



ecosupport

**West Walberton Lane,
Walberton BN18 0AZ**

Phase II Results and Mitigation
Strategy (Final Version)

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Client:

Macra

31st March 2021

Report:	Phase II Results Report and Mitigation Strategy
Site Name:	West Walberton Lane, Arundel, BN18 0AZ
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Date of Issue:	31 st March 2021
Status:	Final Version

Table of Contents

1.0 INTRODUCTION.....	8
1.1 Brief.....	8
1.2 Aims of the Survey	8
1.3 Site Description & Location	8
1.4 Development Proposals	9
2.0 LEGISLATION & POLICY.....	11
2.1 Legislation	11
<i>2.1.1 The Conservation of Habitats and Species Regulations (2019).....</i>	<i>11</i>
<i>2.1.2 The Wildlife and Countryside Act (1981) (as amended).....</i>	<i>11</i>
<i>2.1.3 The Countryside and Rights of Way Act (2000).....</i>	<i>11</i>
<i>2.1.4 Natural Environment and Rural Communities Act (2006).....</i>	<i>11</i>
<i>2.1.5 Protection of Badgers Act.....</i>	<i>11</i>
2.2 Planning Policy.....	12
<i>2.2.1 National</i>	<i>12</i>
2.2.2 Local – Arun Local Plan 2011-2031 Adopted July 2018	14
2.3 Biodiversity Action Plans & UK Post-2010 Biodiversity Framework	15
3.0 METHODOLOGY	16
3.1 Desk Based Search	16
3.2 Assessment of Ponds.....	16
3.3 eDNA Survey.....	18
3.4 Phase II Bat Activity Survey	18
3.4.1 Transect Survey	18
3.4.2 Static Survey	19
3.5 Dormouse Survey.....	20
3.6 Reptile Survey.....	21
3.7 Lepidoptera Survey	21

3.7.1 Transect Survey	21
3.7.2 <i>Brown Hairstreak egg search</i>	22
3.8 Hedgerow Assessment	23
3.9 Badger Survey.....	23
3.10 Assessment of Trees to Support Roosting Bats	24
3.11 Updating Botanical Survey.....	25
3.12 Biodiversity Net Gain Assessment.....	25
3.13 Evaluation and Assessment	25
3.14 Limitations on Survey Information	26
4.0 RESULTS.....	28
4.1 Desk Based Search	28
4.1.1 Protected Sites	28
4.1.2 Protected / Notable Species.....	28
4.2 Assessment of Ponds.....	28
4.3 eDNA Survey.....	28
4.4 Phase II Bat Activity Survey	29
4.4.1 Transect Survey	29
4.4.2 Static Survey	30
4.5 Dormouse Survey.....	30
4.6 Reptile Survey.....	32
4.7 Lepidoptera Survey	34
4.7.1 Transect Survey	34
4.7.2 <i>Brown Hairstreak egg search</i>	36
4.8 Hedgerow Assessment	37
4.9 Badger Survey.....	38
4.10 Assessment of Trees to Support Roosting Bats	38
4.11 Updating Botanical Survey.....	39

4.12 Biodiversity Net Gain Assessment	39
5.0 EVALUATION	42
5.1 Desk Based Search	42
5.1.1 Protected Sites	42
5.1.2 Protected Species	42
5.2 Great Crested Newts	42
5.3 Phase II Bat Surveys	42
5.4 Dormouse Survey	43
5.5 Reptile Survey	44
5.5.1 The Status of Reptiles on Site	44
5.5.2 Valuation	44
5.6 Lepidoptera Survey	44
5.7 Hedgerow Assessment	44
5.8 Badger Survey	44
5.9 Assessment of Trees to Support Roosting Bats	45
5.10 Updating Botanical Survey	45
5.11 Biodiversity Net Gain Assessment	45
5.12 Other Habitats	45
5.12.1 Stream	45
5.12.2 Standard Trees	45
5.12.3 Scrub	45
5.12.4 Dry Ditch	46
6.0 ZONE OF INFLUENCE	47
6.1 Construction Phase	47
6.1.1 Change in Land Use	47
6.1.2 Noise Pollution	47
6.1.3 Air Pollution	47

6.1.4 Water Pollution	48
6.2 Operational Phase.....	48
6.2.1 Human Disturbance.....	48
6.2.2 Light Pollution	48
7.0 IMPACTS IN THE ABSENCE OF MITIGATION	48
7.1 Pre-Construction	49
7.1.1 Habitats	49
7.1.2 Bats	49
7.1.3 Other Mammals	49
7.1.4 Birds.....	49
7.1.5 Designated Sites	49
7.1.6 Reptiles	50
7.1.7 Lepidoptera	50
7.2 During Construction	50
7.2.1 Habitats	50
7.2.2 Bats	51
7.2.3 Other Mammals	51
7.2.4 Birds.....	51
7.2.5 Designated Sites	51
7.2.6 Dormice	51
7.3 Operational	51
7.3.1 Increased Recreational Disturbance	51
7.3.2 Increased Lighting	51
7.3.3 Dormice	52
8.0 GENERAL AVOIDANCE, MITIGATION & COMPENSATION RECOMMENDATIONS.....	53
8.1 Pre-Construction	53
8.1.1 Site Design	53

8.1.2 Protective Fencing.....	53
8.1.3 Avoidance to Nesting Birds	53
8.2 During Construction	53
8.2.1 CEMP	53
8.2.2 Avoidance of Entrapment during the Construction Phase	54
8.2.3 Lighting	54
8.3 Operational	54
8.3.1 Sensitive Lighting for Nocturnal Species	54
8.3.2 Native Planting of Grassland Areas	55
8.3.3 Brown Hairstreak Butterfly	56
9.0 REPTILE MITIGATION STRATEGY	57
9.1 Toolbox Talk	57
9.2 Reptile Displacement	57
9.3 Fencing	58
9.4 Destructive Search	58
9.5 Habitat Management	58
9.6 Safeguard	59
9.7 Enhancements	59
10.0 DORMOUSE MITIGATION STRATEGY	60
10.1 Disturbance	60
10.1.1 <i>Protecting Retained Features</i>	60
10.1.2 Mitigating Operational Impacts	60
10.1.2.2 <i>Cat Predation</i>	60
10.2 Vegetation Clearance Works.....	60
10.2.1 <i>Timing, Methods & Capture</i>	61
10.3 Habitat Compensation.....	63
10.3.1 <i>Habitat Replacement</i>	63

10.4 Post Development Management and Site Safeguard	64
<i>10.4.3 Protection of Habitats</i>	<i>65</i>
10.5 Indicative Timetable.....	65
11.0 BAT MITIGATION STRATEGY	67
11.1 Tree Clearance Works.....	67
12.0 ECOLOGICAL ENHANCEMENTS	68
12.1 Native Planting.....	68
12.2 Bats	68
12.3 Nesting Birds.....	69
12.4 Wildlife Pond	69
13.0 IMPACTS AFTER MITIGATION.....	72
14.0 CONCLUSION	74
15.0 REFERENCES.....	75
APPENDIX I – Protected and notable species within 1km of the site boundary provided by SxBRC.....	78
APPENDIX II – GCN Rapid Risk Assessment Results.	80
APPENDIX III – GCN eDNA Results.	83
APPENDIX IV – Bat Transect Results.	84
APPENDIX V – Bat Static Data Results.....	92
APPENDIX VI – Lepidoptera Transect Results.	98
APPENDIX VII – Hedgerow Assessment.....	104
APPENDIX VIII – Badger Survey Results.....	105
APPENDIX VIII – Assessment of Trees to Support Roosting Bats.	108
APPENDIX X – Updating Botanical Survey Results.	130

1.0 INTRODUCTION

1.1 Brief

In September 2019, All Ecology Ltd was commissioned to undertake an Ecological Appraisal of the Land at West Walberton Lane, Arundel, BN18 0AZ (hereafter referred to as the 'site'). The habitats on site were considered to have the potential to support a range of protected and/or notable species. Therefore, further Phase II Surveys were recommended to confirm the presence/likely absence of these species in order to establish any ecological impacts associated with the proposed development. Ecosupport Ltd were commissioned to undertake the required surveys between 31st of March and 12th of November 2020. Please refer to **Section 1.4** for details of the proposal.

This report must be read in conjunction with the Phase I Report (All Ecology Ltd, 2019).

Should the proposed development not be underway within 18 months of the date of issue of this report, an updated walkover survey should be undertaken by a suitably experienced Ecologist to determine if any significant changes have occurred to the ecological value of the site, as per CIEEM (2019) guidance. Changes to the ecological baseline may require additional or updating ecological surveys and/or alterations to the mitigation and compensation strategy to ensure full project compliance with wildlife legislation and policy.

This survey takes no account of seasonal variation or fluctuations in the presence of any species that might take up residence following this report. Lack of signs of a particular species does not confirm its absence, merely that there was no indication of its presence at the time of survey.

1.2 Aims of the Survey

The aim of Phase II protected species surveys is to confirm the presence/likely absence of species to aid the assessment of the ecological value of the site and potential ecological effects (or lack of) of a proposed development. The results of the survey work also provides evidence to support associated mitigation and compensation.

1.3 Site Description & Location

The site is located to the west of the settlement of Walberton, Arundel, BN18 0AZ (**Figure 1**) (central Grid Reference: SU 96444 06191). It is bound by West Walberton Lane to the north and Eastergate Lane to the south with agricultural land to the west. Due to the site's location on the edge of the settlement, the wider landscape has a mixture of rural and residential characteristics with of agricultural land bound by hedgerows, patches of woodland and similar sized settlements all recorded.

Figure 1. Location of the site within the context of the wider landscape and the red line boundary showing the area of impact as part of this proposal (Goggle Maps, 2020).



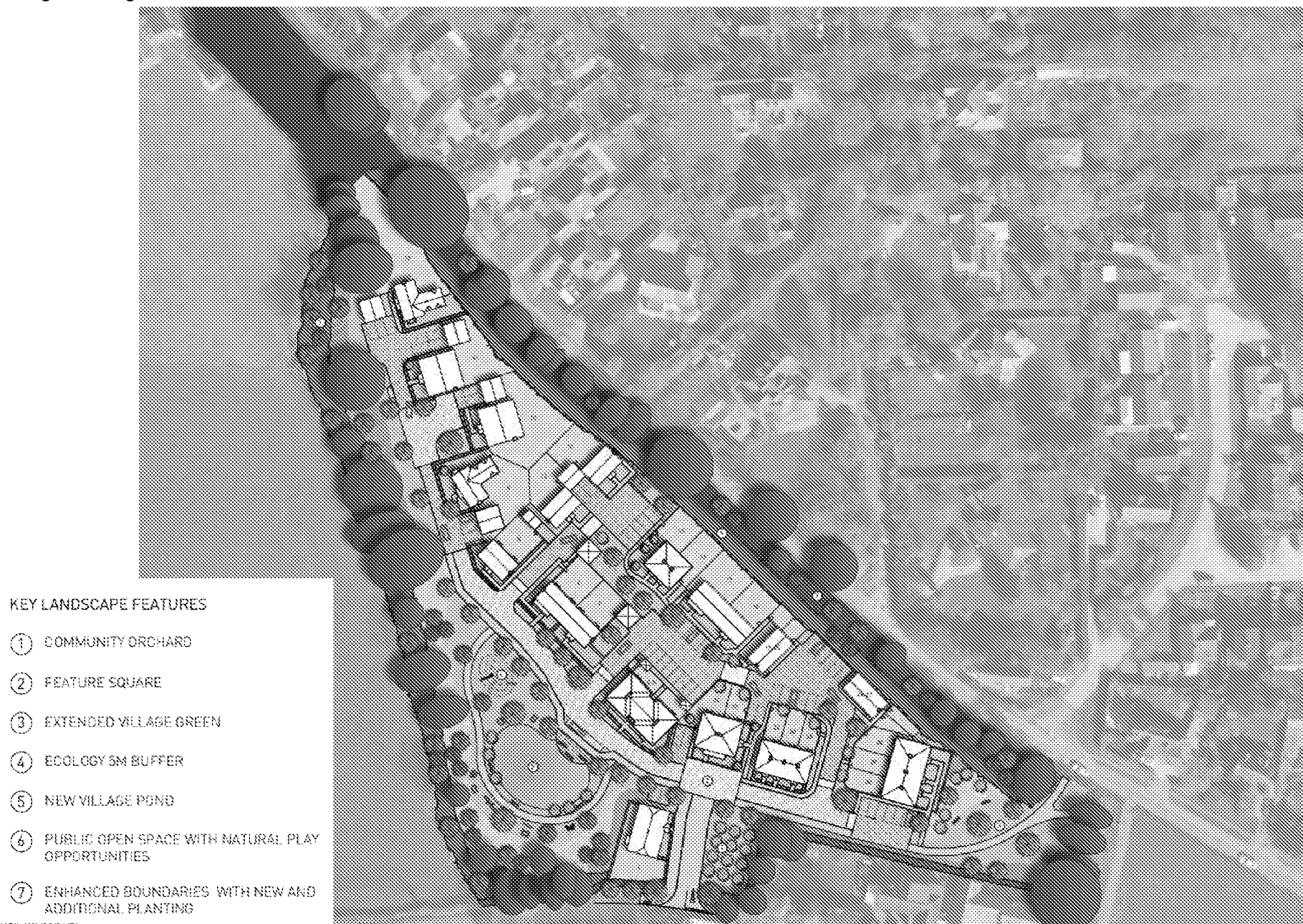
1.4 Development Proposals

In summary, the proposed works include the construction of 30 dwellings and creation of a pond, for which will benefit both wildlife and drainage. Improvement of an already existing access point along the southern hedgerow boundary will be made by removing a section of the hedgerow, which includes 19 trees. Furthermore, a small section of hedgerow will be removed along the north-eastern boundary, to create a footpath. This section will not involve the removal of any trees.

It is understood that no gaps will be cut in any other sections of the hedgerow and no trees, other than the already stated ones, will be removed. A 5m buffer will be kept between the development and the hedgerows and Tree Root Protection Zones have been established and will be protected (**Figure 2**).



Figure 2. Diagram displaying the red line boundary, proposed development and the 5m buffer between the development and the hedgerows. Image courtesy of Pegasus Design.



2.0 LEGISLATION & POLICY

2.1 Legislation

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

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

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

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

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

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

2.1.4 *Natural Environment and Rural Communities Act (2006)*

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

2.1.5 *Protection of Badgers Act*

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

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

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

2.2 Planning Policy

2.2.1 National

The revised National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) outlines a number of more robust measures to ensure the impacts of development upon the Country's biodiversity interests are appropriately mitigated against whilst also seeking to achieve a 'net gain'. The key policy test relating to developments and biodiversity is outlined below.

Chapter 15. Conserving and Enhancing the Natural Environment

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;

d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

171. Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

172. Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great

weight in National Parks and the Broads. The scale and extent of development within these designated areas should be limited. Planning permission should be refused for major development⁵⁵ other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:

- a) the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;*
- b) the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and*
- c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.*

173. Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 172), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.

Habitats and Biodiversity

174. To protect and enhance biodiversity and geodiversity, plans should:

- a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.*

175. When determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons⁵⁸ and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

176. The following should be given the same protection as habitats sites:

a) potential Special Protection Areas and possible Special Areas of Conservation;

b) listed or proposed Ramsar sites; and

c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

177. The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site is being planned or determined.

2.2.2 Local – Arun Local Plan 2011-2031 Adopted July 2018

Arun District Council will encourage and promote the preservation, restoration and enhancement of biodiversity and the natural environment through the development process and particularly through policies for the protection of both designated and non-designated sites. Where possible it shall also promote the creation of new areas for habitats and species. In relation to designated sites, development will be permitted where it protects these sites and the species and habitats contained within them.

