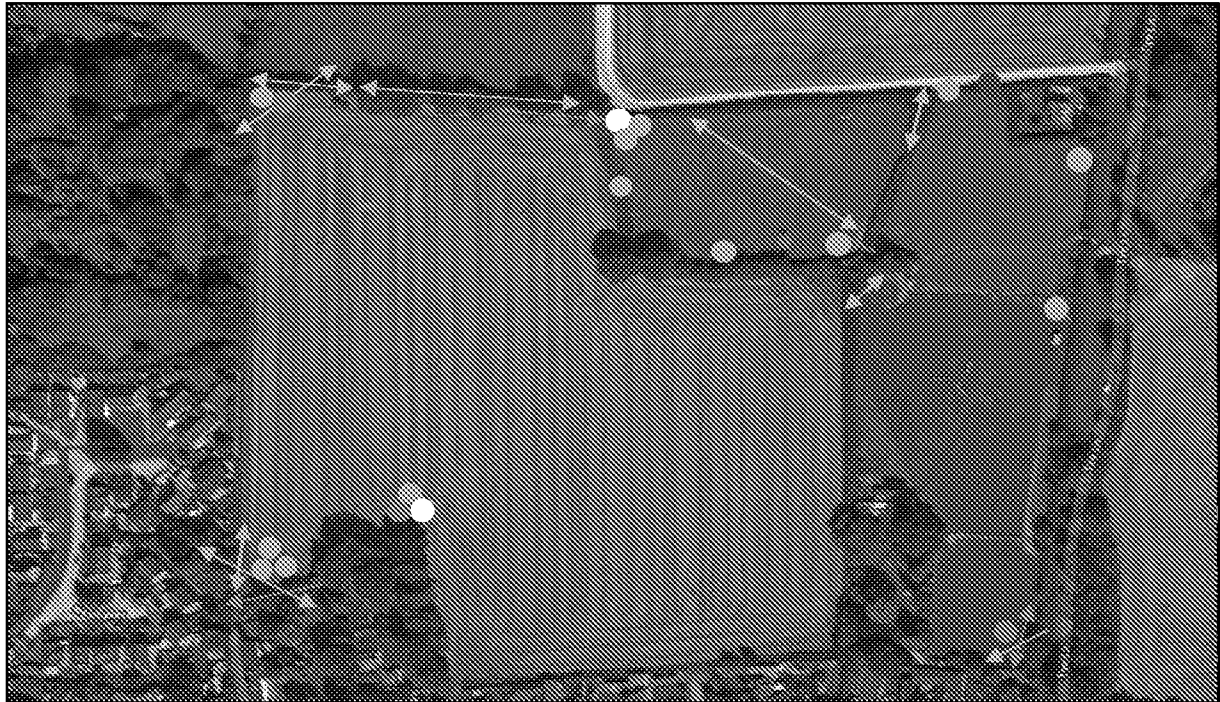


Figure 10. Bat activity recorded within Land West of Tye Lane, Walberton on the 16th May 2018, with blue representing common pipistrelle bats, yellow representing *Myotis spp.*, purple representing brown long-eared bats, pink representing soprano pipistrelle, red representing serotine bats and orange representing noctule bats. Thicker lines represent greater activity observed. Images produced courtesy of Google maps (Map data ©2018 Google).

7th June 2018

Bat activity was recorded between 21:36 and 22:59 by five species; common pipistrelle, soprano pipistrelle, *Myotis spp.*, brown long-eared and serotine. Activity was recorded along all boundaries of the site by mainly common pipistrelle and soprano pipistrelle bats. A single *Myotis spp.* was recorded along the eastern boundary of the site and three brown long-eared bats were recorded on the boundaries of Field 1, where the majority of bat activity was recorded through the survey. The results are detailed in Figure 11.



Figure 11. Bat activity recorded within Land West of Tye Lane, Walberton on the 7th June 2018, with blue representing common pipistrelle bats, yellow representing *Myotis spp.*, purple representing brown long-eared bats, pink representing soprano pipistrelle, red representing serotine bats and orange representing noctule bats. Thicker lines represent greater activity observed. Images produced courtesy of Google maps (Map data ©2018 Google).

2nd July 2018

Bat activity was recorded between 21:56 and 23:03 by only three species; common pipistrelle, soprano pipistrelle, and noctule, with greatly reduced activity also observed overall compared with previous surveys. All but two observations were made on the boundary of Field 1, representing a significant drop in bat activity across the horse paddocks in the eastern half of the site. The results are detailed in Figure 12.



Figure 12. Bat activity recorded within Land West of Tye Lane, Walberton on the 2nd July 2018, with blue representing common pipistrelle bats, pink representing soprano pipistrelle, and orange representing noctule bats. Thicker lines represent greater activity observed. Images produced courtesy of Google maps (Map data ©2018 Google).

8th August 2018

Bat activity was recorded between 20:53 and 22:09 by four species; common pipistrelle, soprano pipistrelle, *Myotis spp.*, and noctule. Activity was recorded along all boundaries of the site with a fairly even spread of observations across all field boundaries by mainly common pipistrelle and soprano pipistrelle bats. A single barbastelle bat was recorded within Field 2. The results are detailed in Figure 13.



Figure 13. Bat activity recorded within Land West of Tye Lane, Walberton on the 8th August 2018, with blue representing common pipistrelle bats, pink representing soprano pipistrelle, lime green representing barbastelle bats and orange representing noctule bats. Thicker lines represent greater activity observed. Images produced courtesy of Google maps (Map data ©2018 Google).

5th September 2018

Bat activity was recorded between 19:53 and 21:20 by six species; common pipistrelle, soprano pipistrelle, *Myotis spp.*, serotine, brown long-eared and noctule. These species were recorded commuting and foraging across the entire site with a concentration of activity recorded along the northern boundary and southwestern corner of Field 1. The results are detailed in Figure 14.



Figure 14. Bat activity recorded within Land West of Tye Lane, Walberton on the 5th September 2018, with blue representing common pipistrelle bats, yellow representing *Myotis spp.*, purple representing brown long-eared bats, pink representing soprano pipistrelle, red representing serotine bats and orange representing noctule bats. Thicker lines represent greater activity observed. Images produced courtesy of Google maps (Map data ©2018 Google).

3.1.3 Bat Activity Surveys – Static Bat Logger Deployment

Three static loggers have been deployed across the Land West of Tye Lane, Walberton on three occasions; 9th May 2018, 16th July 2018 and 27th September 2018. Figure 6 shows the location of the loggers on each of the deployments.

For all surveys, Batlogger A+ detectors and Peersonic detectors with full spectrum RPA2 recorders within a Waterproof IP67 Enclosure were left in the field for at least 5 days, which is the maximum lifetime of the battery. Both of these models of detector are passive recording devices with real time full spectrum calls that can be viewed in detail once downloaded on to Analysis Software so that the species of bat can be identified (where possible).

Where possible, species identification was carried out to species level, except for *Myotis* and *Plecotus* bats, as they are often inseparable through sound analysis alone, and therefore were identified to genus level only. These figures reflect the level of activity by bats and not the number of individuals and should be viewed with caution.

For each survey a total of three detectors were deployed within the proposed site with one logger positioned along the western and eastern boundaries of the site and one other logger positioned on the eastern hedgerow within Field 1 where it was thought that there was a high likelihood of detecting commuting and foraging bats (see Figure 6). Detectors recorded bat activity for up to six nights, depending upon the performance of the batteries.



9th May 2018

The detectors recorded echolocation calls for 5 consecutive nights from the 9th May to the 13th May 2018 and detailed findings for each logger location is provided below. See Figure 6 for the location of each logger.

Location 1 – A total of six species were recorded during the survey including common pipistrelle, soprano pipistrelle, *Nyctalus spp.*, *Myotis spp.*, serotine and barbastelle. Common pipistrelle was recorded every night with a peak count of 1,090 passes indicating foraging activity with repeated passes past the detector. Serotine bats were recorded on one night with a peak of 29 passes and soprano pipistrelles were recorded on three nights with a peak of 15 passes.

Myotis sp. were recorded on one night with a peak of 2 passes and a one barbastelle call was recorded on one night.

The table below shows the full results from the static logger deployment at Location 1 in May 2018.

Table 4. Results from the static logger deployed at Location 1 within the site in May 2018.

Day	<i>Eptesicus serotinus</i>	<i>Nyctalus spp.</i>	<i>Myotis spp.</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Barbastella barbastellus</i>
1	13	15	0	389	0	0
2	29	2	2	1,090	5	0
3	1	0	0	211	2	0
4	1	2	0	142	15	1
5	0	0	0	10	0	0

Location 2 – A total of five species were recorded during the survey including common pipistrelle, soprano pipistrelle, serotine, *Nathusius pipistrellus* *Pipistrellus nathusii* and brown long-eared. Common pipistrelle and soprano pipistrelle were recorded on four of the five nights with a peak of 126 passes by common pipistrelle bats and a peak of 51 passes by soprano pipistrelle. Serotine and *Nathusius pipistrellus* bats were recorded on two nights with a peak of 1 pass by each. A single brown long-eared call was recorded on one night.

Table 5. Results from the static logger deployed at Location 2 within the site in May 2018.

Day	<i>Eptesicus serotinus</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Pipistrellus nathusii</i>	<i>Plecotus auritus</i>
1	1	71	15	0	1
2	0	2	0	1	0
3	3	126	51	0	0
4	0	16	1	0	0
5	1	0	3	1	0

Location 3 – A total of five species were recorded at Location 3 including serotine, *Myotis spp.*, common pipistrelle, soprano pipistrelle and brown long-eared. Common pipistrelle was again the commonest recorded bat at this location, with a peak of 125 recordings on the first evening, followed



by soprano pipistrelle, with a peak of 27 recordings. No recordings were made on the final evening, likely as a result of premature battery failure.

Table 6. Results from the static logger deployed at Location 3 within the site in May 2018.

Day	<i>Eptesicus serotinus</i>	<i>Myotis spp.</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Plecotus auritus</i>
1	1	0	125	27	0
2	5	0	65	9	2
3	1	0	39	3	0
4	0	1	4	0	0
5	0	0	0	0	0

16th July 2018

The detectors recorded echolocation calls for 6 consecutive nights from the 16th July to the 21st July 2018 in Location 1 and 3. The logger at Location 2 only recorded echolocation calls for 5 consecutive nights and detailed findings for each logger location is provided below. See Figure 6 for the location of each logger.

Location 1 – A total of six species were recorded during the survey including common pipistrelle, soprano pipistrelle, *Myotis spp.*, *Nyctalus spp.*, serotine and barbastelle. Common pipistrelle and soprano pipistrelle were recorded on all six nights with a peak of 328 passes by common pipistrelle and a peak of 114 passes by soprano pipistrelle. *Nyctalus spp.* were also recorded on all six nights with a peak of 63 passes. *Myotis sp.* were recorded on five of the six nights and a peak of 9 passes was recorded. Serotine bats were recorded on four nights with a peak of 49 passes and barbastelle bats were recorded on two nights with a peak of 3 passes recorded.

The table below shows the full results from the static logger deployment at Location 1 in July 2018.

Table 7. Results from the bat logger deployed at Location 1 within the site in July 2018.

Day	<i>Eptesicus serotinus</i>	<i>Nyctalus spp.</i>	<i>Myotis spp.</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Barbastella barbastellus</i>
1	1	3	0	65	9	0
2	49	63	2	200	86	1
3	4	6	6	328	114	0
4	1	6	7	81	30	0
5	0	39	9	202	35	3
6	0	19	2	32	3	0

Location 2 – A total of seven species were recorded during the survey including common pipistrelle, soprano pipistrelle, serotine, *Nyctalus spp.*, *Myotis sp.*, *Nathusius pipistrelle* and brown long-eared. Common pipistrelle bats were recorded every night with a peak of 87 passes. Serotine and soprano pipistrelles were recorded on four nights with a peak of 51 passes by serotine bats and a peak of 6 passes by soprano pipistrelles. *Myotis sp.* and brown long-eared bats were recorded on one night with a peak of 1 pass by each species. *Nyctalus spp.* and *Nathusius pipistrelle* were both recorded on two



nights with a peak of 1 pass by *Nyctalus spp.* and a peak of 4 passes by *Nathusius pipistrelle*.

The table below shows the full results from the static logger deployment at Location 2 in July 2018

Table 8. Results from the bat logger deployed at Location 2 within the site in July 2018.

Day	<i>Eptesicus serotinus</i>	<i>Nyctalus spp.</i>	<i>Myotis spp.</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Pipistrellus nathusii</i>	<i>Plecotus auritus</i>
1	0	1	0	2	0	0	0
2	4	3	0	8	2	0	0
3	2	1	0	35	5	0	0
4	0	0	0	4	3	3	0
5	51	0	1	87	6	4	1

Location 3 – A total of six species were recorded during the survey including common pipistrelle, soprano pipistrelle, serotine, *Nyctalus spp.*, *Myotis sp.* and brown long-eared. Common pipistrelle, *Nyctalus spp.* and soprano pipistrelle were recorded on all six nights with a peak of 23 passes by common pipistrelle, a peak of 8 passes by *Nyctalus spp.* and a peak of 7 passes by soprano pipistrelle. Serotine were recorded on five nights with a peak of 22 passes. *Myotis spp.* were recorded on two nights with a peak of 1 pass and brown long-eared were recorded on one night with a peak of 2 passes.

The table below shows the full results from the static logger deployment at Location 3 in July 2018

Table 9. Results from the bat logger deployed at Location 3 within the site in July 2018.

Day	<i>Eptesicus serotinus</i>	<i>Nyctalus spp.</i>	<i>Myotis spp.</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Plecotus auritus</i>
1	0	6	0	23	3	0
2	1	6	1	8	7	0
3	2	4	0	6	1	0
4	3	6	0	22	3	0
5	22	8	1	19	4	0
6	3	1	0	6	5	2

27th September 2018

A total of three detectors were deployed within the site. One logger was placed along the western and eastern boundaries along with one other logger positioned on the eastern hedgerow within Field 1 where it was thought that there was a high likelihood of detecting commuting and foraging bats (see Figure 6). The detector positioned at Location 1 recorded echolocation calls for 5 consecutive nights and the detectors at Locations 2 and 3 recorded echolocation calls for 4 consecutive nights from the 27th September to the 1st October 2018. See Figure 6 for the location of each logger.