Proposed development likely to have an adverse effect on land with the designated features of any Site of Biodiversity or Geological Importance as designated in the Arun Local Plan or any subsequently designated sites (either individually or in combination with other developments), will not normally be permitted. Development on wildlife sites with the highest value will only be permitted exceptionally where the following can be demonstrated:

- There is no alternative solution (which shall be adequately demonstrated by the developer).
- There are reasons of public health or public safety or
- There are benefits of primary importance to the environment or iv. There are imperative reasons of overriding public interest.

Aside from the above however, the presumption in favour of sustainable development does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined. In determining any planning application affecting Sites of Biodiversity or Geological Importance the Council will ensure that the intrinsic natural features of particular interest are safeguarded or enhanced having regard to;



- The European, National or Local status and designation of the site;
- The nature and quality of the site's features, including its rarity value;
- The extent of any adverse impacts on the notified features of interest;
- The need for compensatory measures in order to re-create remaining features of habitats on or off the site.

Where appropriate the Council will ensure the effective management of designated sites through the imposition of planning conditions or Section 106 agreements as appropriate.

Policy ENV DM3 states that any development will retain and incorporate important ecological habitats, wildlife corridors and stepping stones as well as be designed to minimise any disturbance to these habitats. Developments that fail to do so will have their proposal rejected. Where a development scheme would result in a habitat loss, mitigation measures will be proposed as part of the proposed scheme and such measures agreed with the Local Planning Authority prior to the determination of any planning application. Within Biodiversity Opportunity Areas (BOAs) identified within the local plan or where likely to have an impact on species or habitats within the BOAs, any application for planning permission shall include a properly conducted survey of the presence of that species and habitat and impact(s) that development may have on the BOA.

Development and biodiversity Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement. Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licensed person. All developments shall have regard to Natural England's standing advice for protected species.

2.3 Biodiversity Action Plans & UK Post-2010 Biodiversity Framework

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

3.0 METHODOLOGY

3.1 Desk Based Search

In 2019 All Ecology Ltd submitted a data request to Sussex Biodiversity Records Centre (SxBRC). The following information was requested:

- Statutory site designations on or within 1 km of the site.
- Non-statutory site designations on or within 1 km of the site.
- Records of protected species within the 1 km of the site.
- Records of rare or notable species within the 1 km of the site.

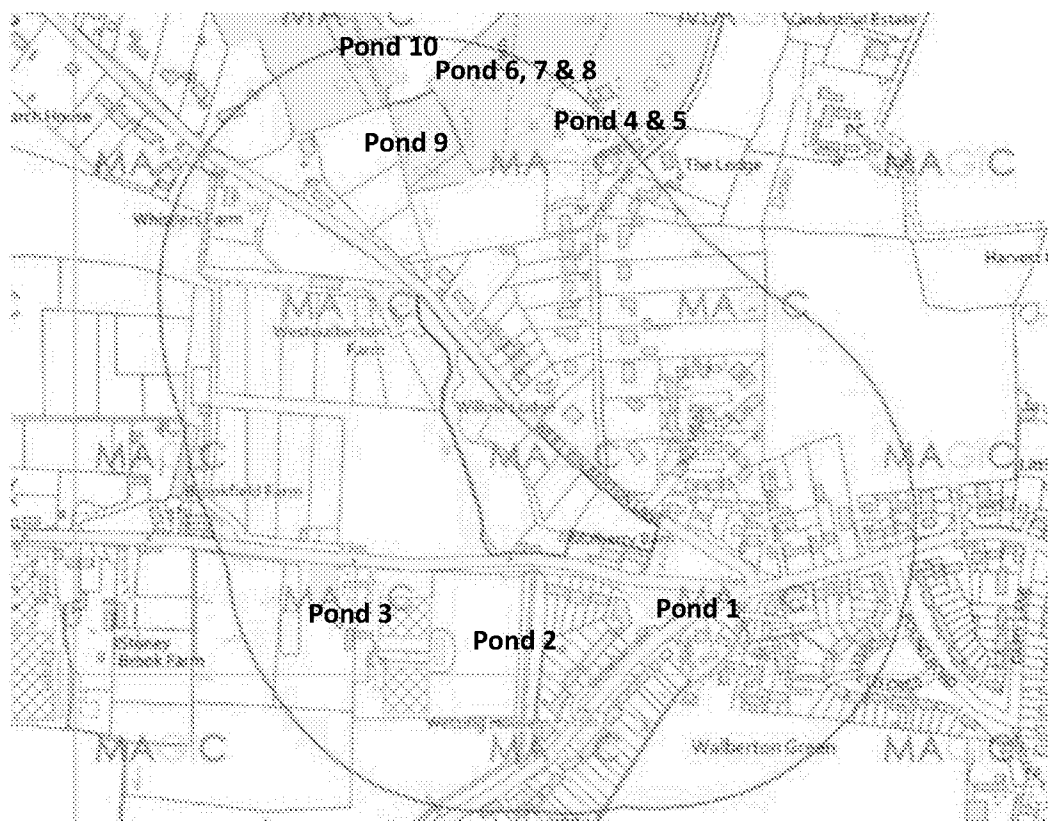
Additionally, MAGIC (Multi-Agency Geographic Information for the Countryside, 2019) was used to establish the distance and direction of designated sites and species records within the search area.

3.2 Assessment of Ponds

Although the development will not impact directly upon any ponds, Great Crested Newts (*Triturus cristatus*) (GCN) can utilise terrestrial habitat up to 250m from a pond (Langton et al., 2001). Therefore, a pond must be surveyed if it holds potential to support newts (Natural England, 2013). All Ecology Ltd identified a number of ponds within 250m of the site (**Figure 3**) and undertook an HSI Assessment of two of the ponds Pond 1 and 2.

When undertaking the eDNA Assessment on Pond 2, Ecosupport staff identified an additional pond (Pond 3) as a result they undertook an HSI on this additional water body.

Figure 3. Ponds within 250m.



A Habitat Suitability Index (HSI) takes into account the following factors when calculating the ponds suitability to support GCN:

- Location of Pond
- Surface Area
- Desiccation Rate
- Water Quality
- Shade
- Presence of Waterfowl and Fish
- Number of Ponds within 1km
- Quality of Terrestrial Habitat
- Macrophyte Cover

These criteria are used to calculate a score according to ARG guidelines (ARG, 2010) using the Oldham (2000) calculation formulae.

This gives a score between 0 and 1 of the suitability of the pond for GCN with:

0.40 – 0.50: Poor suitability for GCN

0.51 – 0.59: Below average suitability for GCN

0.60 – 0.69: Average suitability for GCN

0.70 – 0.79: Good suitability for GCN

0.80 – 1.00: Excellent suitability for GCN

For ponds of average suitability or above, further surveys are often recommended.

It was not possible to gain access to the other ponds illustrated in **Figure 3** above. As a result, a Rapid Risk Assessment was undertaken. This simple risk assessment can inform the decision as to whether to apply for a licence. Early consideration of options can often result in no licence being required. A sound survey and careful comparison with development plans will often be the best guide to whether a licence should be obtained. As a result, this assumes the presence of GCN within ponds and considered the impact of the development in the absence of Mitigation (i.e. the worst-case scenario).

Each effect is assigned a notional probability of leading to an offence. The maximum notional probability is then used to derive a conclusion, which is displayed as red (probability ≥ 0.65), amber (0.3-0.65) or green (<0.3).

Red: offence highly likely. This indicates that the development activities are of such a type, scale and location that an offence is highly likely.

Amber: offence likely. This indicates that the development activities are of such a type, scale and location that an offence is likely.

Green: offence highly unlikely. This indicates that the development activities are of such a type,

scale and location that it is highly unlikely any offence would be committed should the development proceed. Therefore, no licence would be required.

3.3 eDNA Survey

Due to the identified suitability of Pond 2 to support GCN, and the resulting Rapid Risk Assessment classification, an eDNA assessment was undertaken to determine the presence/likely absence of the species. The survey was undertaken in full compliance with best practice guidance published by Defra (Biggs *et al.*, 2014). A total of 20 water samples were taken from the pond, spaced as evenly as possible around the pond margin and targeting in particular areas where suitable egg-laying vegetation was present, as well as areas of open water which could facilitate displaying male GCN. 30ml samples were taken at each survey point and mixed together in a sterile bag. Six individual 15ml samples of this water were then mixed thoroughly with ethanol to preserve the eDNA sample. These samples were then refrigerated at 2-4°C prior to being sent for analysis. Analysis of the eDNA samples was undertaken by Surescreen Scientifics, a recognised 'quality supplier' by Natural England. The survey was undertaken in April 2020 during the optimal timings as per best practice guidelines.

3.4 Phase II Bat Activity Survey

3.4.1 Transect Survey

Phase II Bat Activity Surveys were undertaken on site to assess the usage by foraging and commuting bats, following best practice guidelines published by the Bat Conservation Trust (Collins, J., (ed.), 2016). As the site was classified as having high quality habitat to support commuting and foraging bats, and given the presence of nearby records of Barbastelle, two surveys per month were undertaken with one dusk/dawn survey (15 in total).

During each survey a transect route was walked around the site boundary. The direction travelled was alternated each survey to allow different areas to be surveyed at different times. Bat Scanner detectors were used to determine the species of bats recorded. The dusk surveys began at sunset and continued for approximately two hours after sunset, the dawn surveys began two hours before sunrise and continued until sunrise itself. The surveyors walked at a constant speed, recording bat passes and associated details such as species, time and direction of flight wherever possible (**Table 1**).

During all surveys the following information was recorded on survey forms where possible:

- Time of call registration;
- Species;
- Location / activity;
- Direction of flight.



Table 1. Surveyors who undertook the Bat Transects.

Survey Number	Surveyors
1	Zenobia Hatch (lead surveyor) and Steven Hatch
2	Zenobia Hatch (lead surveyor) and Steven Hatch
3	Zenobia Hatch (lead surveyor) and Steven Hatch
4	Zenobia Hatch (lead surveyor) and Steven Hatch
5	Zenobia Hatch (lead surveyor) and Steven Hatch
6	Zenobia Hatch (lead surveyor) and Steven Hatch
7	Zenobia Hatch (lead surveyor) and Steven Hatch
8	Zenobia Hatch (lead surveyor) and Steven Hatch
9	Zenobia Hatch (lead surveyor) and Steven Hatch
10	Joe Carter (lead surveyor)
11	Zenobia Hatch (lead surveyor) and Leesha Hicks
12	Zenobia Hatch (lead surveyor) and Steven Hatch
13	Zenobia Hatch (lead surveyor) and Holly Maynard
14	Holly Maynard (lead surveyor) and Julie Trelvellick
15	Zenobia Hatch (lead surveyor) and Julie Trelvellick

3.4.2 Static Survey

As per best practice guidance, static bat surveys were also undertaken to facilitate quantitative analysis of data to supplement that collected during the transect surveys. Three static detectors (Anabat Express) were deployed and left *in situ* to collect data for five consecutive nights, with care taken to ensure suitable weather conditions for the duration of the survey period (**Figure 4**). The static detectors were positioned so that there were no obstructions to the microphone and at a suitable height to maximise the amount of bat activity recorded. Data was subsequently analysed using Anabook software, with all bat species and counts recorded. Bat passes of the same species where they were recorded multiple times within a one-minute period were assumed to be multiple passes by the same bat.

Figure 4. Location of the three Static Bat Detectors and the direction of the microphones.



3.5 Dormouse Survey

Nest tubes and nest boxes were deployed within the boundary vegetation on the 31st of March 2020. Nest tubes were made from a stiff plastic folded into a tubular square, 25cm in length with a 5x5cm cross-section, with a plywood tray sealing one end. 50 tubes were tied to the underside of suitable branches using wire. The nest boxes were constructed of wood and tied to the trunks of trees within the hedgerow. They were checked monthly from April - November 2020 for the presence of and/or evidence of Dormice, such as Dormouse nests and nuts with teeth marks indicative of Dormice. The tube checks took place in conjunction with an index of probability, which indicated the likelihood of finding dormice during each month of the year. Carrying out the surveys over these months achieved a score of > 20. Guidelines state that this score is sufficient, therefore the survey effort expended was considered to be adequate.

All surveys between the 21st of April 2020 and 26th of June 2020 were undertaken by Zenobia Hatch and Steven Hatch. Following the presence of a Dormouse nest on the 26th of June 2020, the remaining Dormouse surveys were undertaken by Ashely James BSc (Hons) (License Number: 2018-35528-CLS-CLS), on the 23rd of July 2020 and the 28th of October 2020, and Lyndsey McBean BSc (Hons) (License Number: 2020-44360-CLS-CLS), on the 17th of August 2020, 15th of September 2020 and 12th of November 2020.



3.6 Reptile Survey

Habitats on site were considered suitable for reptiles. Therefore, a full reptile survey was carried out on site between the 15th of April and the 28th of May 2020. All surveys were undertaken in accordance with best practice guidance (Froglife, 1999). Refugia (87 bitumen roofing felt mats), were spread across the site on the 31st of March 2020 and allowed two weeks to bed in. The refugia was then checked seven times during suitable weather conditions by experienced reptile workers. The species, approximate life stage and sex of any reptiles found was recorded.

All surveys were undertaken by Zenobia Hatch BSc (Hons), with the exception of the final survey (28th of May 2020), which was undertaken by Holly Maynard MRes, BSc (Hons).

3.7 Lepidoptera Survey

3.7.1 Transect Survey

A fixed transect was established on site along which butterflies were recorded during regular visits (between the 21st of April and 17th of September 2020) following in accordance with best practise guidance (**Figure 5** and **Table 2**) (UK Butterfly Monitoring Scheme, 1993). The transects were undertaken between 10:45 and 15:45 and only when weather conditions were suitable for butterfly activity:

- Temperature between 13 - 17°C, with at least 60% sun
- > 17°C, providing it was not raining
- Wind speeds of < 5 on the Beaufort scale

Table 2. Surveyors who undertook the Lepidoptera Transects.

Survey Number	Surveyors
1	Zenobia Hatch (lead surveyor) and Steven Hatch
2	Zenobia Hatch (lead surveyor)
3	Zenobia Hatch (lead surveyor)
4	Zenobia Hatch (lead surveyor)
5	Zenobia Hatch (lead surveyor)
6	Zenobia Hatch (lead surveyor) and Steven Hatch
7	Zenobia Hatch (lead surveyor)
8	Zenobia Hatch (lead surveyor)
9	Zenobia Hatch (lead surveyor) and Steven Hatch

10	Zenobia Hatch (lead surveyor) and Julie Trelvellick
11	Zenobia Hatch (lead surveyor) and Leesha Hicks
12	Zenobia Hatch (lead surveyor)
13	Zenobia Hatch (lead surveyor) and Julie Trelvellick
14	Holly Maynard (lead surveyor)
15	Zenobia Hatch (lead surveyor)

Figure 5. Transect route split into six sections for the Lepidoptera Survey.



3.7.2 Brown Hairstreak egg search

The Brown Hairstreak butterfly (*Thecla betulae*) is a declining species in the UK, with a 49% occurrence change reduction between 1976 and 2014 (Fox et al, 2015). It is listed under Section 41 Species of Principle Importance under the Natural Environment and Rural Communities Act (2006) (NERC) in England, it is also a UK Biodiversity Action Plan (BAP) Priority Species and is listed as a High Priority species by Butterfly Conservation (Newland and Still, 2015; Eeles, 2019).