Location 1 – A total of four species were recorded during the survey including common pipistrelle, soprano pipistrelle, *Nathusius pipistrelle* and *Myotis spp.* Common pipistrelle bats were recorded on all five nights with a peak of 15 passes indicating foraging activity. *Myotis spp.*, *Nathusius pipistrelle* and soprano pipistrelle were each recorded on one of the five nights with a peak of one call by *Myotis sp.* and *Nathusius pipistrelle*. A peak of 2 soprano pipistrelle calls were recorded.



The table below shows the full results from the static logger deployment at Location 1 in September 2018.

Table 10. Results from the bat logger deployed at Location 1 within the site in September 2018.

Day	<i>Myotis</i> <i>spp.</i>	<i>Pipistrellus</i> <i>pipistrellus</i>	<i>Pipistrellus</i> <i>pygmaeus</i>	<i>Pipistrellus</i> <i>nathusii</i>
1	0	2	0	0
2	0	3	0	0
3	0	4	0	0
4	0	1	0	1
5	1	15	2	0

Location 2 – A total of seven species were recorded during the survey including common pipistrelle, soprano pipistrelle, Nathusius pipistrelle, brown long-eared, serotine, *Myotis spp.*, and barbastelle. Common pipistrelle bats were recorded on all four nights with a peak of 55 passes whilst soprano pipistrelle and brown long-eared were recorded on three nights with a peak of 31 passes by soprano pipistrelle and a peak of 5 passes by brown long-eared. Nathusius pipistrelle was recorded on one night with a peak of 2 passes and barbastelle bats were recorded on two nights with a peak of 2 passes.

The table below shows the full results from the static logger deployment at Location 2 in September 2018.

Table 11. Results from the bat logger deployed at Location 2 within the site in September 2018.

Day	<i>Eptesicus</i> <i>serotinus</i>	<i>Myotis</i> <i>spp.</i>	<i>Pipistrellus</i> <i>pipistrellus</i>	<i>Pipistrellus</i> <i>pygmaeus</i>	<i>Barbastella</i> <i>barbastellus</i>	<i>Pipistrellus</i> <i>nathusii</i>	<i>Plecotus</i> <i>auritus</i>
1	0	0	37	0	2	0	1
2	0	1	4	1	0	0	0
3	1	3	55	7	0	2	5
4	1	0	40	31	2	0	3

Location 3 – Six species were recorded during this deployment, with common pipistrelle, myotis, soprano pipistrelle, serotine, brown long eared and nyctalus species recorded in order of abundance. Recordings of myotis bats had notably increased, with a peak of 59 recordings made on the second evening – the highest recording for this group of species at the site.

The table below shows the full results from the static logger deployment at Location 3 in September 2018.

Table 12. Results from the bat logger deployed at Location 3 within the site in September 2018.

Day	<i>Eptesicus</i> <i>serotinus</i>	<i>Nyctalus</i> <i>spp.</i>	<i>Myotis</i> <i>spp.</i>	<i>Pipistrellus</i> <i>pipistrellus</i>	<i>Pipistrellus</i> <i>pygmaeus</i>	<i>Plecotus</i> <i>auritus</i>
1	6	0	17	20	14	1
2	0	3	59	6	5	3



3	0	1	8	53	3	1
4	2	0	3	57	0	3

Summary

Across these surveys, it is clear that the greatest activity has been recorded in Location 1 during the first and second deployments, with clearly the greatest activity by common pipistrelle, serotine and *Nyctalus* species. The greatest activity for myotis bats was at Location 3 on the third deployment, though this result could be skewed by repeated foraging passes. Activity was greatly reduced at Location 1 on the third deployment, with common pipistrelle activity in particular notably reduced.

3.2 Breeding Birds

Table 13 below details the bird survey results for all three visits. The table is divided into red, amber and green lists from the Birds of Conservation Concern (BOCC) categories. In total, 20 species of bird were recorded during the surveys; of these 3 species is 'red' listed under the BOCC and 2 species is 'amber' listed. Figures 15, 16 and 17 show the location of each individual recorded and the date it was recorded within the Land West of Tye Lane, Walberton.

Table 13. Maximum count of breeding bird species over three visits in April, May and June 2018.

Species	17 th April 2018	10 th May 2018	14 th June 2018
Song thrush <i>Turdus philomelos</i>	1		
Starling <i>Sturnus vulgaris</i>	3	7	1
House Sparrow <i>Passer domesticus</i>	4	3	
Dunnock <i>Prunella modularis</i>	2	4	1
Stock Dove <i>Columba oenas</i>	1		
Blackbird <i>Turdus merula</i>		3	2
Blue tit <i>Cyanistes caeruleus</i>	5		1
Goldfinch <i>Carduelis carduelis</i>	1	4	
Greenfinch <i>Carduelis chloris</i>	5	1	
Great tit <i>Parus major</i>	2	1	1
Long-tailed tit <i>Aegithalos caudatus</i>	1		
Robin <i>Erithacus rubecula</i>	3	2	
Whitethroat <i>Sylvia communis</i>	3		
Woodpigeon <i>Columba palumbus</i>			6
Wren <i>Troglodytes troglodytes</i>		4	2
Swallow <i>Hirundo rustica</i>	1	2	
Carrion Crow <i>Corvus corone</i>			2
Kestrel <i>Falco tinnunculus</i>			1
Buzzard <i>Buteo buteo</i>			1