West Sussex is a known stronghold for Brown Hairstreak (Roebuck, n.d.; UK Butterflies, 2020). The site has the potential to provide high quality habitat in accordance with the UK Butterfly Monitoring Scheme (2016), largely due to the presence of > 20% Blackthorn (*Prunus spinosa*) in the hedgerows with frequent (> 25%) being young (< 3 years old) growth. This species can be difficult to identify by a fixed transect survey, however, they can be effectively surveyed for by undertaking an egg search (UK Butterfly Monitoring Scheme, 2016).

One brief egg search was undertaken on the 31st of March 2020, by Zenobia Hatch BSc (Hons) and Steven Hatch BSc (Hons), to establish if this species may be present at the site. A more thorough survey was undertaken on the 6th of November 2020, by Zenobia Hatch BSc (Hons) and Julie Trelvellick. Both surveys were carried out in accordance with best practice guidance (UK Butterfly Monitoring Scheme, 2016).

3.8 Hedgerow Assessment

The hedgerows were surveyed on the 26th of June 2020, by Zenobia Hatch BSc (Hons) and Steven Hatch BSc (Hons). The Wildlife criteria, provided in Part II of Schedule 1 of the Hedgerows Regulations 1997, was followed to determine the ecological importance of the site's hedgerows. Hedgerows are also considered important should they satisfy any of the following criteria:

- The hedgerow contains species in part I of Schedule 1; Schedule 5; or Schedule 8 of the Wildlife and Countryside Act 1981; or various other defined species including certain Red Data Book species.
- That the hedgerow is referred to in a record held by a biological record centre as containing protected plants (within 10 years) or birds and animals (within 5 years); or,
- That the hedgerow contains one of the following criteria per average 30m section surveyed:
 - Seven Schedule 3 species; or,
 - Six Schedule 3 species and three listed features (see below); or,
 - Six Schedule 3 species, including one of the following: Black Poplar, Large-Leaved Lime, Small-Leaved Lime or Wild Service-tree; or,
 - Five Schedule 3 species and four listed features; or,
 - Four Schedule 3 species, two listed features and lying adjacent to a bridleway or footpath; with,
- Listed features include:
 - A bank or wall which supports the hedgerow along at least half of its length;
 - Gaps which together do not exceed 10% of the length of the hedgerow;
 - At least one standard tree per 50m of hedge;
 - At least three Schedule 2 woodland species within the hedgerow;
 - A ditch along at least one half of the length of the hedgerow;
 - Connections scoring 4 points or more (1 point per connection of the hedgerow with another, 2 points per connection of the hedgerow to a pond or broad-leaved woodland); and,
 - A parallel hedge within 15m of the hedgerow.

3.9 Badger Survey

A total of three mammal holes have been identified at the site, one within the western

hedgerow and two within the northern hedgerow. Two of the holes have been identified as being used by Rabbits (*Oryctolagus cuniculus*) and Foxes (*Vulpes vulpes*), however, it was not possible to determine the species using one of the holes in the northern hedgerow by visual inspection alone. Therefore, a camera trap was deployed at the site for 21 consecutive days between the 4th and 24th of September 2020 by Zenobia Hatch BSc (Hons) (**Figure 6**). Weekly checks were made to ensure the camera was still in the correct position and working as it should, the batteries and SD card were also changed during these checks.

Figure 6. Location of the mammal hole surveyed by the camera trap (illustrated by the yellow circle) and the other mammal holes (displayed by a blue circle).



3.10 Assessment of Trees to Support Roosting Bats

An assessment of three mature trees in the eastern, and 19 in the southern hedgerows was undertaken by Zenobia Hatch BSc (Hons) and Julie Trellick, to determine their level of potential to support roosting bats. This assessment was undertaken as the trees are to be removed, as part of the proposed development (please refer to **Section 1.4**).

This assessment involved using close-focus Avian Trekker binoculars and a high-powered torch

to inspect each tree from ground level, searching for features indicative of bat roost presence (**Table 3**). The survey was carried out in accordance with *Bat Surveys for Professional Ecologists; Good Practice Guidelines* 3rd edition published by the Bat Conservation Trust (Collins, J. (eds), 2016) on the 6th of November 2020.

Table 3. Tree features commonly used by bats and field signs that may indicate bat presence (BCT, 2012).

Features of trees used as bat roosts	Signs indicating possible use by bats
Natural holes. Woodpecker holes. Cracks/splits in major limbs. Loose bark. Hollows/cavities. Dense epicormic growth (bats may roost within it). Bird and bat boxes.	Tiny scratches around entry point. Staining around entry point. Bat droppings in, around or below entrance. Audible squeaking at dusk or in warm weather. Flies around entry point. Distinctive smell of bats. Smoothing of surfaces around cavity.

3.11 Updating Botanical Survey

Within the All Ecology report, it highlighted the limitation of the survey having been undertaken in September, therefore, missing the optimum time for recording floristic diversity. As a result, updating surveys were undertaken of the grassland on site between May – September. The species present were noted, and their frequency recorded using the DAFOR scale (Dominant, Abundant, Frequent, Occasional and Rare).

3.12 Biodiversity Net Gain Assessment

To comply with legislation and ensure the proposed development provides a Biodiversity Net Gain, an assessment utilising the Biodiversity Metric 2.0 was undertaken. This involved entering the habitats on site, and proposed development as numerical data to calculate the percentage of Biodiversity Net Gain.

3.13 Evaluation and Assessment

The methodology for the assessment of the likely ecological effects of the proposed development is based on CIEEM's Guidelines for Ecological Assessment in the UK and Ireland (CIEEM, 2018). The guidelines provide a useful framework for assessing ecological impacts at any level.

The approach of the guidelines is to assess potential impacts to all features of ecological interest that could be affected by a scheme. As a scheme may have effects beyond its boundaries, it is important to identify the 'zone of influence' of the scheme and to assess the potential for significant ecological impacts throughout this zone as well as those within the application boundaries, for example impacts upon nearby species, habitats and sites designated for their nature conservation value. Where such features are identified, they are first valued and then assessed as to the likely magnitude and significance of potential impacts that may be exerted upon those features by the proposed scheme. 'Significant' impacts are considered to be where they affect the integrity and/or conservation status of a designated site for a habitat or species. All potential significant impacts are considered in the absence of any avoidance, mitigation or compensation to inform the suitable design of such measures (where necessary), which can then be incorporated into the scheme to reduce such impacts. Finally, an assessment is made to

identify any residual impacts upon these features (both positive and negative) that would remain once any impact avoidance, mitigation or compensation measures have been implemented.

All ecological features identified within the site boundaries and the identified zone of influence of the proposals are considered within a defined geographical context, as follows:

- International
- National
- County
- District
- Local
- Site

The guidelines state that ecological features that are valued, under the ecological assessment of a scheme, to be of less than local value are not considered sufficiently valuable for an impact to be considered significant. Therefore, only those features assessed as being of at least local value require avoidance, mitigation and/or compensation. That said, where a feature is of less than local value but where impacts upon this feature hold the potential to result in contravention of relevant wildlife legislation, measures must be implemented to ensure compliance with legislation, regardless of the level of value of the feature.

Potential impacts are considered at all stages of the proposed development. The assessment should consider all types of impact (both direct and indirect) and whether potential impacts are short, medium, long-term, permanent, temporary, reversible, irreversible, positive and/or negative.

3.14 Limitations on Survey Information

All surveys were undertaken at the appropriate time of year, in accordance with best practise guidelines. However, there is potential for seasonal variation and fluctuations in the presence of species, including the potential for additional species to take up residence following the production of this report. Lack of signs of a particular species does not confirm its absence, merely that there was no indication of its presence during the time of survey.

This survey does not constitute a full site assessment for invasive species, such as Japanese Knotweed (*Fallopia japonica*), but no such species were found during the time on site.

It was not possible to gain access to all of ponds (please see **Section 3.2**), however, the completion of the Rapid Risk Assessment has concluded it is highly unlikely an offence would occur associated with any of the ponds not surveyed, even if GCN were present. Therefore, it is not considered to be a significant limitation.

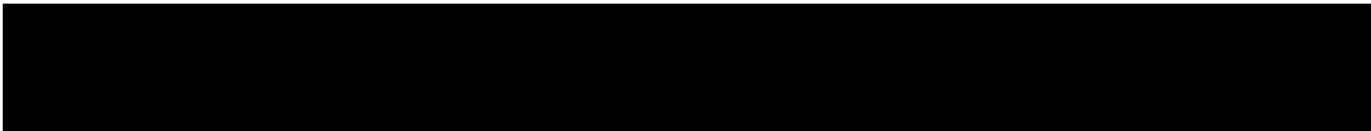
The Lepidoptera transect could not always be consistently spaced apart due to inappropriate weather conditions to undertake the surveys. However, this is not considered to be a significant limitation as multiple surveys were undertaken within each NERC species flight periods, providing opportunities to identify the species if they were present at the site. Furthermore,

during every sight visit outside of the Lepidoptera surveys, a note of the species observed was kept, ensuring species seen outside of the transect, but not within, were also recorded.

Additionally, two of the Lepidoptera transects were started prior to 10:45am, the 6th and 11th transect. This was due to the high temperatures, 23 – 24°C and 24 – 26°C respectively, and the high level of Lepidoptera activity observed. Therefore, it is not considered to be a limitation upon the survey results.

It was noted that the grass was cut between the 8th and 22nd of July 2020, this had the potential to impact the results of the surveys, most notably the Lepidoptera and Updating Botanical surveys.

Part of the northern hedgerow had been flailed not long before the 28th of October 2020. It was noted that none of the Dormouse tubes were directly impacted by this. This has the potential to impact the results of the Lepidoptera and Dormouse surveys.



4.0 RESULTS

4.1 Desk Based Search

4.1.1 Protected Sites

There is one statutory designated site within 1km of the site. This is the South Downs National Park which is approximately 813m northeast of the site. The South Downs contains a mosaic of habitats that cover 1600 km² in area which include lowland heathland. The national park contains a number of rare flora and fauna including Burnt-tip Orchid (*Orchis ustulata*) and the Adonis Blue butterfly (*Polyommatus bellargus*).

There are no non-statutory designated sites within 1 km of the site.

4.1.2 Protected / Notable Species

SxBRC provided the following records for protected and notable species within 1 km of the site boundary:

- **Mammals** – 12 species
- **Birds** – 37 species
- **Reptiles** – 4 species
- **Amphibians** – 4 species
- **Invertebrates** -
 - Lepidoptera – 27 species
 - Tue Flies – 8 species
 - Grasshoppers / Crickets – 2 species
 - Coleoptera – 5 species
 - Ants / Bees / Sawflies / Wasps - 34 species
- **Flora** – 25 species

Please see **Appendix I** for more details.

4.2 Assessment of Ponds

Of the three ponds assessed (Pond 1, 2 and 3), one pond (Pond 2) was classified as having 'Average' suitability to support GCN achieving a score of 0.66. Pond 1 achieved a score of 0.28 thus classifying it as having 'Poor' suitability and Pond 3 achieved a score of 0.59 classifying it as having 'Below Average' suitability.

Following the Rapid Risk Assessment, it is considered likely that even if GCN are present in all ponds identified within the search radius, GCN would only likely be impacted within Ponds 1, 2 and 3 (**Appendix II**).

As only Pond 2 had suitability to support GCN, further assessment was only recommended for this water body.

4.3 eDNA Survey

Pond 2 was subject to an eDNA assessment. This concluded a likely absence of GCN within the pond (**Appendix III**).

4.4 Phase II Bat Activity Survey

4.4.1 Transect Survey

The relevant survey conditions recorded during all transects can be seen in **Table 4**. Activity was dominated by Common Pipistrelle (*Pipistrellus pipistrellus*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*) across most of the transects. On the 30th of April, Soprano Pipistrelle was the only species recorded and on July 16th, August 12th and September 17th, Common Pipistrelle were the dominant species recorded. There were occasional registrations of Serotine (*Eptesicus serotinus*) and low numbers of Long-eared (*Plecotus* spp.), Noctule (*Nyctalus noctula*) and Myotis species also recorded (See **Appendix IV** for a diagrammatic representation of results).

Table 4. Conditions of the Bat Transect Surveys.

Survey Number	Survey Type	Date	Timings	Weather Conditions
1	Dusk Transect	16/04/2020	Start: 20:00 Sunset: 20:00 End: 22:00	14 - 12°C, Beaufort 1 – 0, 35 - 50% cloud cover and no rain.
2	Dusk Transect	30/04/2020	Start: 20:22 Sunset: 20:22 End: 22:22	8 - 9°C, Beaufort 2 – 1, 80 - 20% cloud cover and no rain.
3	Dusk Transect	15/05/2020	Start: 20:46 Sunset: 20:46 End: 22:46	12 - 11°C, Beaufort 0 – 1, 10 - 40% cloud cover and no rain.
4	Dusk Transect	27/05/2020	Start: 21:03 Sunset: 21:03 End: 23:03	15 - 14°C, Beaufort 0 – 1, 60 - 20% cloud cover and no rain.
5	Dusk Transect	15/06/2020	Start: 21:18 Sunset: 21:18 End: 23:18	15 - 14°C, Beaufort 0, 15 - 50% cloud cover and no rain.
6	Dusk Transect	29/06/2020	Start: 21:20 Sunset: 21:20 End: 23:20	16 - 15°C, Beaufort 2 – 1, 95 - 100% cloud cover and no rain.
7	Dusk Transect	16/07/2020	Start: 21:08 Sunset: 21:08 End: 23:08	20 - 17°C, Beaufort 0 – 1, 90 - 80% cloud cover and no rain.
8	Dusk Transect	29/07/2020	Start: 20:50 Sunset: 20:50 End: 22:50	17 - 15°C, Beaufort 0, <10% cloud cover and no rain.

9	Dusk Transect	12/08/2020	Start: 20:28 Sunset: 20:28 End: 22:28	26 - 23°C, Beaufort 1 – 3, 90 - 100% cloud cover and no rain.
10	Dusk Transect	27/08/2020	Start: 19:57 Sunset: 19:57 End: 21:57	15 - 14°C, Beaufort 3, 100% cloud cover and no rain.
11	Dawn Transect	28/08/2020	Start: 04:11 Sunrise: 06:11 End: 06:11	14°C, Beaufort 0 – 2, 100% cloud cover and intermittent light – medium rain that started at 04:57 and lasted until 05:35.
12	Dusk Transect	17/09/2020	Start: 19:11 Sunset: 19:11 End: 21:11	16 - 14°C, Beaufort 1, <5% cloud cover and no rain.
13	Dusk Transect	28/09/2020	Start: 18:46 Sunset: 18:46 End: 20:46	18°C, Beaufort 0 – 1, 100% cloud cover and no rain.
14	Dusk Transect	08/10/2020	Start: 18:28 Sunset: 18:28 End: 20:28	15°C, Beaufort 0 – 1, 90% cloud cover and no rain.
15	Dusk Transect	22/10/2020	Start: 17:55 Sunset: 17:55 End: 19:55	14 - 11°C, Beaufort 0 – 2, <10% cloud cover and no rain.

4.4.2 Static Survey

Appendix IV provides full details on the data recorded by all three static detectors over a five-day period, twice monthly from April – October. The same assemblage of bat species was recorded during the transect surveys, with addition of two Nathusius' Pipistrelle (*Pipistrellus nathusii*) on April the 16th, one on June the 16th by static number 1. Static number 2 also recorded one individual of this species on April the 16th and static number 3 recorded one individual of this species on June the 3rd. Common and Soprano Pipistrelles were the most frequently recorded species, with occasional Serotines. All other species were recorded in low numbers.