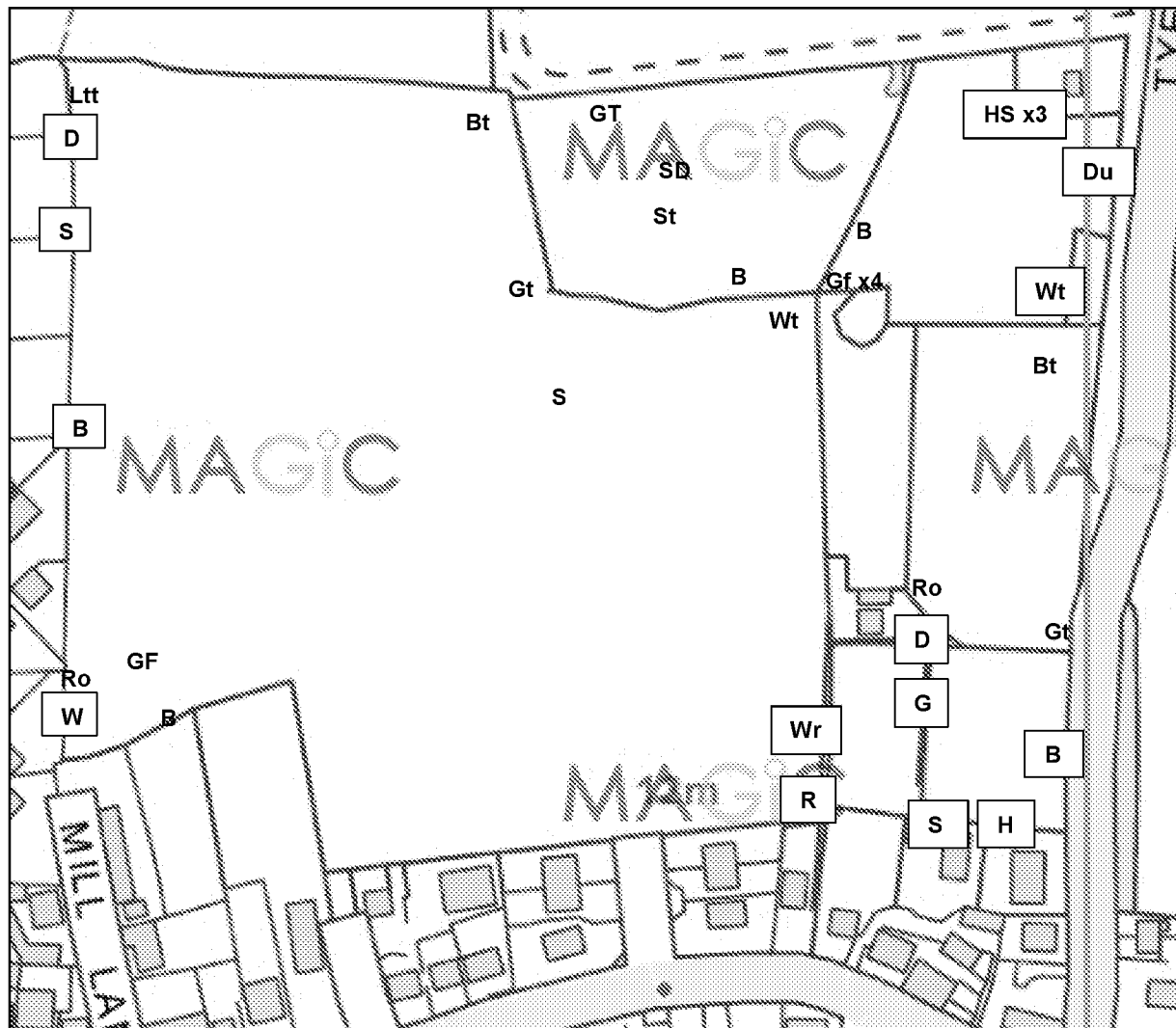


Figure 15. The location of the birds recorded during 17 April 2018 breeding bird survey. Ro=Robin, Du=Dunnock, GF=Goldfinch, B=Blackbird, Bt=Blue Tit, Wt=Whitethroat, ST=Song Thrush, Greenfinch=Gf, HS= House Sparrow, St= Starling, Ltt= Long tailed tit, Great tit= GT, SD= Stock Dove, Sw= Swallow. The box surrounding the species indicates a territory call/song has been observed.

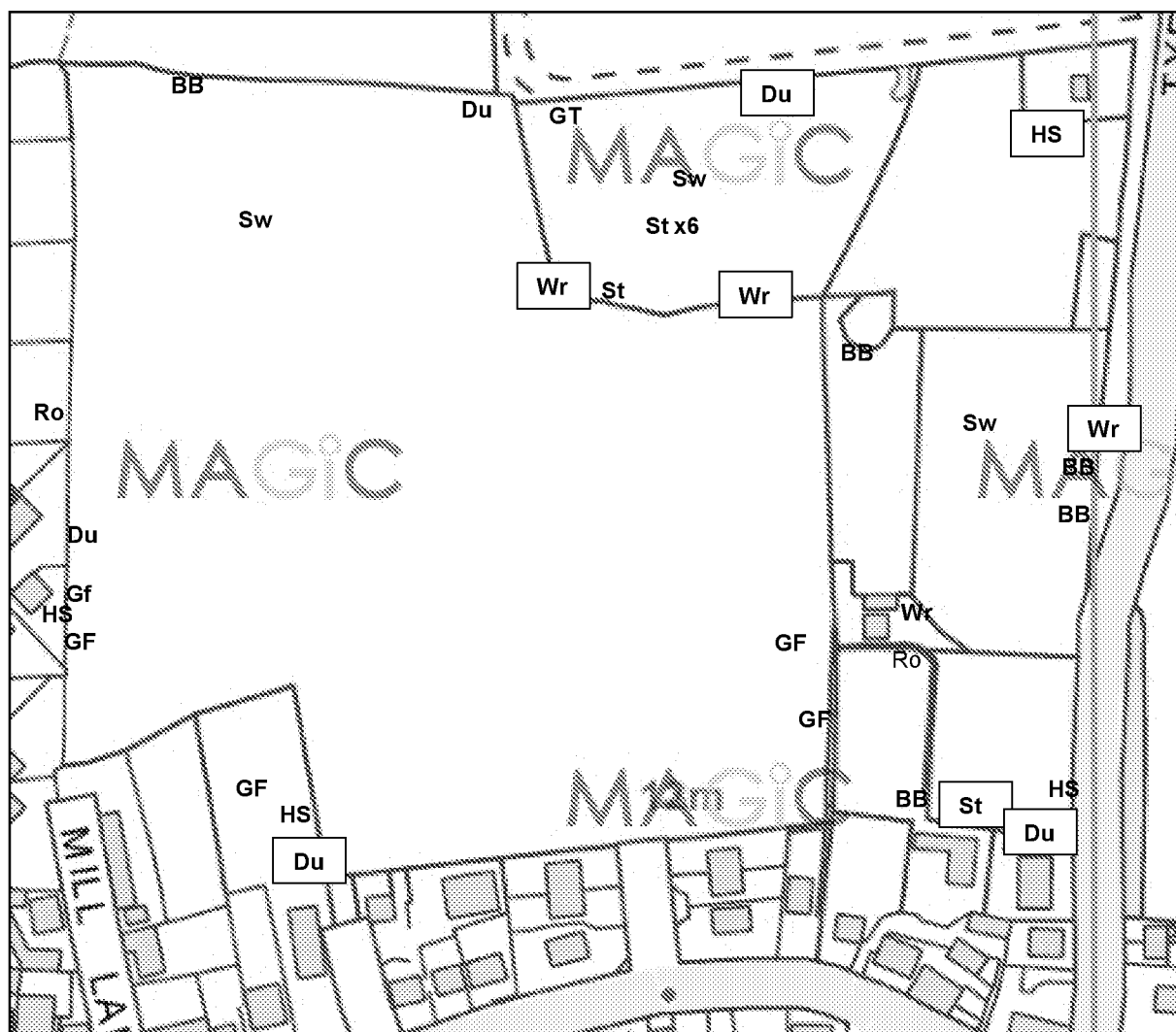


Figure 16. The location of the birds recorded during 10 May 2018 breeding bird survey. Ro=Robin, Du=Dunnock, GF=Goldfinch, BB=Blackbird, Bt=Blue Tit, Greenfinch=Gf, HS= House Sparrow, St= Starling, Great tit, Sw= Swallow, Wr=wren. The box surrounding the species indicates a territory call/song has been observed.