4.5 Dormouse Survey

Evidence of Dormice (*Muscardinus avellanarius*) were recorded from June – November in a total of ten tubes across the western and northern hedgerows. This includes eight nests (two of which are juvenile practice nests) and nuts eaten by Dormice. Additionally, a total of three adult Dormice, two were confirmed males and the third was not sexed, were recorded in August, October and November respectively (**Table 5 and Figure 7**).

Evidence of Wood mouse (*Apodemus sylvaticus*) were also recorded in a total of 19 tubes. Furthermore, a Blue Tit (*Cyanistes caeruleus*) nest was also recorded within a nest box in April.

Table 5. Results of the Dormouse surveys and corresponding map numbers (please see **Figure 7**).

Date	Map number	Results
April 21 st	1	Blue Tit nest found in nest box.
May 28 th		No evidence of any species identified
June 26 th	2	Dormouse nest. No further tubes were checked due to surveyors not having a Dormouse licence.
July 23 rd	3	Start of a Dormouse nest.
	4	Nuts, eaten by Dormouse.
August 17 th	5	Dormouse nest with adult male inside. Nest is made from woven shredded bark and green leaves.
	6	Wood Mouse food cache.
	7	Dormouse nest made from green leaves, grass and bark.
September 15 th	8	Wood Mouse nest with adult Wood Mouse inside.
	9	Wood Mouse food cache.
	10	Wood Mouse nest.
	11	Juvenile Dormouse practice nest made of shredded bark only.
	12	Dormouse nest made of bark and brown leaves.
October 28 th	13	Adult male Dormouse.
November 12 th	14	Wood Mouse nest with two adult Wood Mouse inside.
	15	Wood Mouse food Cache.
	16	Wood Mouse nest with one adult Wood Mouse inside.
	17	Wood Mouse nest.
	18	Dormouse practice nest, unwoven, green leaves and shredded bark.
	19	Dormouse nest, woven with grass and leaves (green and brown) with adult Dormouse inside.

Figure 7. Location of evidence of Dormice (yellow) and Wood Mouse (white) with corresponding map numbers (please see **Table 5**).



4.6 Reptile Survey

During the surveys, Slow Worms were recorded on site (**Table 6** and **Figure 8**).

Table 6. Results and conditions of the Reptile Surveys.

Date	Time	Temp (°C)	Wind (Beaufort)	Cloud (%)	Precipitation	Reptiles
15/04/2020	11:35 – 12:10	12	1 – 2	15 – 5	0	0
21/04/2020	12:30 – 13:10	16	3 – 4	5	0	0

24/04/2020	09:35 – 10:15	14	1	10	0	1 Adult Female Slow Worm
01/05/2020	14:00 – 14:40	13	1 – 5	30 – 90	Light drizzle during last 5 mins	0
06/05/2020	09:10 – 09:50	13 – 14	1 – 2	0	0	2 Adult Female Slow Worms
19/05/2020	08:50 – 09:35	14 – 16	1 – 2	70 – 50	0	0
28/05/2020	06:15 – 07:00	12	3 – 4	0	0	1 Adult Female Slow Worm
Total						4 Adult Female Slow Worms

Figure 8. Location of Slow Worms recorded on the 24th of April (orange circle), 6th (orange and blue circle) and 28th (white circle) of May 2020.



4.7 Lepidoptera Survey

4.7.1 Transect Survey

Conditions of the surveys are provided in **Table 7**, a summary of species recorded is in **Table 8** and full results are in **Appendix V**. During these surveys, a total of 18 butterflies, and four moth species were recorded. Of these species, only one, the Cinnabar moth (*Tyria jacobaeae*) is listed under s41 of NERC. This species was only observed on one transect, out of a total of 15, flying through the site. The most frequently recorded species include Meadow Brown (*Maniola jurtina*) and Large White (*Pieris brassicae*), which were recorded on 9 of the transects. Small White (*Pieris rapae*) were recorded on 8 transects, with Small Skipper (*Thymelicus sylvestris*) and Gatekeeper recorded on a total of 6. Additionally, one Clouded Yellow (*Colias croceus*), was observed commuting across the site by section 2, on the 31st of July 2020, after the transect survey had ended. The Clouded Yellow is a truly migratory European species which is a regular visitor to Britain.

The 6th transect, on the 26th of June 2020, was when the highest number of individuals (355 butterflies and two moths), and species (12 butterflies and one moth) were recorded. Meadow Browns, a widespread and common species, were the most frequently recorded individuals, with a total of 193 individuals recorded across the transect. During the following transect, on the 7th of July 2020, a total of 122 butterflies, from nine species were recorded.

Breeding behaviour was observed on seven of the transects, species displaying breeding behaviour include Meadow Brown, Small Copper (*Lycaena phlaeas*), Peacock (*Aglais io*), Small White, Marbled White (*Melanargia galathea*) and Small Skipper. This included observations of egg laying by Meadow Brown, Small Copper, Marbled White and Small Skipper. All species recorded displaying breeding behaviour at the site are classified as 'least concern' on the GB Red List (**Table 8**). Dog fighting, has been included as breeding behaviour, it is likely due to territorial behaviour between males or could be a sign of courtship between a male and female.

Table 7. Conditions of the Lepidoptera Surveys.

Survey Number	Date	Time	Temp (°C)	Wind (Beaufort)	Cloud (%)	Precipitation
1	21/04/2020	12:30 – 13:14	16 - 17	3 - 4	5	0
2	06/05/2020	11:00 – 11:50	15 – 16	1 – 2	0	0
3	22/05/2020	12:45 – 13:32	16 - 17	2 – 3	30	0
4	28/05/2020	11:30 – 12:36	18 – 19	2	< 5	0
5	22/06/2020	13:10 – 14:27	18	0 – 1	40 – 20	0
6	26/06/2020	09:50 – 10:47	23 - 24	0 – 1	< 5	0

7	07/07/2020	11:15 – 12:29	18 – 19	0 – 2	70 – 50	0
8	23/07/2020	12:10 – 13:57	19 – 20	0 – 1	60 – 40	0
9	31/07/2020	12:35 – 14:15	28	0 – 1	0	0
10	05/08/2020	10:51 – 11:59	18	3	25 – 30	0
11	12/08/2020	09:40 – 10:20	23 – 26	1 – 2	< 5 – 0	0
12	26/08/2020	14:00 – 14:40	20	3 – 2	70 – 30	0
13	02/09/2020	11:50 – 13:45	18	1	80 – 60	0
14	07/09/2020	14:00 – 15:10	17	0 – 1	40 – 10	0
15	17/09/2020	11:00 – 11:50	18 – 19	2 – 1	< 5	0

Table 8. Summary of species recorded during the Lepidoptera surveys.

Common Name	Scientific Name	GB Red List	NERC s41	Biodiversity Action Plan (BAP)	Transect section(s) recorded	Number of surveys recorded
Brown Argus	<i>Aricia agestis</i>	Least Concern	No	Not listed	5	1
Cinnabar moth	<i>Tyria jacobaeae</i>	Vulnerable	Yes. Medium priority group 3	Yes	6	1
Comma	<i>Polygonia c-album</i>	Least Concern	No	Not listed	2	1
Common Blue	<i>Polyommatus icarus</i>	Least Concern	No	Not listed	5	1
Dark Green Fritillary	<i>Speyeria aglaja</i>	Least Concern	No	Not listed	3, 6	1
Gatekeeper	<i>Pyronia tithonus</i>	Least Concern	No	Not listed	All	6
Green-veined white	<i>Pieris napi</i>	Least Concern	No	Not listed	4, 1	2
Holly Blue	<i>Celastrina argiolus</i>	Least Concern	No	Not listed	2	3
Large Skipper	<i>Ochlodes sylvanus</i>	Least Concern	No	Not listed	1, 2, 3	3
Large White	<i>Pieris brassicae</i>	Least Concern	No	Not listed	All	9

Marbled White	<i>Melanargia galathea</i>	Least Concern	No	Not listed	1, 6, 2, 3, 5	2
Meadow Brown	<i>Maniola jurtina</i>	Least Concern	No	Not listed	All	9
Mother Shipton	<i>Euclidia mi</i>	Least Concern	No	Not listed	5, 1	2
Peacock	<i>Aglaia io</i>	Least Concern	No	Not listed	1, 4, 5, 6	2
Red Admiral	<i>Vanessa atalanta</i>	Least Concern	No	Not listed	3, 2, 5, 1	5
Ringlet	<i>Aphantopus hyperantus</i>	Least Concern	No	Not listed	2, 5	1
Six-spot Burnet Moth	<i>Zygaena filipendulae</i>	Least Concern	No	Not listed	1, 2, 3	1
Small Copper	<i>Lycaena phlaeas</i>	Least Concern	No	Not listed	3, 1, 2, 4	4
Small Skipper	<i>Thymelicus sylvestris</i>	Least Concern	No	Not listed	All	6
Small White	<i>Pieris rapae</i>	Least Concern	No	Not listed	4, 1, 5, 3, 6	8
Speckled Wood	<i>Pararge aegeria</i>	Least Concern	No	Not listed	1, 2	2
Vapourer moth	<i>Orgyia antiqua</i>	Least Concern	No	Not listed	4, 5, 2, 1, 6	5

4.7.2 Brown Hairstreak egg search

During the brief egg search on the 31st of March 2020, a total of five Brown Hairstreak eggs were identified, two along the northern hedgerow and three along the western. During the more thorough survey on the 6th of November 2020, two eggs were identified along the northern hedgerow (**Figure 9**).



Figure 9. Location of Brown Hairstreak eggs identified on the 31st of March 2020 (white circle), and on the 6th of November (orange circle).



4.8 Hedgerow Assessment

The hedgerows on site forms part of an offsite hedgerow network. The species present in the understorey are indicative of species-poor ground flora of all three hedgerows. Hedgerow 1 contains five woody species, hedgerow 2 also contains five woody species and hedgerow 3 contains eight woody species, which averages out as 5.6 across the three sections surveyed. All woody species recorded are listed in Schedule 3 of the regulations. Hedgerow 2 had one species listed under Schedule 2, and Hedgerow 3 also had one species. None of the species in Schedule 2 were recorded in Hedgerow 1.

Hedgerow 2 and 3 have been classified as 'important' under the regulations due to the presence of a species (Dormice) in Schedule 5 of the Wildlife and Countryside Act 1981. No other criteria were met (see **Appendix VII** for full details).

Figure 10. Location the hedgerow sections to take an average to classify the hedgerow.



4.9 Badger Survey

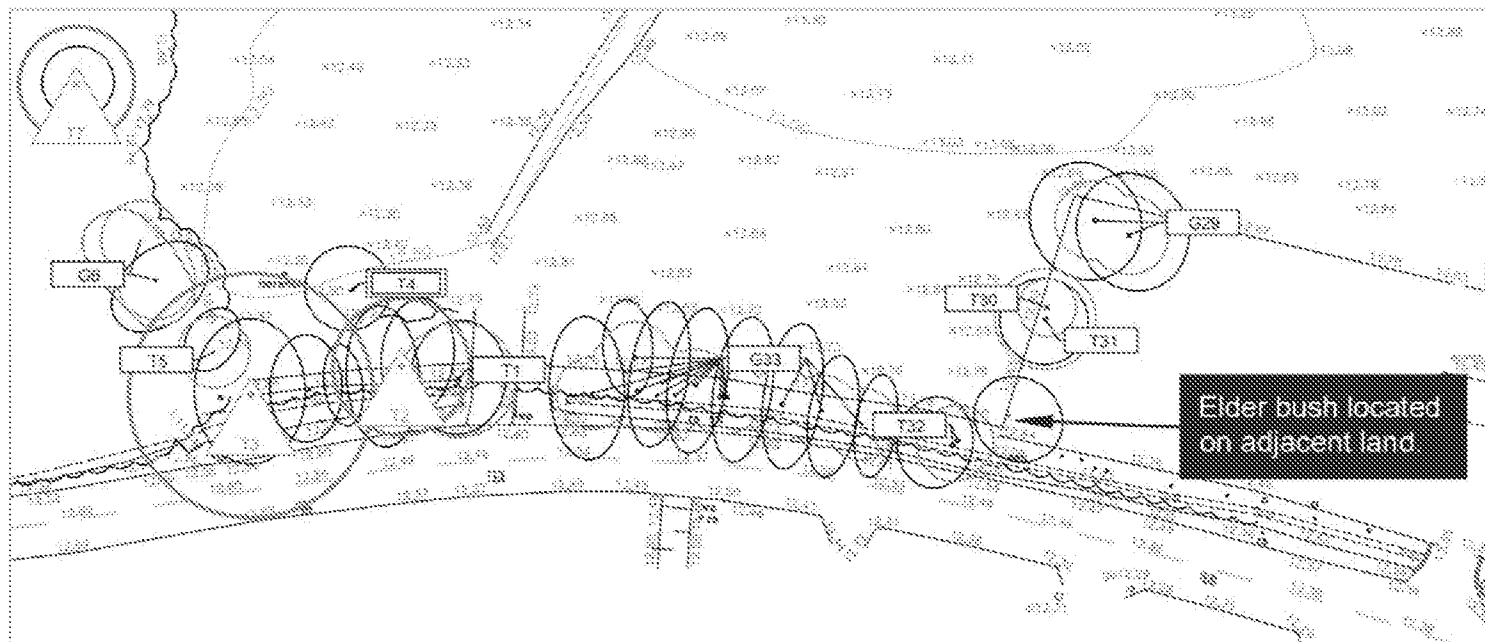
No Badgers (*Meles meles*) were recorded by the camera trap. It has been determined that the hole is being utilised by Rabbits as they have been recorded entering and exiting the hole, as well as grooming and foraging immediately outside of the hole on numerous occasions. Since the deployment of the camera static, rabbit faeces were also noted around the hole when checking the camera trap. Other species recorded include rodents such as Rats (*Rattus norvegicus*) and Mice species. Birds, such as Robin (*Erithacus rubecula*), Dunnock (*Prunella modularis*) and Song Thrush (*Turdus philomelos*) were also recorded foraging. Furthermore, one Fox was observed sniffing at the hole from a distance. Please refer to **Appendix VIII** for the full survey results.

4.10 Assessment of Trees to Support Roosting Bats

A total of 19 trees were surveyed along the southern boundary, ten were assessed as having low suitability for roosting bats (**Tree 2, 3, 8, 10, 11, 13, 14, 15, 17 and 18**). All trees surveyed were assessed as having nesting bird potential. Please refer to **Appendix IX** for full details.

Please note, Trees 3 – 19 are grouped as 'G33' within the Arboricultural opportunities and constraints assessment report, dated 28th of August 2020, by Barrell Tree Consultancy (**Figure 11**).

Figure 11. Location the trees to be removed along the southern site boundary (T1, T2 and G33). Image courtesy of Barrell Tree Consultancy.



4.11 Updating Botanical Survey

Species abundantly recorded within the grassland include Meadow Foxtail (*Alopecurus pratensis*), Common Knapweed (*Centaurea nigra*), Timothy (*Phleum pratense*), Sheep Sorrel (*Rumex acetosella*), Meadow Buttercup (*Ranunculus acris*), Ribwort Plantain (*Plantago lanceolata*) and Common Nettle (*Urtica dioica*). Frequent Broad-leaved Dock (*Rumex obtusifolius*), Herb Robert (*Geranium robertianum*), Yorkshire-fog (*Holcus lanatus*) and Creeping Bent (*Agrostis stolonifera*) were also recorded, along with occasional White Dead-nettle (*Lamium album*), Bird's-foot-trefoil (*Lotus corniculatus*), Common Chickweed (*Stellaria media*), Ground Ivy (*Glechoma hederace*), Yarrow (*Achillea millefolium*) and Creeping Thistle (*Cirsium arvense*). Common Toadflax (*Linaria vulgaris*), Lady's Bedstraw (*Galium verum*), Cuckoo Flower (*Cardamine pratensis*), Changing Forget-me-not (*Myosotis discolor*), Green Alkanet (*Pentaglottis sempervirens*) and Woody Nightshade (*Solanum dulcamara*) were rarely recorded. See **Appendix X** for a complete list of botanical species recorded at the site.

4.12 Biodiversity Net Gain Assessment

The calculations of pre-development biodiversity units for the site are based on the habitat types (aligned to the UK Habitat Classification system) and associated conditions identified during the Phase I survey undertaken by All Ecology Ltd in 2019.

The areas of pre-development habitat have been estimated based upon the Phase 1 Habitat Map created by Ecosupport Ltd while the areas of post-development habitat have been estimated based on figures provided by Pegasus Group. It should be noted that the following

calculations should not be considered definitive as they are based on the successful implementations of both the proposed works, the post-works enhancement and mitigation measures, and the ongoing management of habitats once the development has been completed.

Table 9: Summary of pre- and post-development biodiversity units.

DEVELOPMENT STAGE	BIODIVERSITY UNITS		TOTAL BIODIVERSITY UNITS
Pre-development Baseline Units	Non-Linear Habitats	8.00	18.12
	Hedgerows	10.12	
Post-development Units	Non-Linear Habitats	8.06	19.84
	Hedgerows	11.78	
TOTAL NET BIODIVERSITY UNIT	Non-Linear Habitats	0.05 / +0.67%	+9.13%

Table 10: Further details of pre- and post-development biodiversity units.

PRE-DEVELOPMENT (UK Habitat Classification system)	HABITATS	HABITAT AREA / LENGTH		BIODIVERSITY UNITS
		HECTARE	KILOMETRE	
Grassland – other neutral grassland		1.08	-	4.97
Heathland and shrub – Mixed scrub		0.54	-	2.48
Sparsely vegetated land- Ruderal / Ephemeral		0.24	-	0.55
Species Rich Native Hedgerows with trees		-	1.0	10.12
PRE-DEVELOPMENT TOTALS		1.86	1.0	18.12
POST-DEVELOPMENT HABITATS (UK Habitat Classification system)				
Urban – Developed land; (buildings and hardstanding) sealed surface		0.64	-	0
Grassland – other neutral (front and rear gardens / informal open spaces, long grasses and wildflowers)		0.51	-	3.92
Heathland and shrub – Mixed (new native planting) scrub		0.25	-	2.11
Urban – Artificial lake or pond (wildlife pond)		0.04	-	0.26
Species Rich Native Hedgerows with trees (enhanced existing hedgerows and new native hedgerow)		-	1.0	11.78
Retained vegetation (boundary scrub/shrubs and hedgerow buffer flora)		0.42	-	1.77
POST-DEVELOPMENT TOTALS		1.86	1.0	19.84

It should be noted that the natural drainage of the site post-development has been purposely designed so that it flows into and then out of the pond. This will ensure that water does not

stagnate, thus improving the pond's suitability to support a range of fauna and flora species, and in turn adding to the biodiversity value of the entire site (see also **Section 12.4**).

The anticipated biodiversity net gain as result of the proposed development at West Walberton Lane, assuming habitats are retained, enhanced or created as per the current project plan has been calculated as a net increase of 0.05 Biodiversity Units for Habitats and 1.66 Biodiversity Units for Hedgerows. This equates to net percentage increases in biodiversity of 0.67% and 16.43% respectively for the site's habitats and hedgerows. The combined increase in biodiversity for the site equates to 9.13%.

NB: It must be noted that the anticipated biodiversity nets gains for the site are based upon the assumption that all retained, enhanced or created habitats will be managed going forward so as achieve and maintain a condition assessment of at least moderate as per the relevant Habitat Type Condition Sheets found within the Biodiversity Metric 2.0 Technical Supplement.

5.0 EVALUATION

5.1 Desk Based Search

5.1.1 Protected Sites

The South Downs National Park is of ***national value***.

5.1.2 Protected Species

It was considered that the habitats on site held potential to support the species recorded in the near-by vicinity including invertebrates, reptiles, nesting birds, Dormice, Hedgehog and commuting and foraging bats. As a result, Phase II Species surveys were carried out to confirmed presence/likely absence and the associated value of the site.

5.2 Great Crested Newts

The eDNA assessment concluded a likely absence of GCN within Pond 2. Therefore, as the only pond with suitability and likely to result in an offence, it is considered unlikely that GCN are present with the offsite ponds. Therefore, highly unlikely GCN would be negatively impacted by proposed development.

5.3 Phase II Bat Surveys

Brown Long-eared, Common and Soprano Pipistrelle bats are within the Common category of bats, whilst the other species all fall under the Rarer category (Wray *et al* 2010). No roosts were identified on site, although it is considered there may be potential for roosts within some of the trees within the hedgerows bordering the site.

Guidance using a points-based system, developed by Wray *et al.* (2010), produces a score of 35 points for commuting and 34 points for foraging bats (**Table 11**). These scores classify the site as being of ***regional value*** for both commuting and foraging bats.

Table 11. Valuation of habitat for (a) commuting and (b) foraging bats (Wray et al. 2010).

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

5.4 Dormouse Survey

A total of three individual Dormice were recorded within nest tubes along with eight nests (including two juvenile practice nests), which indicates there is a well-established population in the local area that are using the site. No confirmed evidence of Dormice utilising the site for breeding purposes was recorded, although, breeding will be assumed due to the suitability of the habitat and evidence recorded. Dormice are relatively common and widespread within West Sussex and have been recorded in suitable habitat across the county. Therefore, the site is considered to be of **county value** for this species (CIEEM, 2018).

5.5 Reptile Survey

5.5.1 The Status of Reptiles on Site

The species recorded on the site are relatively common and widespread and the survey results do not indicate that the site is a 'Key Reptile Site' as defined by appropriate guidance. The reptile surveys have indicated that there is a **low** population of Slow Worms (HGBI, 1998).

5.5.2 Valuation

The value of the reptile population on the site has been estimated following the CIEEM guidelines on Ecological Impact Assessment (CIEEM, 2018), which uses a geographical scale to describe the value of an ecologically important feature. The site is considered to be of **local value** for reptiles.

5.6 Lepidoptera Survey

During the surveys 18 species of butterfly and four moth species were recorded during the transects. Of these, only the Cinnabar moth was listed as Vulnerable on the red list, all other species recorded were of least concern. Six species were observed expressing breeding behaviours although, one of these species, the Small White, is unlikely to breed at the site due to a lack of suitable larval food plants. It is highly likely that 12 of the observed butterfly species are breeding at the site due to the presence of suitable larval foodplants. Of the four observed moth species, three are very likely breeding at the site, with the Cinnabar only a possible breeder due to a very limited amount of the larval foodplant being present at the site.

The most abundant species recorded at the site were species which have larvae that eat grasses. These include the Meadow Brown, Small Skipper and Marbled White. This is likely due to various grass species being abundant across the entire site. A number of the other species observed have more specific larval foodplants, which are less abundant at the site, and as such this is reflected in the lower abundance of these species and their presence in fewer of the transect sections.

Whilst not recorded during any of the transects, Brown Hairstreak butterfly eggs were found during egg searches. The presence of eggs highlights that this species is breeding at the site.

Due to the species, and numbers, recorded it is considered the site is of **local value** for Lepidoptera, particularly due to the large number of Meadow Brown butterflies recorded and the presence of Brown Hairstreak.

5.7 Hedgerow Assessment

The hedgerow (including the trees), along the northeast, west and south boundaries consist of UK native species and so qualify as NERC Priority Habitat.

In accordance with the ecological criteria of the Hedgerows Regulations (as described in **Section 3.8**) the hedgerow survey classified the northern and western hedgerows on site as 'important' hedgerows. The hedgerows on site are considered to be of **local value**.

5.8 Badger Survey

The survey has determined that the mammal hole in the northern hedgerow is utilised by

Rabbits. No Badgers were identified on site during the camera trapping period, however, due to suitable foraging and commuting habitat, the site is considered to be of **site value** for this species group. Please note, the mammal holes will not be directly impacted as part of this proposed development (**Figure 2 and 6**).

5.9 Assessment of Trees to Support Roosting Bats

A total of 12 out of 22 trees were assessed as having low suitability for roosting bats. All of the trees were assessed as having nesting bird suitability, therefore they are considered to be of **site value**.

5.10 Updating Botanical Survey

During the initial assessment, the site was considered to be dominated by semi-improved grassland, however, abundant Common Knapweed was recorded. The presence of this species can indicate the grassland is an example of semi-improved, neutral, acid or calcareous grassland. It was considered likely the site was an example of neutral to calcareous grassland.

The updating survey classified the habitat as semi-improved neutral to calcareous grassland.

A depression within the field had been marked as fen habitat by SxBRC. However, at the time of the surveys, the vegetation and dry habitat did not reflect this.

5.11 Biodiversity Net Gain Assessment

The anticipated biodiversity net gain as result of the proposed development at West Walberton Lane, assuming habitats are retained, enhanced or created as per the current project plan has been calculated as an overall net increase of 9.13% for the site. This is considered to be of **local – county value**.

5.12 Other Habitats

The following information is based on the results detailed within the original Ecological Appraisal report.

5.12.1 Stream

The narrow stream is classified as a chalk stream by the SxBRC which is designated as NERC Priority Habitat. Therefore, it is considered to be of **local value**.

5.12.2 Standard Trees

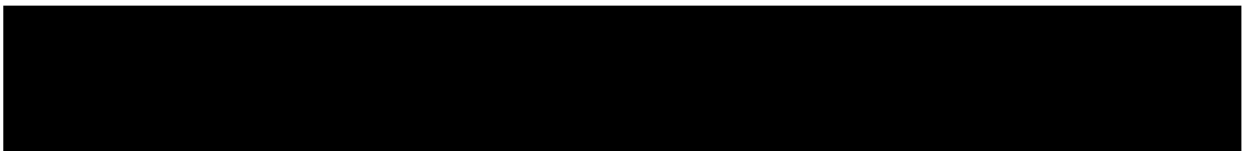
There were a small number of standard trees on site, a number of which were veteran/ancient trees. Seven of these standard trees and trees within the hedgerows had potential roosting features for bats as well as providing habitat for nesting birds. As a result, they are considered to be of **local value**.

5.12.3 Scrub

The scrub habitat has potential to support Dormice, Brown Hairstreak Butterflies, nesting and breeding birds. As a result, it is considered to be of **local - county value**.

5.12.4 Dry Ditch

The dry ditch present along the southern and eastern boundary is considered to be of ***site value*** only, due to a limited number of species recorded within the dry ditch.



6.0 ZONE OF INFLUENCE

The Zone of Influence is defined by CIEEM as being the areas / resources that may be affected by the biophysical changes caused by activities. The Zone of Influence is based on the sensitivity of the receptor to any biophysical changes which could occur and the extent to which those changes could occur.

6.1 Construction Phase

6.1.1 Change in Land Use

The change of use of the site will result in the physical structure of the present site being altered by the proposed development. Site preparation activities will include some earthworks and earth stripping associated with a phased construction. Therefore, the zone of influence is predicted to extend across the development footprint. Therefore, all protected species and habitats within the development footprint and along the boundary have the potential to be disturbed and harmed.

6.1.2 Noise Pollution

Noise disturbance occurs as a result of plant operation, traffic movements, and movements of site personnel associated with the continued extraction, crushing, screening and tipping within the application area.

When ground cover or normal unpacked earth is present between the source and receptor, the ground becomes absorptive to noise energy and is called a soft site. This can reduce in-air noise over distance. As these conditions are present on site is considered that the noise from construction will not travel far past the development boundary. This will be aided by the presence of screening vegetation around the boundary of the site. The retention of perimeter vegetation and reinforcing planting of hedgerows will reduce noise levels outside of the development footprint. It is therefore considered that the zone of influence for noise will be within the development boundary itself and 50m outside of the boundary.

6.1.3 Air Pollution

Particles associated with the construction phase of this development will come from three main sources. The vehicles on site, from exhaust emissions, the contact of tyres on the road surface or dust blowing from materials carried via vehicles, stripping of topsoil/vegetation and excavation of footings for the new properties.

The zone of influence for air pollution, particularly dust, will depend on the time of year/weather condition within which works are carried out. For example, in dry conditions there may be dust generated by activities taking place during the construction phase, whereas in wet weather less dust will be generated. It is also dependant on the wind speed at the time of the activity as this determines how far the air pollution will be transported and indeed the direction.

Fugitive dust from development sites is typically deposited within 100-200m of the source; the greatest proportion of which comprise larger particles (greater than 30 microns) is deposited within 100m (Greater London Authority, 2006). Therefore, the zone of influence for air pollution during construction will be the development footprint itself with a 200meter buffer.

6.1.4 Water Pollution

The zone of influence can be limited to a single river or stream, but can also extend many miles downstream. The impact area is related to releases of pollutants to a water body will depend on the type of water body (e.g. stream, river or lake), the volume and flow of that water body, the nature of the pollutant and the chemical characteristics of the water body. There is a chalk stream, which runs along the western boundary of the site, which connects to the wider network. Therefore, the zone of influence includes both the stream and those it is connected to.

6.2 Operational Phase

The zone of influence associated with the operational phase is extended beyond the site boundaries due to the nature of the development resulting in an increase in human activity and disturbance in the direct vicinity and further afield.

6.2.1 Human Disturbance

A study found that 38% of walking trips were for personal errands, 28% were for exercise, 21% were for recreation or leisure and 5% for work. The average trip length was 2.1km (National Highway Traffic and Safety Administration and the Bureau of Transportation Statistics, 2002). With this in mind the zone of influence for disturbance in the form of people on foot will be 2.1km.

6.2.2 Light Pollution

This impact of lighting will be confined within the development footprint itself. There is the possibility of light spilling into adjacent land however by retaining and enhancing existing vegetation it is considered this will be minimal. Therefore, the zone of influence will encompass the development footprint with a one-meter buffer along the outside of the boundary.

6.2.3 Air

Pollution will arise from the increased level of traffic and vehicles associated with a housing development. It is outside of the expertise of this report to model the spatial patterns of air dispersion and deposition for various chemicals to allow for close delineation of the area of influence. Therefore, a general consideration of the impacts on nearby notable ecological features will be taken into account.

6.2.4 Noise

The site is currently screened by vegetation. The retention of this and additional planting will continue to provide screening for wildlife populations. As there are already levels of noise associated with nearby housing development and road networks it is not considered noise generation will be significantly increased. Similarly, as the noise associated with this development will not be continuous and will not reach high levels, it is considered unlikely that the zone of influence for this development in operation will extend 10m from development boundary.

7.0 IMPACTS IN THE ABSENCE OF MITIGATION

This chapter considers the likely ecological impacts of the proposals, in the absence of mitigation. The potential impacts are identified in reference to the likely biophysical changes



associated with the scheme. Only impacts to ecological features or resources identified within **Section 5** are considered within this chapter. In many cases, whilst a potential negative impact is identified at this stage, avoidance measures or mitigation can be implemented to ensure no residual negative impacts. Avoidance and mitigation measures to ensure that no significant impacts occur and ecological enhancements are detailed in **Section 8**.

7.1 Pre-Construction

7.1.1 Habitats

Development of the site will see clearance of vegetation and topsoil stripping which would result in damage to, and physical loss of, habitats present on the site. The loss of semi-improved neutral – calcareous grassland will have a ***negative impact at a local level***.