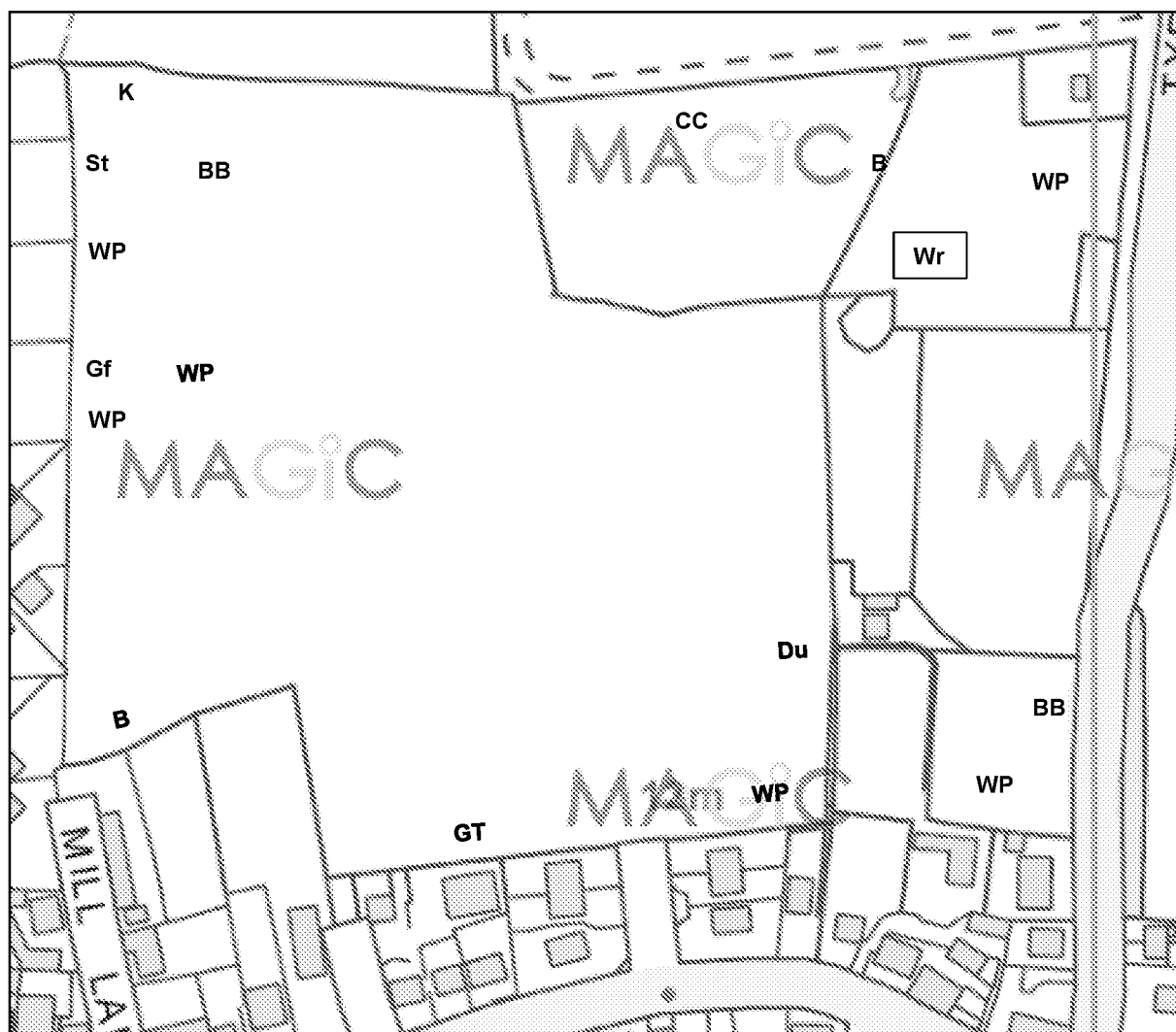


Figure 17. The location of the birds recorded during 14 June 2018 breeding bird survey. Du=Dunnock, GF=Goldfinch, BB=Blackbird, Bt=Blue Tit, K= Kestrel, Greenfinch=Gf, HS= House Sparrow, St= Starling, Great tit= GT, CC= Carrion Crow, WP= Wood Pigeon, Wr= Wren. The box surrounding the species indicate territory call/song.

3.3 Dormice

On the 26th March 2018, a total of 80 nest tubes were spread within the hedgerows within the Land West of Tye Lane, Walberton, West Sussex.

Six dormouse nest-tube checks have been completed at Land West of Tye Lane according to best practice guidelines. The first check was undertaken on the 27th April 2018 and all tubes were found to be empty. The second and third checks were carried out on the 29th May 2018 and 29th June 2018. Three dormouse nests were identified across the site both times and no active dormice were identified in any of the tubes. Figure 7 below indicates where dormouse nests have been identified within the site.

The fourth nest-tube check was undertaken on the 31st July 2018 and three dormouse nests were identified. No active dormice were observed during the survey. A number of tubes were identified with green leaves and there were two tubes with active wood mice. The fifth check was undertaken on the 31st August 2018 and seven tubes were found to have wood mice occupying them. Two intact dormouse



nests were identified across the site with one old dormouse nest also identified.

The final check was carried out on the 27th September 2018 and three dormouse nests were identified across the site. No active dormice were identified within any of the tubes. A number of tubes had nesting material typical of a wood mouse nest and a number of tubes also had food caches stored within them.

It should be noted that common dormice frequently move around within their large home range and that the number of occupied tubes does not represent the number of animals present in the area. This density is typical for common dormouse populations where even in the best habitats, densities of animals do not generally exceed 10 animals per hectare and the average density of animals in hedgerows is around one individual per hectare⁵. The detailed results of each nest tube check are presented in Appendix 4.



Figure 18. The yellow dots indicate the location of nest tubes with dormouse nests at any one time during the survey season.

⁵ Bright, B., Morris, P., Mitchell-Jones, A.J. and Mitchell-Jones, T (1997) *The Dormouse Conservation Handbook*. English Nature.



Figure 19. One of the dormouse nests identified along the northern boundary of Field 1.



Figure 20. A dormouse nest located along the northern boundary of Field 2.

3.4 Reptiles

A total of 39 reptile survey sheets were placed across the proposed site and left for a minimum of ten days to 'bed in' before the commencement of the survey process. Below, Table 14 provides weather



data and findings during the reptile survey undertaken. Reptiles were identified under mats 3, 4, 5, 9, 13, 16, 18, 23, 29, and 31 (see Figure 8 and Figure 20).

Table 14. Results of the reptile survey undertaken at Land West of Tye Lane, Walberton. SW – Slow Worm, GS – Grass Snake, CL – Common lizard, Juv – Juvenile, SA – Sub-adult, F - Female, M – Male.

Date	Air/Refugia Temp °C	Weather Notes, cc = Cloud cover	Species Total
5/04/18	9/15 °C	Sunny, 5% cloud cover.	0
12/04/18	11/15.4°C	100% cloud cover with sunny spells.	A single incidental slow worm sighting was made.
18/04/18	11/12.2°C	15% cloud cover, light breeze	1x SW, 2x SA SW
25/04/18	11/15°C	60% cloud cover, light breeze, sunny	2x SA SW, 2x F SW, 1 M SW
3/05/18	14/18°C	30% cloud cover, sunny, dry	2x M SW, 2x F SW
9/05/18	14/20°C	80% cloud cover, medium breeze, dry	6x Juv GS, 2x M SW, 1 Juv SW
14/05/18	15/20°C	3% cloud cover, sunny, still	2x SA GS, 2x Juv GS, 1x F SW



Figure 21. The blue dots indicate the locations where reptiles were found within the Land West of Tye Lane at any one time.



4 POTENTIAL IMPACTS AND OUTLINE MITIGATION RECOMMENDATIONS

4.1 Bats

4.1.1 Potential Impacts

The proposed development does not require the demolition of any buildings or felling of any trees that are known to support roosting bats or have potential roosting features suitable for bats. Therefore, there are no identified impacts on bat roosts.

The proposed development has potential to result in disturbance to commuting and foraging bats, both during construction and in the long term after completion, through increased artificial lighting, disruption of commuting corridors and direct loss of the semi-improved grassland habitat that could be an important source of insect prey for bats. The most sensitive bat species to artificial light in the UK includes the myotis group of species, long-eared bats and barbastelle, all of which have been recorded at the site.

Barbastelle bats were recorded on the bat logger at Location 1 on one night in May 2018, two nights in July 2018 and two nights in September 2018, whilst Location 3 proved to be valuable for *Myotis* bats during the September logger deployment. Loss of these habitats for commuting or foraging, or illumination of these habitats by artificial light will therefore lead to significant impact upon these bats, though it should be recognised that barbastelle bats are a very wide-ranging species, foraging long distances from their roosts.

The loss of the arable field and horse paddocks as a foraging resource is a small impact, given the very small populations of invertebrate prey associated with these ecologically poor habitats. Indeed, the creation of garden habitats, with associated hedgerows, ornamental trees and shrubs, is likely to lead to a net gain in foraging resources, dependent upon the species used in the planting scheme and the impact of artificial light upon both bats and their invertebrate prey.

In the absence of suitable mitigation measures, the impact upon commuting and foraging bats is considered to be **likely low negative impact at a county level**.

4.1.2 Outline Mitigation Measures

To minimise impacts on existing habitat features used by bats, the proposed development layout has been designed to retain the field boundaries largely intact and provide a broad buffer zone of undeveloped land around the western and southern boundaries of the site. This will ensure that features currently used by commuting and foraging bats are retained and enhanced. The minor loss of hedgerow and scrub habitat to accommodate the access road through the housing development will be offset through the establishment of new native hedgerow and tree lines around the edges of the development, forming a buffer between the built zone and public open spaces around the site. Specific details will be provided within a separate landscape planting scheme.

The grassland areas enclosed in the public open spaces will include a new wildflower meadow area and rain gardens will provide an abundance of insect prey to be exploited by bats. The ornamental planting scheme for residential properties should include species known to be beneficial to insects to



contribute towards the food resource for bats.

It is important that the proposed scheme incorporates a 'sensitive lighting plan' developed as part of the detailed design, in accordance with guidelines set out by the Bat Conservation Trust. This should include measures to create 'dark corridors' through the development site along the retained hedgerows, and measures to minimize light spill onto all semi-natural habitats. All street lighting should be directed downwards and use light sources that are not attractive to insects. Reflective white line marking should be used in preference to artificial lighting in all non-essential applications.

Incorporating integral bat roosting opportunities into new buildings will be necessary to provide a net gain in roosting opportunities for bats and the creation of no less than 20 new roosting features is recommended across the development, focusing on locations with good links to hedgerows and tree lines. All of the above described details to mitigate impacts upon bats should be outlined within a Mitigation Statement that prescribes in detail how all habitats and features for bats for bats will be created.

With the provision of new roosting features for bats within the new development, there will be a **certain moderate positive impact upon roosting bats at a county level**. The proposed new habitat creation measures, incorporating a native hedgerow, tree, shrub and wildflower meadow planting scheme would lead to a **certain positive low impact upon roosting bats at a county level**.

4.2 Breeding Birds

4.2.1 Potential Impacts

The surveys at the site have not identified any ground nesting bird species, which indicated the likely absence of declining farmland birds such as Skylark *Alauda arvensis* and lapwing *Vannellus vannellus*. However, the surveys have identified a good range of common and widespread bird species.

Song thrush, starling and house sparrow, red listed bird species, and dunnock and stock dove, amber listed bird species, were identified during the surveys. The boundary habitats appear to have value for dunnock, song thrush, goldfinch, robin and greenfinch. The majority of the boundary hedgerows will be retained with only small sections of hedgerow being removed to allow access in to the site from Tye Lane.

In the absence of adequate mitigation measures, the impact upon breeding birds is considered to be a **certain negative low impact at a local level**.

4.2.2 Outline Mitigation Measures

The proposed development layout has been designed to avoid removal of trees, and the majority of hedgerows, therefore resulting in minimal direct loss of the breeding habitats used by the existing bird assemblage. All of the proposed new hedge creation and tree planting will benefit the majority of common nesting birds and given the absence of notable farmland birds, the conversion of ecologically poor arable habitat to land that includes a number of trees and shrubs (as outlined above in section 4.1.2), will likely lead to a net gain in habitat value for a variety of birds. For this reason, the development proposal is considered likely to lead to at least a **certain positive low impact at local level** with the proposed landscape enhancements included.



Appropriate mitigation will comprise compensation and enhancement by planting up the boundaries with high value native scrub, and native tree and shrub species. Any scrub or saplings 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 deemed clear of nesting birds.

4.3 Common Dormice

4.3.1 Potential Impacts

The common dormouse is confined to the hedgerows and tree belts forming the existing field boundaries to the site. The current scheme layout has been designed to minimise the loss of this habitat and most of the existing hedgerows and tree belts will remain intact. However, localised impacts on this habitat type are unavoidable where access roads pass through the housing development, as some hedgerow removal is required that represents a permanent loss of habitat used by dormouse, together with some severance of habitat connectivity at the canopy level.

In the absence of mitigation, clearance of hedgerow habitat could potentially result in the destruction of nests and mortality of dormice. Severance of habitat connectivity could potentially prevent access to the remaining fragments of hedgerow habitat to dormice in the longer term.

Finally, the proposed development has potential for indirect impacts on dormice through disturbance from artificial lighting and increased predation risk by domestic cats, which may hunt dormice within accessible hedge structures.

Unmitigated, the development proposal has the potential to result in a **likely low negative impact upon dormice at a county** level when considering the amount of suitable habitat that would be affected and the abundance of dormice in West Sussex.

4.3.2 Outline Mitigation Measures

As for bats, the proposed development layout has been designed to retain the existing field boundaries to minimize impacts on dormouse habitats. A section of the existing hedgerow along the eastern boundary will need to be removed to allow the new access road to be constructed. Planting thorny species including blackthorn, hawthorn, rose species etc. along the existing hedgerows will reduce the risk of dormouse predation by domestic cats and also increase the hedgerow density allowing dormice to move around the site and other suitable habitat.

The layout of the proposed scheme avoids severance of ecological connectivity by ensuring that there is no fragmentation and isolation of any part of the existing hedgerows. All retained hedgerows are linked to the wider habitat network across the landscape at least once.