Clearance work taking place adjacent to hedgerows and mature trees could adversely affect these habitats through damage by machinery and particularly by root zone compaction. This would have a ***certain adverse impact to habitat of local value***. The removal of small sections of the hedgerow on site will result in ***adverse impact at a local level***.

7.1.2 Bats

Stripping of grassland habitats, and removal of 22 trees from the boundary, will result in the loss of bat foraging habitat. This would have a ***likely negative impact at a county - regional level*** for foraging and commuting bats. Furthermore, felling of lot potential bat roosting trees and works that could negatively impact upon, disturb and or harm roosting bats (if present). This would have a potential for ***adverse impact (scale determined by presence / status of any roost(s) if identified)***.

7.1.3 Other Mammals

The potential indirect impact to Badgers and Hedgehogs is associated with the disruption to habitat connectivity. The loss of commuting corridors and foraging habitat would result in a ***likely negative impact at a site level***.

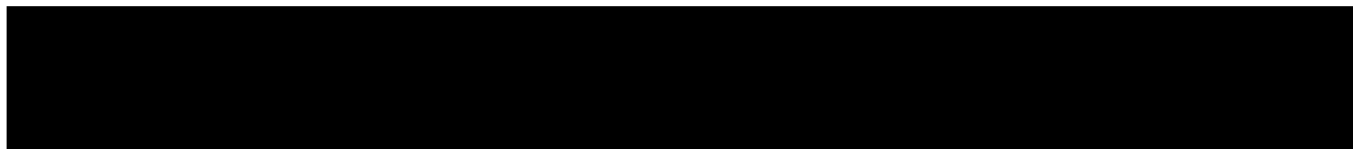
7.1.4 Birds

The removal of vegetation, if undertaken during bird nesting season, has the potential to negatively impact upon nesting birds. This would have a ***likely negative impact at a site level***. Three trees within the eastern, and 19 within the northern hedgerow are to be removed as part of the proposed development. Given the area to be lost in comparison to the total area, it is not considered this will have a significant negative impacted and is unlikely to compromise the functionality of a green corridor around the site periphery.

Noise generated during on site activities has the potential to impact upon the nesting birds on site. This would have a ***likely negative impact at a site level***.

7.1.5 Designated Sites

The South Downs National Park is well separated and isolated from the site and therefore it is considered there will be negligible impacts during pre-commencement works.



7.1.6 Reptiles

Should clearance of the grassland take place whilst reptiles are present death or injury to these individuals could occur causing an offence under the Wildlife and Countryside Act, 1981. This would have a **certain adverse impact at a site level** and if significant numbers are killed, it may have a negative impact on the viability of populations at a local level.

7.1.7 Lepidoptera

Works will result in the loss of semi-improved neutral - calcareous grassland, utilised by 19 species of butterfly and four species of moth that were observed during the surveys, the actual number of species is expected to be higher. This will have a **negative impact at a local level**.

7.1.8 Dormice

If the proposed development was to proceed without suitable mitigation and compensation, it would likely result in an offence being committed under the W&CA (1981 as amended) and the Conservation of Species and Habitats Regulations (2017) through potentially killing, injuring and disturbing Dormice and damaging a place of rest. This would have a **certain adverse impact at county level**.

Subject to a successful European Protected Species (EPS) license application, the works will include the removal of a section of hedgerow, including three trees, along the eastern, and a section of hedgerow, including 19 trees, along the southern hedgerow boundaries (please see **Section 1.4** for more details). Should adequate mitigation not be implemented, this has the potential to result in direct harm to individual Dormice if they were to be present within the vicinity of the tree removal at the time of the works, which could constitute a major negative impact at **site level**, as well as an offence under wildlife legislation. Due to the presence of Dormice within the wider habitat, and the retention of suitable habitat on site, this would likely constitute a **low to moderate negative impact upon the local population** and a minimal impact at a national level.

Creation of gaps in the hedgerows is not considered to cause any fragmentation or isolation issues as the gap in the eastern hedgerow, very near to where Dormice have been recorded, will be a small gap. It is not considered to be an issue within the southern hedgerow, although a larger gap, the eastern end of the southern hedgerow does not link to any other suitable habitat off site as it is boarded by a wooden fence. Furthermore, all retained suitable habitats will be preserved and enhanced. Additionally, they also connect to a wider network of corridors for this species.

7.2 During Construction

7.2.1 Habitats

Development works taking place adjacent to hedgerows and standard trees could adversely impact these habitats through damage by machinery and particularly by root zone compaction. This is also risk of dust generation negatively impacting the vegetation. This would have a **likely adverse impact at a local level**.

Construction activities on site can result in the increased risk of water pollution incidents that have the potential to directly negatively impact upon the stream and potentially those offsite. This would have a ***potential adverse impact at a local level***.

7.2.2 Bats

The use of artificial lighting during construction could negatively impact upon commuting and foraging nocturnal species. If this lighting impacts upon the boundary trees and/or hedgerows this would have a ***likely adverse impact at a county - regional level***.

7.2.3 Other Mammals

Open excavations at night pose a threat to commuting and foraging nocturnal wildlife (i.e. Badgers and/or Hedgehogs can become trapped). There is a ***potential negative impact at site level***.

7.2.4 Birds

Noise generation within close proximity to boundary vegetation poses a risk of disturbance towards nesting birds. This may cause nest abandonment. This would have a ***likely adverse impact at site level***.

7.2.5 Designated Sites

No statutory or non-statutory wildlife sites are located within or immediately adjacent to this site, therefore it is considered unlikely there will be any direct negative impacts during the construction phase.

7.2.6 Dormice

Impacts during construction work that are likely to occur to any Dormice within the vicinity of the works include an increased level of disturbance (e.g. through noise, vibration and visual), an increase in dusk deposition on vegetation and an increase in localised light pollution from the construction area. Impacts have the potential to dissuade Dormice from occupying retained habitats on site and habitats within the immediate surroundings and / or limit breeding success. If adequate protection is not implemented around the retained habitat, accidental encroachment by machinery and the inappropriate storage of construction materials could result in damage to retained habitats, consequently decreasing their suitability and putting individual Dormice present at risk of harm. Unmitigated works are considered likely to result in a ***moderate negative impact at a district level***. However, due to the presence of relatively large areas of connected Dormouse habitat within the vicinity of the site, it is not considered to likely result in significant impacts upon the integrity of Dormouse populations at a higher level.

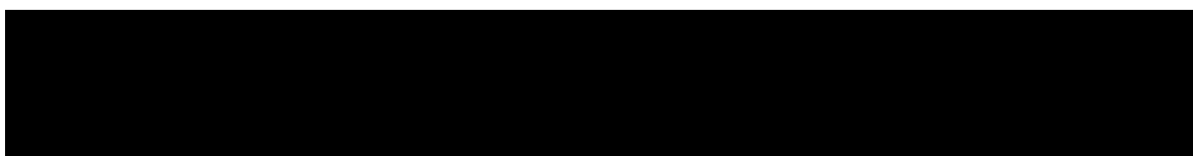
7.3 Operational

7.3.1 Increased Recreational Disturbance

The increase in residential development is likely to result in increased visitor pressure on the South Downs National Park. This would have a ***minor negative impact at a national level***.

7.3.2 Increased Lighting

Increased levels of artificial light can cause disturbance and disruption to bats. Though several



bat species can take advantage of artificial lighting systems for foraging, feeding off the insects they attract, other species avoid them.

Many night flying insects are attracted to light, especially those lamps that emit an ultra-violet component and particularly if it is a single light source in a dark area (BCT, 2009). Studies have shown that, although Noctules, Leisler's, Serotine and Pipistrelle bats swarm around white mercury and metal halide street lights, this behaviour is not true for all species. The slower flying broad winged species such as Long-eared bats, Myotis species, Barbastelle (*Barbastella barbastellus*) and Horseshoe (*Rhinolophidae Sp.*) bats generally avoid streetlights (BCT, 2009). In addition, it is also thought that insects are attracted to lit areas from further afield resulting in depletion of feeding sources elsewhere. However, the majority of species recorded during the survey effort are more tolerant towards artificial light.

Artificial lighting is also thought to increase the risk of predation. For example, observations have been made of Kestrels (*Falco tinnunculus*) hunting at night under the artificial light along motorways (BCT, 2009). Therefore, increased light levels may lead to increases in mortality.

Bright light may reduce social flight activity and cause bats to move away from the light area. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross. For example, Daubenton's (*Myotis daubentonii*) bats move their flight paths to avoid streetlamps (BCT, 2009).

If light levels were to increase significantly and were widespread across the site this would **likely have a negative impact upon commuting and foraging bats of local/country value.**

7.3.3 Dormice

Noise associated with the new dwellings may create additional disturbance to Dormice, as they are nocturnal, it is anticipated that this will most likely occur for a short period of time during the early evening, when residents typically return home, to when it gets dark (particularly during the warmer summer evenings). Furthermore, other impacts may also include an increase in external lighting associated with the development and in increase of predation upon Dormice by cats.



8.0 GENERAL AVOIDANCE, MITIGATION & COMPENSATION RECOMMENDATIONS

Mitigation refers to measures that can be undertaken to avoid or reduce ecological impacts. Compensation refers to measures taken in order to offset potential significant impacts. Please note a specific Reptile Mitigation Strategy has been provided in **Section 9.0**.

8.1 Pre-Construction

8.1.1 Site Design

The hedgerows and mature native trees will be retained and protected via a sufficient buffer, including minimal light spillage. Any losses in hedgerow will be replaced via native planting elsewhere on site.

Provision will be made to promote site connectivity and extended foraging ranges and opportunities for the European Hedgehog, as per best practice. Holes measuring 10cm x 10cm will be made at the base of boundary fences/gravel boards into and between each garden and the surrounding habitats. Small signage will be installed on the fence above both sides of these access points to ensure they remain open upon completion of the development. The People's Trust for Endangered Species provide such signage, the purchase of which also supports conservation efforts: <https://shop.ptes.org/product/wildlife-friendly-gardens/hedgehog-highway-signs-pack-of-two/>

8.1.2 Protective Fencing

Tree protective fencing will protect boundary vegetation from direct impact and from severance or asphyxiation of the roots. Fences must be installed at the distance of the branch spread away from the tree trunk (British Standard 5837:2012 Trees in relation to construction) at a distance half the height of the tree and be of chestnut paling or of another similarly robust style of fencing. No vehicles will enter the protective ring fencing and no materials will be stored within their circumference. All protective fencing must be in place prior to any construction machinery arriving on site, before any works on site get underway, and will remain in place until all work is completed. This will minimise the level of disturbance within the boundary vegetation during construction.

8.1.3 Avoidance to Nesting Birds

Any vegetation clearance will take place outside of the bird nesting season (typically between March – August, dependent on weather). If this is not possible, any potential nesting sites must be checked by a suitably qualified Ecologist. If an active nest is identified, a 5m buffer will be established, within which no works will be able to take place until the Ecologist has confirmed the checks have fledged and the nest is no longer active.

8.2 During Construction

8.2.1 CEMP

Works will be subject to, and will adhere to, a Construction Environmental Management Plan (CEMP), which will detail measures of reducing noise, air and water pollution. This will pay particular attention towards ensuring the stream and dry ditch is protected during the construction phase in accordance with best practice guidance, including Environment Agency

Pollution Prevention Guidelines. The CEMP will be followed for the duration of construction and is considered will minimise any risks to the identified ecological receptors.

8.2.2 Avoidance of Entrapment during the Construction Phase

During construction, any excavations on site must be covered nightly and/or include a suitable escape ramp for the protection of wildlife (a suitable escape ramp can be created using wooden planks placed at a 45-degree angle or provision of a sloping end wall). Any temporarily exposed open pipe systems must be checked and then suitably capped when not in use to prevent access by wildlife. A member of staff on site will be responsible for ensuring that this is carried out before leaving the site each day.

8.2.3 Lighting

In order to avoid any disturbance to commuting and foraging bats and other nocturnal wildlife, construction works must be limited to daylight hours and will not be undertaken 30 minutes prior to dusk through to dawn. All lighting will be sensitive to the use of the site by nocturnal wildlife, for example by including low-level downward-facing / hooded lights that are sensor-operated where possible.

8.3 Operational

8.3.1 Sensitive Lighting for Nocturnal Species

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

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

- All luminaires must lack UV elements when manufactured. Metal halide, fluorescent sources will not be used. LED luminaires will be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) must be adopted to reduce blue light component.
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use must only be as directed by the lighting professional.
- Column heights will be carefully considered to minimise light spill.

- Only luminaires with an upward light ratio of 0% and with good optical control must be used – See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires will always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting must be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed (**Figure 12**).

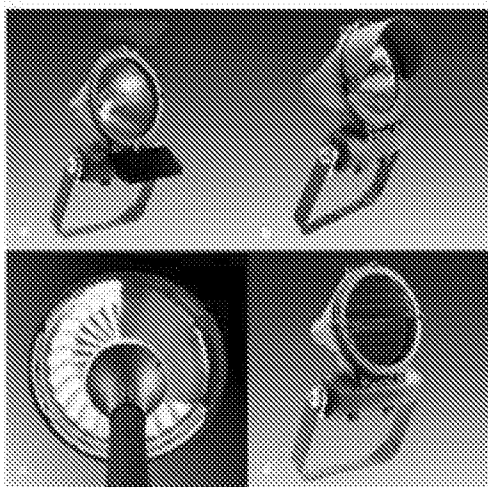


Figure 12. (a) Shield 'barn doors' (b) cowl hood; (c) shield and; (d) external louvre Images from ILP (2018).

8.3.2 Native Planting of Grassland Areas

Although the development will see the retention of buffers along the retained hedgerows, the development will result in an unavoidable loss of grassland habitat. This will be compensated for through the provision of planting / habitat creation for Lepidoptera and other invertebrate species.

For all grassland areas across the development, including the area bordering the pond, a wildflower seed mix aimed at benefiting pollinators will be sown, such as the NV4 Value Summer Flowering Butterfly & Bee Meadow Mixture, sold by Naturescape, which contains 17 wildflower and six grass species. Further details of this particular seed mix are available at: <https://www.naturescape.co.uk/product/nv4-value-summer-flowering-butterfly-bee-meadow-mixture/#>

Wildflower grasslands take time to establish, therefore, the first-year management is key to their success. Cutting will occur regularly at approximately 10cm in height, which will prevent vigorous grasses from taking over. As the recommended mixture contains Yellow Rattle (*Rhinanthus minor*), cutting in the spring and early summer is to be avoided, to allow them to set seed. All cuttings must be removed from the cut area and taken away from the site (Sussex Wildlife Trust, n.d.; Mann, 2018).

Long term management will include the grassland being cut between late August and March, as the recommended seed mixture is a summer flowering seed mix. Sward height will be kept low, approximately 5 – 10cm in height. All cuttings will be removed from the area and taken away from the site, to prevent any excessive nutrient accumulation, which would result in undesirable plant species from outcompeting wildflower species (Sussex Wildlife Trust, n.d.; Mann, 2018).

8.3.3 Brown Hairstreak Butterfly

Brown Hairstreak can be found on Blackthorn twigs as eggs or larvae for the majority of the year, therefore, hedge trimming can have an adverse impact them, with the possibility of eradicating the entire population from a site by annual trimming (Butterfly Conservation, 2013).