A European Protected Species (EPS) mitigation licence is recommended for the development to proceed legally. A detailed mitigation strategy would form part of the licence conditions that deals with both the immediate effects of clearance of dormouse habitat and long-term impacts. Standard best practice for vegetation clearance where dormice are present involves timing the initial above-ground works in late Autumn and winter, when animals are in hibernation at ground level. This is followed by stump removal in spring when dormice become active and can move away from the construction zone.



This method also avoids the bird breeding season and therefore prevents impacts on birds' nests, eggs and young.

The small losses of hedgerow sections are fully compensated for by the establishment of new native species hedgerows, together with tree and shrub planting schemes as part of the soft landscape design for the proposed development that will be linked to the existing habitat network. Overall, the extent of native hedgerows, trees and scrub habitat will increase should the proposed development go ahead providing a net benefit to dormice. Further prescriptive details for these new hedgerows should be provided within a Mitigation Statement for the development and the measures proposed in this document should be reflected within the Landscape Plan for the development.

With the implementation of all of the above outlined mitigation measures, leading to a significant increase in suitable dormouse habitat at the site, there will be a **likely positive low impact at a county level**.

4.4 Reptiles

4.4.1 Potential Impacts

The reptile survey at this site identified a 'low population' of slow worms and a 'low population' of grass snakes, with individuals identified on all boundaries of Field 1 and the northern boundary of Field 2. The proposed development will see very little reptile habitat impacted, with the site boundaries and the narrow grass margins around the arable field representing the only suitable habitat present.

As the development proposal includes the retention of these boundaries, there is very little impact risk to reptiles and there is no requirement to translocate the population. There are clear opportunities for new habitat creation to ensure the conservation status of reptiles is preserved and indeed enhanced.

The impact upon reptiles is considered to be a **likely neutral impact at a local level**.

4.4.2 Outline Mitigation Measures

Very little existing suitable reptile habitat will be impacted by the development proposal. The horse paddocks are tightly grazed, making the sward unsuitable for reptiles and at present suitable habitat is restricted to the narrow grassland margin around the arable field and bordering the hedgerows on the edges of the horse paddocks. As the development proposal includes areas of 'open green space', rain gardens and a number of ponds which will be suitable for reptiles, there are clear opportunities to increase the value of the site for both slow worms and grass snakes. These areas can be enhanced with the planting of a wildflower meadow mix and the implementation of a management plan that favours a suitable sward for foraging.

The protection of suitable reptile habitat will involve the installation of temporary reptile fencing and/or Heras fencing, to mark out habitats that must be protected from construction activity and prevent the migration of reptiles onto the construction zone. This fencing would need to remain in-situ until all construction work deemed a risk to reptiles has been completed - i.e. earthworks and associated landscaping.

The extent of suitable reptile habitat means that an on-site reptile translocation may not be necessary,



with the fencing alone required to contain reptiles outside of the construction zone. However, there is a risk that prior to construction the horse paddocks could establish a suitable grassland sward. For this reason, it would be important to ensure that the sward is kept short, below 5cm in height, until the reptile fencing has been installed.

All details for reptile protection and compensation measures will be included in the Mitigation Statement and with the above described mitigation in place, the development should result in a **likely positive impact at a local level**.



Appendix 1 – Legislation and 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, a number of 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. 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’.

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 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 landowner]. 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) places a statutory duty under Section 40 on all public bodies, including planning authorities, 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 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).

UK Post-2010 Biodiversity Framework

The UK Biodiversity Action Plan (UK BAP), published in 1994, was the UK's response to the commitments of the Rio Convention on Biological Diversity (1992). 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.

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 because Government believes that local people and organisations are best placed to decide how to implement the strategy in the most appropriate way for their area or situation.

In Kent, the themes identified as priorities in Biodiversity 2020 are carried forward by the Kent Biodiversity Partnership that administers the Kent Biodiversity Action Plans and Biodiversity Opportunities Areas (Kent BAP, 2014).



Birds of Conservation Concern (BoCC)

In 1996, the UK's leading non-governmental bird conservation organisations reviewed 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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Appendix 2 - Survey Conditions and Bat Activity Survey Data

Table 15. Weather conditions and surveyor details during bat activity surveys.

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
18 th April 2018	20:00 - 21:56 Sunset – 20:02	Max/Min temp.: 17-16°C 10% cloud cover, light breeze, dry.	Paul Whitby, BSc, MCIEEM, CEcol, (Natural England Level 2 Bat Licence) Jess Burkitt, BSc Grad CIEEM Briony Hill, BSc, Grad CIEEM
16 th May 2018	20:40 – 22:16 Sunset: 20:46	Max/Min temp.: 12-10°C 80% cloud cover and windy at the start of the survey. Light breeze from 21:00 till end of the survey.	Paul Whitby, BSc, MCIEEM, CEcol Sophie Bradfield BSc (Hons) Emma Baker MSc, Qualifying Member of CIEEM
7 th June 2018	20:55 – 22:42 Sunset: 21:12	Max/Min temp.: 15 -14°C 80% cloud, light breeze, dry but recent rain.	Simon Rayburn, BSc Sam Lunn MSc, ACIEEM (Natural England Level 2 Bat Licence) Kate Lewis MSc
2 nd July 2018	21:04-23:05 Sunset: 21:19	Max/Min temp: 21.5 - 19°C. 10% cloud cover, breezy, dry.	Sophie Bradfield, BSc Briony Hill, BSc (Hons), Grad CIEEM (Natural England Level 2 Bat Licence) Lydia Dowell, BSc (Hons)
8 th August 2018	20:22- 22:22 Sunset: 20:37	Max/Min temp.: 18.5°C 100%cloud cover, light breeze	Emma Baker MSc, Qualifying Member of CIEEM Briony Hill BSc (Hons), Grad CIEEM Lydia Dowell BSc (Hons)
5 th September 2018	19:25- 21:20 Sunset: 19:40	Max/Min temp.: 18 -16°C 40% cloud cover, light breeze	Emma Baker MSc, Qualifying Member of CIEEM Briony Hill BSc (Hons), Grad CIEEM Jess Burkitt BSc (Hons), Grad CIEEM



Appendix 3 – Common Dormouse Nest-Tube Checks Results

Table 16. Abbreviations: DM=dormouse; WM=wood mouse; YN=Yellow-necked mouse; ad=adult; juv=juvenile, N=nest only; NM=nest material, not woven, unspecified; F=food cache (wood mouse); bee=Tree bumblebee *Bombus hypnorum* nest. Bird=bird nest (BTO codes apply to species); E=empty; nf=tube not found.