Optimum management for the Brown Hairstreak is achieved by cutting hedges on a rotational cycle of three to five years, whereby only one third of the available hedgerow(s) is cut in any one year (Butterfly Conservation, 2013, 2014; Eeles, 2019). The ideal time to cut hedges, in regard to Brown Hairstreak, is during early August, as the majority of individuals will be in the pupal stage within the leaf litter and females are unlikely to have commenced egg laying (Eeles, factsheet). However, cutting this time of year can have negative impacts upon other wildlife species (e.g. nesting birds). Therefore, cutting of the hedgerows will occur during late winter (January and February), every three – five years on a rotational basis, as this will have the least detrimental impact upon the majority of Hedgerow species (Butterfly Conservation, 2013). Whilst this will result in any Brown Hairstreak eggs being lost from the cut season, the rotational cutting will prevent the entire population from being negatively impacted.

Allowing the Blackthorn to produce suckers is greatly beneficial, as these suckers are often favoured sites for Brown Hairstreak egg laying (Butterfly Conservation, 2014).



9.0 REPTILE MITIGATION STRATEGY

9.1 Toolbox Talk

An ecologist will deliver a toolbox talk to all persons working at the site, detailing the sensitive measures required, including the protection and identification of reptiles and what to do if one is found.

9.2 Reptile Displacement

Whilst suitable reptile habitat is present across a large proportion of the site, a low number of Slow Worms were recorded in the top north-eastern corner of the site only (**Figure 8**). Reptile displacement should be undertaken across the entirety of the site during the active period for reptiles (mid-March until mid-October), and under suitable weather conditions (9 – 18°C, during periods of sun with intermittent cloud, no precipitation or high winds).

Prior to any vegetation works, the location of the 5m buffer will be identified on site and marked out with posts so all persons working on site know where the buffer is located (**Figure 13**). No strimming or vegetation works are to take place within the 5m buffer. An ecologist will supervise all vegetation strimming works to 15cm. The strimming should be completed directionally towards areas of suitable / enhanced habitat (5m buffer).

Figure 13. Landscape plan showing areas of grassland to be protected and enhanced (approximate area within the yellow dashed lines) and location of two artificial hibernacula (blue circles).



After completion of the strimming works, a fingertip search will be carried out to check for any reptiles. If any are identified, they will be translocated to protected / retained areas (5m buffer) on site. Once this has been undertaken, a clearance of the area will be finalised by a destructive search of the area of grassland from which reptiles have been displaced.

9.3 Fencing

Semi-permanent exclusion fencing will be installed around the perimeter of the site (5m buffer) after the reptile displacement has taken place. This will provide a division between the reptile area and the 'working' areas i.e. those areas where humans and machinery will disturb the ground and also will prevent reptiles from passively passing through the site from surrounding favourable habitat. The fencing will remain in place until all works are completed.

9.4 Destructive Search

Following the reptile displacement, a supervised destructive search will be undertaken on all areas to be impacted by the proposed development:

- An ecologist will supervise all aspects of the destructive search
- Hand searches will be conducted, including the removal of debris on the ground in order to remove potential refuges
- Using medium sized excavator (approx. 8 – 10 tonnes) with a toothed bucket will be used to carry out a gradual scrape of the top one to two inches of top soil
- Areas where soil has been removed and the soil heaps should be checked for reptiles
- Deeper scrapes will be carried out where necessary, such as beneath root systems, buried material, cracks or holes in the ground
- The excavated soil will be stored in an area identified as unsuitable reptile habitat, as directed by the supervising ecologist in liaison with the developers
- If any reptiles are found within the site during any stage of the works after this stage, all works must cease and an ecologist must be contacted immediately

9.5 Habitat Management

Following reptile displacement, cleared areas of grassland will be subjected to regular management to maintain a short sward vegetation height. This will be unsuitable for reptiles and subsequently prevent any reptiles from recolonising the area.

Habitat monitoring and subsequent management of the 5m buffer acting at the receptor must be undertaken to maintain its suitability to support reptiles. Responsibility for the management and on-going monitoring of the receptor site will be placed with a management company following the completion of the development.

The area will be managed for reptiles. Such management will primarily be through non-intervention to allow scattered scrub to develop. However, there may be occasional cutting back of scrub to prevent a dense cover forming that would reduce suitability for reptiles.

The long-term aims of the habitat management of the receptor site are to provide a continued diverse habitat in terms of both species and structure. Scrub habitat will be allowed to develop but must not exceed 15% coverage of the site in order to create a structurally diverse habitat with 'ecotones' (i.e. scrub/grassland interface) with suitable basking and foraging areas for

reptiles. This will be achieved by an annual selective strimming of up to 50% of the grassland, avoiding any scrub (unless scrub cover exceeds 15%). The vegetation will not be cut any lower than 15cm from the ground to avoid injuring reptiles.

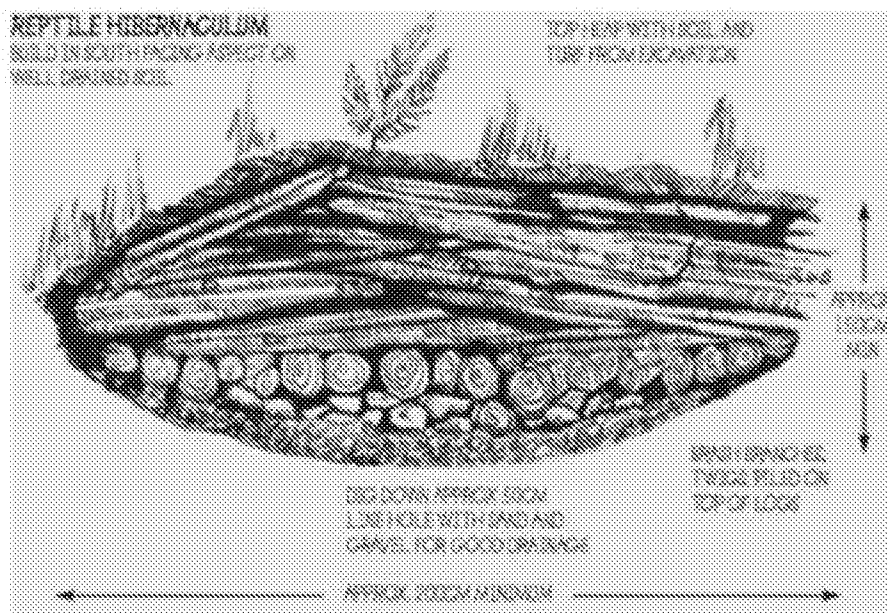
9.6 Safeguard

The 5m buffer of reptile enhancement will be protected in perpetuity from any works that could reduce its suitability to support reptiles and/or pose any risk to reptiles that may be present, including but not limited to development, as it falls within the root protection zone of the boundary vegetation.

9.7 Enhancements

Two artificial hibernacula will be constructed around the boundary of the site. These will provide shelter and hibernation opportunities as well as providing a significant habitat resource for invertebrates (a food resource for reptiles). The design of the hibernacula will follow best practice guidelines (HART, 2009), comprising a mixture of rubble and organic materials with a turf cover (Figure 14 and 13).

Figure 14. Reptile hibernaculum design (HART, 2009).



10.0 DORMOUSE MITIGATION STRATEGY

10.1 Disturbance

10.1.1 Protecting Retained Features

Prior to construction works commencing the retained hedgerows will be protected via the installation of heras fencing (or similarly robust construction fencing) covered with dust sheets and with regular information signage installed. Access will not be permitted behind this fencing by construction personnel. This will protect Dormouse habitat from direct damage/disturbance and dust. A toolbox talk will be given to all contractors.

10.1.2 Mitigating Operational Impacts

10.1.2.1 Lighting

Please see **Section 8.3.1**.

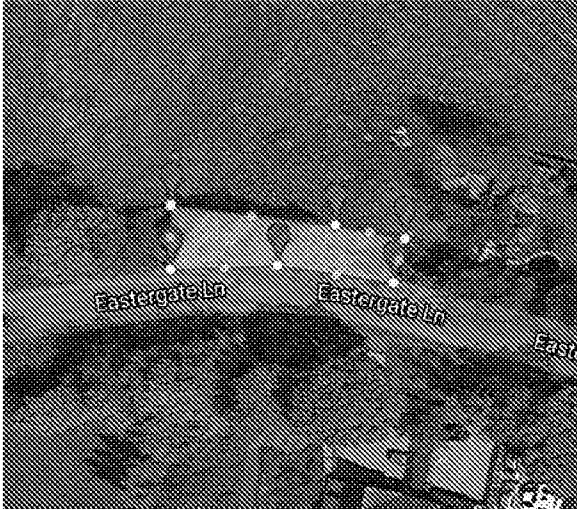
10.1.2.2 Cat Predation

To minimise the risks of cat predation once the dwellings have been completed and the new occupants moved in, thorny species, such as Blackthorn and Hawthorn, will be planted up within the 5m buffer between the hedgerows and the proposed development (please see **Section 1.4** for more details of the 5m buffer). As these species mature, they will provide a natural deterrent to cats moving into the boundary hedgerows / treelines.

10.2 Vegetation Clearance Works

Prior to clearance commencing, 10 Dormouse nest boxes (**Figure 15**) will be installed within the retained hedgerow boundaries within 100m of the areas to be cleared, to increase the carrying capacity of the retained habitats for Dormice (**Table 12**). These will also act as a receptor site for any Dormice identified during the sensitive clearance works.

Table 12. Areas and approximate spatial extent of suitable Dormouse habitats to be removed under licence on site.

Area to be removed	Estimate extent (m ²)	Assessed suitability for Dormice
Tree line along the southern boundary of the site boundary (Figure 2 and 11), primarily comprising of Oak, Hawthorn, Blackthorn, Field Maple and Elder.	Approximately 234.14 m ² 	Low due to this area being comprised of gappy tree and shrub growth with minimal undergrowth.
Area of hedgerow (Figure 2). Species present include Hawthorn, Blackthorn and Bramble.	Approximately 140.38 m ² 	High (confirmed presence) (Figure 7)

Estimated total habitat loss: 374.52m²

10.2.1 Timing, Methods & Capture

Prior to works commencing, the Named Ecologist or accredited agent will provide all site operatives with a toolbox talk to inform them of the potential presence of Dormice, their legal status, means of identification, habitat requirements, the methodologies required to avoid impacts on the species and what they should do if a dormouse is found. A written record that this has been undertaken, signed by attendees, will be kept and made available to Natural England should it be required. Ten Dormouse nest boxes will also be erected within the retained habitats on site (**Figure 15**).

Figure 15. Site layout / landscape plan with indicative locations of Dormouse nest boxes indicated the yellow circles.



During the hibernation period, Dormice will be in nests at, or just below, ground level and are unlikely to be active. They are therefore vulnerable to crushing so vegetation clearance will therefore occur to 30cm above ground level only. This cut will ensure that the habitat is no longer suitable for Dormice once they have emerged from hibernation. The named ecologist or accredited agents will carry out a visual and hand search of the areas to be cleared, including a 5m buffer either side, to ensure that no Dormice are disturbed, injured or killed during vegetation clearance. The ecologist will be present throughout the clearance works to ensure they are undertaken in a sensitive manner that will avoid disturbance to any Dormice. The ecologist will also inspect any exposed stumps post felling for the presence of occupied Dormouse hibernation nests to ensure that, if present, the nest remains safe and not too exposed.

Cut material will be removed from the site and chipped and spread in areas of grassland or removed from site.

In the event that an occupied Dormouse hibernation nest is disturbed during the clearance, the nest will be left in situ where possible, covered with leaves, moss and twigs. If leaving the nest in situ would be unsafe for the Dormouse (e.g. it may be trampled and/or exposed to sunlight which would result in the nest drying out) the nest would be moved to a safe location within 50m of the original nest location. The nest will be surrounded by damp leaf litter and covered

with a slate or slab (supported to prevent collapsing on to the nest) to protect the Dormouse from predators and maintain damp conditions. In the unlikely event of the animal rousing from hibernation, it will be taken into captivity until it can be released within 100m of its capture site when weather conditions become suitable. If more than one hibernating Dormouse is encountered during the works, then those works will cease and Natural England will be consulted for advice on how to proceed.

Once Dormice have emerged (typically May onwards), stump extraction can be undertaken and the remaining vegetation and any bare earth if required can then be dug up and removed. This will be preceded by the Named Ecologist, or an accredited agent carrying out a fingertip search of the areas around the stumps to be removed, and any arisings of leaves and other loose ground litter will be raked. Clearance will again be supervised by the ecologist.

The use of heavy machinery will be limited as much as possible to avoid disturbing and/or killing of dormice. The Named Ecologist or accredited agent will advise on the least damaging location for anchor points to be established and search the areas for Dormouse if required. Access for operatives and machinery will be from established access track and will not impinge on any vegetation to be retained. Cut material should not be dragged up the slope face, potentially disturbing hibernating Dormice. Brambles and smaller vegetation will be cut by hand.

10.3 Habitat Compensation

10.3.1 Habitat Replacement

The permanent loss of approximately 374.52m² of Dormouse suitable habitat within the eastern and southern hedgerows will be compensated for through the reinforcement of the existing hedgerows on site (please see **Figure 16** and **Section 1.4**). Species that may be used for the planting include:

- Blackthorn (*Prunus spinosa*). This will also benefit the Brown Hairstreak butterfly.
- Hawthorn (*Crataegus monogyna*)
- Hazel (*Corylus avellana*)
- Holly (*Illex aquifolium*)
- Wild Privet (*Ligustrum vulgare*)
- Dog Rose (*Rosa canina*)
- Honeysuckle (*Lonicera periclymenum*)
- Alder Buckthorn (*Frangula alnus*)
- Common Broom (*Cytisus scoparius*)
- Gorse (*Ulex* spp)
- Field Maple (*Acer campastre*)
- Guelder Rose (*Viburnum opulus*)
- Wayfaring Tree (*Viburnum lantana*)

Planting density will seek to achieve a minimum of 4 plants / m².

NB All shrubs/trees used for the planting will be of at least a size of 90 – 120 cm bare root plants with 1 in 50 plants used a standard tree (250 cm minimum height). Native climbers will be planted as required and favourable to the planting arrangements of the other shrubs/trees.

The use of spiral guards and canes will be included to protect new plantings. Planting will aim take place during the first late autumn-winter period available after the EPS licence has been granted to allow adequate time for establishment. To avoid damaging the root system of existing trees / shrubs, planning will be done using hand tools.

Figure 16. Landscape plan showing areas of new tree / shrub planting (displayed by the yellow dashed lines) (please see **Figure 2**).



10.4 Post Development Management and Site Safeguard

At this stage, it is envisaged that the buffer will be owned by the client and managed by an appointed management company with efforts made to prevent garden waste dumping within it (such as a wooden knee rail). General management prescriptions for this area are outlined below:



- Weeds will be suppressed with the use of chippings. Some additional weed control may be required which will be achieved through strimming or spot spraying with herbicide, specifically glyphosate.
- There will be a non-intervention of trimming or reduction during the first five years of growth other than light trimming works where required due to access or other such requirements. Spiral guards (required due to presence of deer) and canes can be removed in year five.
- Thereafter coppicing and trimming techniques can be used at three to four yearly intervals to reduce the height and width of planting areas. All trimming and coppicing should take place during the winter period (January-February) so that nesting birds and food resources from the shrubs are not adversely impacted.
- Any plants that are removed, die or become seriously damaged or defective within five years of planting shall be replaced like for like in the next planting season.

10.4.3 Protection of Habitats

The retained boundary habitats are not to be included within the available garden areas of the new dwellings (where they may be cut down / back) and so the rear extents of the gardens will not include any of the existing shrubs (and will be fenced off so as to not allow access). The new owners will also be provided with information leaflets outlining the presence of Dormice within the boundary habitats, the legal protection they and their habitat is afforded as well as providing some general information on the species ecology (text to be informed by an ecologist).