	April	May	June	July	August	September
Completion date	27/04/18	29/05/18	28/06/18	31/07/18	31/08/18	27/09/18
1	E	E	E	NM	NF	DM-N
2	E	E	E	E	NM	E
3	E	E	E	E	E	NM
4	E	E		E	N (old dormouse nest)	E
5	E	E	E	E	WM-N	F
6	E	E	E	E	E	NM
7	E	E	E	E	NM	NM
8	E	E	E	E	NM	NM
9	E	E	E	E	E	NM
10	E	E	E	E	E	NM
11	E	E	E	E	E	E
12	E	E	E	E	E	NM
13	E	E	E	WM	WM x3	F
14	E	E	E	E	E	NM
15	E	E	E	E	E	E
16	E	E	E	E	DM	E
17	E	E	E	E	E	E
18	NM	NM	NM (old)	E	E	E
19	E	E	E	E	E	NM
20	E	E	E	E	E	E
21	E	E	E	E	E	E
22	E	E	E	E	E	NM
23	E	E	E	E	E	F
24	E	E	E	E	E	E
25	E	E	E	E	E	F
26	E	E	E	E	NM	E
27	E	E	E	E	NM	NF
28	E	E	E	E	NM	E
29	E	E	E	E	E	E
30	E	E	E	E	NM	E
31	E	E	E	E	E	E
32	E	E	E	E	NM	E
33	E	E	E	E	E	E
34	E	E	E	E	E	E
35	E	E	E	E	E	E
36	E	E	E	E	E	E
37	E	E	E	E	E	E
38	E	E	NM	NM	NM (old)	E



39	E	E	E	E	NM	E
40	E	E	NM	DM-N	DM-N	DM-N
41	E	E	E	E	E	E
42	E	E	E	E	E	E
43	E	E	E	E	E	E
44	E	E	E	E	WM	E
45	E	E	E	F	F	F
46	E	E	E	E	E	E
47	E	E	E	E	NM	NM
48	E	E	E	E	E	E
49	E	E	E	F	F	E
50	E	E	E	E	E	E
51	E	E	E	E	E	E
52	E	E	E	E	E	E
53	E	E	NF	NF	NF	E
54	E	E	E	NF	E	E
55	E	E	E	E	E	E
56	E	E	E	E	E	E
57	E	E	E	E	E	E
58	E	E	E	E	F	E
59	E	E	E	E	E	E
60	E	E	E	E	E	E
61	E	E	E	E	E	E
62	E	E	E	E	E	E
63	E	E	E	E	E	E
64	E	E	E	E	E	E
65	E	E	E	E	E	E
66	E	E	E	E	E	E
67	E	E	E	E	E	E
68	E	E	E	E	E	E
69	E	E	E	E	E	E
70	E	E	NF	E	NF	E
71	E	E	E	E	E	E
72	E	E	E	E	E	E
73	E	E	WM	WM	E	E
74	E	E	E	E	E	E
75	E	E	E	E	E	E
76	E	E	E	E	E	DM-N
77	E	E	E	E	E	E
78	E	E	E	E	F	E
79	E	E	E	E	F	E
80	E	NM	DM-N	DM-N	Old DM nest	Old DM nest



Appendix 4 - Artificial Lighting and Wildlife

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 Trust⁶ should be considered while designing the lighting scheme. A simple process which should be followed where the impact on bats is being considered as part of a proposed lighting scheme. It contains techniques which can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. This includes the following measures:

Avoid lighting on key habitats and features altogether

there is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24-hour operation. However, in the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully consider the presence of protected species

Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved. The following are techniques which have been successfully used on projects and are often used in combination for best results;

- Dark buffers, illuminance limits and zonation
- Sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill
- Consider the design of the light and fittings, whereby the spread of light is minimised ensuring 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.
- Screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding
- Glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features.
- Creation of alternative valuable bat habitat on site, whereby additional or alternative bat flightpaths, commuting habitat or foraging habitat could result in appropriate compensation for

⁶ Bat Conservation Trust and Institute for Lighting Professionals (2018) Guidance note 8. Bats and Artificial Lighting. <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>



any such habitat being lost to the development.

- Dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

Demonstrate compliance with illuminance limits and buffers

- *Design and pre-planning phase*; It may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.
- *Baseline and post-completion light monitoring surveys*; baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on key habitats and features and so may prevent the agreed or modelled illuminance limits being achieved.
- *Post-construction/operational phase compliance-checking*



Appendix 5 – Methodology for Assessment of Ecological Impacts

The assessment of ecological impacts follows best practice guidelines for impact assessment⁷.

Six steps are required as part of an ecological impact assessment which are detailed below:

1. Identify important ecological features (habitats, species, ecosystems and their functions/processes)

A summary of the approach to valuing important ecological features is detailed in Table 1.

Table 1: Categorisation of the level of value an important ecological feature has

Level of value	Example
International	Internationally designated site; Special Protected Area (SPA), Special Areas of Conservation (SAC), Ramsar, Biosphere Reserves. A viable area of a habitat or area important for maintaining viability listed as in Annex 1 of the Habitats Directive. Regularly occurring population of internationally important species listed in Annex 1, 2 or 4 of the Habitats Directive and Annex 1 of the Birds Directive.
National	Nationally designated sites; Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Local Nature Reserves (LNR). Regularly occurring population of nationally important species listed in UK BAP, Schedules 1, 5 and 8 of the Wildlife and Countryside Act or UK Red Data Book Species.
County / Regional	Non-statutory designated sites; Local Wildlife Sites (LWSs), Sites of Nature Conservation (SNCIs) and Site of Importance for Nature conservation (SINCs). Ancient woodland more than 0.25ha. A viable area of a habitat or area important for maintaining viability identified in local/county BAPs listed as in Annex 1 of the Habitats Directive. Regularly occurring population of a species listed as being nationally scarce or a local/county BAP due to its rarity or localisation.
Local	Sites designated at a local level due to meeting ecological selection criteria. Habitats and species which are scarce in the local area.
Neighbourhood	Common widespread habitats (poor-semi improved grassland, arable fields, coniferous plantations etc).
Less than neighbourhood / negligible	Habitats with little to no ecological value (amenity grassland and hardstanding)

2. Identifying and characterising impacts to important ecological features

Impacts are characterised based on the changes expected to the extent and integrity of the important ecological features. This takes in to account permanent and temporary effects, timings and reversibility.

⁷ CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (2nd ed.). Chartered Institute of Ecology and Environmental Management, Winchester.



Impacts can be high, medium, low or neutral – see Table 2. Each impact has a varying probability of occurring – see table 3. Impacts can either be negative or positive.

Table 2: Categorisation of the level of impact occurring to important ecological features

Impact type	Description
High	Large-scale, permanent changes to an important ecological feature which will impact on its integrity. This will likely result in changes in the conservation status of a species population or habitat type at the site.
Medium	Moderate-scale, permanent changes to an important ecological feature or large-scale temporary changes which will not impact upon its integrity. This will likely result in temporary changes in the conservation status of a species population or habitat type at the site, however these are unlikely to be reserved long-term.
Low	Small-scale, temporary changes to an important ecological feature or large-scale temporary changes which will not impact upon its integrity. This will likely result in temporary changes in the conservation status of a species population or habitat type at the site, however these are unlikely to be reserved long-term.
Neutral	No change in important ecological features.

Table 3: Categorisation of the probability of an impact occurring to important ecological features

Impact type	Description
Certain	It is reasonable to conclude that the impact will occur as a result of the proposal
Likely	It is reasonable to conclude that the impacts are more likely to occur than not as a result of the proposal.
Unlikely	It is reasonable to conclude that these impacts are less likely to occur than to occur as a result of the proposal.

The following four steps lead on from the information identified in the above two steps:

3. Incorporating measures to avoid and mitigate these impacts;
4. Assessing the significance of any residual effects after mitigation;
5. Identifying appropriate compensation measures to offset significant residual effects; and
6. Identifying opportunities for ecological enhancement.