10.5 Indicative Timetable

The below timetable of works is used for illustrative purposes and will likely be subject to change depending on the dates of when the relevant permissions are granted (**Table 13**).

Table 13. Indicative timetable of works (subject to change depending on when planning permission / EPS licence is granted).

Works to be undertaken	November – March 2021 / 2022	November – March 2021 - 2022	May 2022 onwards
Erection of mitigation boxes			
Stage 1 of habitat clearance (vegetation cut down to no lower than 20cm under a qualified ecologist's supervision)			
Planting of trees and shrubs within compensational habitat / 5m buffer			

Stage 2 of habitat clearance (Removal of roots / lower sections)			
Erection of temporary protective fencing for retained boundary vegetation and newly planted areas			
On-going management works			
Population monitoring			

11.0 BAT MITIGATION STRATEGY

11.1 Tree Clearance Works

A total of 19 trees along the southern boundary are to be removed as part of the proposed development. Ten of these (**Tree 2, 3, 8, 10, 11, 13, 14, 15, 17 and 18**) have been assessed as having low suitability for roosting bats. All trees surveyed were assessed as having nesting bird potential, full details are in **Appendix IX**.

All tree clearance work will adopt the following methodology:

- All works to be undertaken that will impact the trees must take place outside of the bat hibernation period (November – April). Therefore, a nesting bird check will also be required. Bird nesting season is typically between March – August, dependent on the weather. Any potential nesting sites must be checked by a suitably qualified Ecologist. If an active nest is identified a 5m buffer will be established, within which no works will be able to take place until the Ecologist has confirmed the checks have fledged and the nest is no longer active.
- All trees to be impacted on site and have been identified of 'low potential' for roosting bats will be subject to a check by a Suitably Licenced Ecologist prior to any felling works commencing. The nesting bird check can be undertaken at the same time.
- The licenced Ecologist will check all Potential Roosting Features (PRF) as identified during the assessment of trees for bats (**Appendix IX**) to search for evidence of bats / roosting bats. A high-powered torch will be used to check each PRF. An endoscope will be used if the back of the feature cannot be seen with the torch alone. If no bats / evidence of bats (e.g. droppings) are found, then the licenced Ecologist will sign these off and the trees can be 'soft' felled shortly after the inspection.
- If any bats / evidence of bats (e.g. droppings) are found, then all works must stop immediately, and further surveys will be required. Similarly, if the back of the feature cannot be seen / ruled out through the initial check then this may also be subject to further survey.
- If a roost is identified, a European Protected Species (EPS) Licence will be required from Natural England to ensure works can continue in accordance with UK wildlife legislation. In the presence of a bat roost, the report will also need to be updated to outline the mitigation and compensation strategy.



12.0 ECOLOGICAL ENHANCEMENTS

Enhancements will be implemented to increase the value of the site in comparison to the baseline, ensuring a net gain for biodiversity.

12.1 Native Planting

In addition to the planting outlined in Section 8.3.2 and 10.3.1, as a general enhancement, in line with the Chartered Institute of Ecology and Environmental Management CIEEM guidance (2012), any proposed planting on site must aim for a 70:30 ratio in favour of native species over non-natives and ornamentals. In addition, fruit bearing trees, providing food sources for birds and small mammals during the autumn and winter and nest sites during the spring and summer. Species that will be considered include:

- Hawthorn (*Crataegus monogyna*)
- Blackthorn (*Prunus spinosa*)
- Wild Cherry (*Prunus avium*)
- Crab Apple (*Malus sylvestris*)
- Alder Buckthorn (*Frangula alnus*)
- Elder (*Sambucus nigra*)
- Rowan (*Sorbus aucuparia*)

Shrubs to be considered within the landscape planting include:

- Holly (*Ilex aquifolium*)
- Dogwood (*Cornus sanguinea*)
- Privet (*Ligustrum vulgare*)
- Dog Rose (*Rosa canina*)
- Guelder Rose (*Viburnum opulus*)

12.2 Bats

Bat boxes will be incorporated into at least 4 (approximately 10%) of the new dwellings. The 1FR Bat Tube is designed to be installed on the external walls of buildings, either flush or beneath a rendered surface. It has been specifically designed to meet the requirements of the species of bats that inhabit buildings, including those which have been recorded on site. It has an integrated wooden panel onto which bats can cling, and a ridged entrance slope that makes it easy for bats to enter and leave the box safely. The design maintains stable climatic conditions, providing bats with a safe and stable roosting environment. This style of bat box requires no maintenance as droppings fall out of the entrance ramp.

The Enclosed Bat Box 'C' from Ibstock is designed for Pipistrelle species and can be integrated directly into the brickwork of new buildings. The inside of the box is designed to create several roosting zones that are ideal for crevice-dwelling bats. The bottom entrance means that no maintenance is required as droppings simply fall out of the bottom.

In general, bats seek warm spaces when rearing young. For this reason, bat boxes must be located where they will receive at least partial sunlight (facing south, south-west or south-east). However, installing bat boxes in more than one orientation will allow for a choice of roosting conditions. To increase the chances of bats roosting in a bat box, the boxes will be placed adjacent to vegetation features so as to be located near to existing flight paths.

The bat boxes will be installed a minimum of 2m above ground level, although 5-7m is preferable

to prevent disturbance from people and predators. The features will also be positioned near the eaves or gable apex of buildings to minimise disturbance.

12.3 Nesting Birds

To ensure birds have safe opportunities for nesting on site at least 4 (approximately 10%) of the new dwellings will have bird boxes erected. Those constructed of woodcrete are favourable, as they will last longer than wooden boxes. In addition, boxes with a variety of entrance hole sizes and open fronted designs will be selected, to suit a variety of species, as follows:

- **32mm entrance hole** will attract Great Tit (*Parus major*), Redstart (*Phoenicurus phoenicurus*), Nuthatch (*Sitta europaea*), House Sparrow (*Passer domesticus*) and bats.
- **26mm entrance hole** suits Blue Tit (*Cyanistes caeruleus*), Marsh Tit (*Poecile palustris*), Coal Tit (*Periparus ater*) and possibly Wren (*Troglodytes troglodytes*).

No. 10 Schwegler Swallow Nest features and integral Swift bricks will be installed along the eaves of at least 4 (approximately 10%) of the new dwellings. The boxes will ensure a minimum of 6cm clearance between the top of the nest feature and the eaves. These boxes mimic natural nesting sites whilst providing a stable environment for both chick rearing in the summer and roosting in the winter.

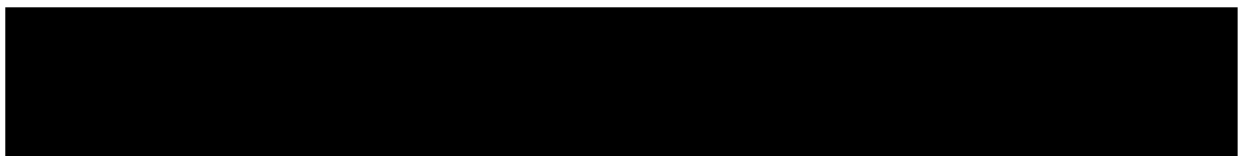
1SP Schwegler Sparrow Terrace features will be introduced within of at least 4 (approximately 10%) of the new dwellings. These can be fixed onto the surface of a suitable wall or incorporated into the brickwork. Ideally place the terrace two meters or more above ground level. It is suitable for all types of houses in built-up areas. Although designed specifically for Sparrows, it may also occasionally attract Tits, Redstarts and Spotted Flycatchers

12.4 Wildlife Pond

The creation of a pond provides the potential to create a beneficial net gain for biodiversity, benefiting species such as aquatic invertebrates, amphibians, birds and bats, as well as an attractive feature within the landscape. If created properly, a wildlife pond will require minimal management. Furthermore, ponds have the ability to store large amounts of carbon, which is important to help with climate change (Sussex Wildlife Trust, 2013).

Features of the pond will include:

- The pond must not be lined with concrete or pre-formed linings, as these often have sides that are too steep for wildlife. Flexible linings will be used, options include polythene, PVC or butyl rubber.
- A pond dug later in the year is more likely to fill up naturally with rainwater, which is beneficial for wildlife.
- A range of depths, to benefit a variety of plant and animal species (**Figure 17**). One area will be a minimum depth of 80cm (preferably 1m where possible). This prevents the entire pond from freezing over during winter, the deep-water refuge areas will be used for species such as newts.
- A shallow sloping area, which allows birds and other animals easy access into, and out of the water.



- A mosaic of vegetation and habitat types, both within and around the water, including submerged and emergent plants, floating and rooted plants, piles of dead wood and earth and rocks.
- Do not stock the pond with fish, this can be detrimental for aquatic invertebrates and amphibians, as well as limit plant growth.
- Signs around the pond to explain to the new occupants the pond is for wildlife purposes and dogs will not be allowed to enter the pond.
- Only use native plants (please see **Table 14** for recommended species).

Figure 17. Diagram of a wildlife pond showing a range of features (Sussex Wildlife Trust, 2013).

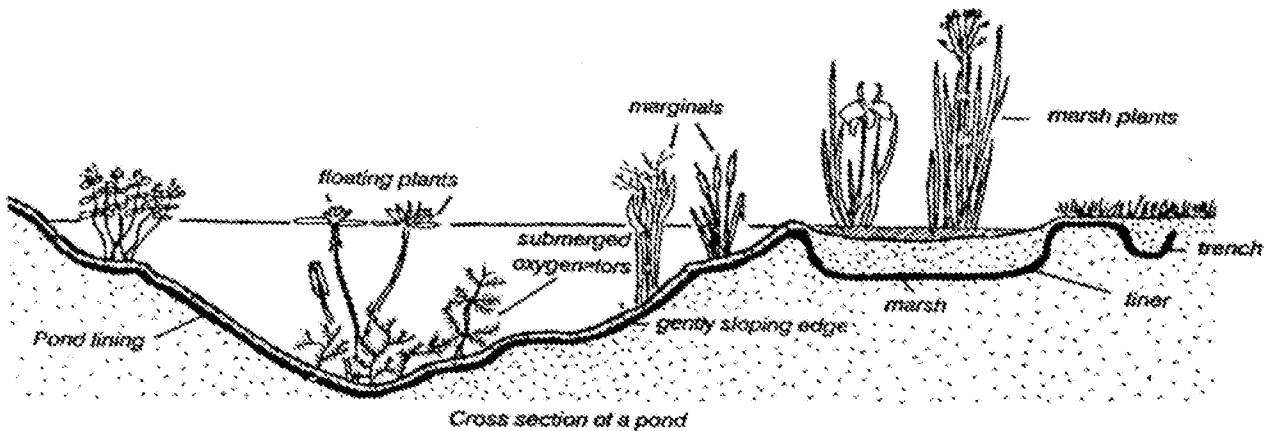


Table 14. Recommended native pond plant species that will be considered for the pond. Information from the Sussex Wildlife Trust, 2013.

Plant Type	Common Name	Scientific Name
Oxygenators	Hornwort	<i>Ceratophyllum demersum</i>
	Spiked Water-millfoil	<i>Myriophyllum</i>
	Water Crowfoot	<i>Ranunculus aquatilis</i>
	Water Starwort	<i>Callitriche stagnalis</i>
	Water Violet	<i>Hottonia palustris</i>
	Curled Pondweed	<i>Potamogeton crispus</i>
Floating	Amphibious Bistort	<i>Polygonum amphibium</i>
	Frogbit	<i>Hydrocharis morsus-ranae</i>
	Broad-leaved Pondweed (not suitable for small ponds)	<i>Potamogeton natans</i>
	Water Crowfoot	<i>Ranunculus aquatilis</i>

	Water Soldier	<i>Stratiotes aloides</i>
Emergent	Bogbean	<i>Menyanthes trifoliata</i>
	Branched Bur-reed	<i>Sparganium erectum</i>
	Greater Spearwort	<i>Ranunculus lingua</i>
	Flowering Rush	<i>Butomus umbellatus</i>
	Yellow Flag	<i>Iris pseudacorus</i>
Marginal	Arrowhead	<i>Sagittaria sagittifolia</i>
	Brooklime	<i>Veronica beccabunga</i>
	Lesser Spearwort	<i>Ranunculus flammula</i>
	Marsh Marigold	<i>Caltha palustris</i>
	Water-forget-me-not	<i>Myositis scorpioides</i>
	Water Mint	<i>Mentha aquatica</i>
	Water Plantain	<i>Alisma plantago-aquatica</i>
	Water Speedwell	<i>Veronica anagallis-aquatica</i>
Marsh and Fen	Creeping Jenny	<i>Lysimachia nummularia</i>
	Cuckooflower	<i>Cardamine pratensis</i>
	Gipsywort	<i>Lycopus europaeus</i>
	Great Willowherb	<i>Epilobium hirsutum</i>
	Hemp Agrimony	<i>Eupatorium cannabinum</i>
	Marsh Woundwort	<i>Stachys palustris</i>
	Meadowsweet	<i>Filipendula ulmaria</i>
	Purple Loosestrife	<i>Lythrum salicaria</i>
	Ragged Robin	<i>Lychnis flos-cuculi</i>
	Rushes and Sedges	<i>Juncus spp and Carex spp</i>

13.0 IMPACTS AFTER MITIGATION

Table 15 below demonstrates how the appropriate Mitigation either reduces the magnitude of the impact, if not removes it entirely. In some cases, it is considered likely the development may in fact result in a gain for biodiversity.

Table 15. Impacts in the absence of mitigation with residual impacts following execution of mitigation.

Impact	Mitigation / Compensation	Residual Impacts
Pollution incident impacting stream	CEMP to be produced and followed.	With the appropriate level of avoidance and mitigation it is considered there will be likely negligible impacts .
Damage/death of hedgerows and boundary trees	All vegetation will be protected by fencing and a buffer has been incorporated within the design of the site.	With the appropriate level of protection there will be likely negligible impacts .
Death / injury of reptiles	The reptile mitigation strategy has been implemented in full (Section 9.0).	With the implementation of the mitigation strategy and ensuring five negative capture days were achieved there will be likely negligible impacts towards reptiles.
Death / injury of Dormice	The Dormice mitigation strategy has been implemented in full (Section 10.0).	With obtaining an ESP Licence and implementation of the mitigation strategy, there will be likely negligible impacts towards Dormice.
Death / injury of Bats	The Bat mitigation strategy has been implemented in full (Section 11.0).	With the implementation of the mitigation strategy and ensuring if any signs of bat(s), or any bat(s) themselves are identified, all works to the impacted tree(s) will stop immediately and an ESP Licence will be obtained, there will be likely negligible impacts towards Bats.
Disturbing breeding birds	A buffer along the hedgerows has been incorporated within the design of the site. Any vegetation clearance will take place outside of nesting bird	Sensitive timings combined with increasing nesting opportunities are considered to result in likely positive impacts .

	season or supervised by an ecologist.	
Death / injury of Badgers	Escape ramps to be installed during construction and buffers around the site to be retained.	Likely negligible impacts
Loss of connectivity across the site	Gaps in new fencing to facilitate continued access and connectivity.	Likely negligible impacts
Loss of grassland	A buffer around the boundary of the site grassland areas have been incorporated into the scheme will ensure grassland habitat is retained and enhanced by planting of native wildflower pollinator seed mix.	Given the floral diversity within the grassland, and the permanent losses associated with the construction of new dwellings and hand standing infrastructure, there is an unavoidable loss in floral diversity within the grassland. However, by utilising native planting throughout the landscape scheme, this will be reduced to <i>minor negative impact</i> .
Loss of habitat for foraging and commuting bats	Features most commonly utilised by bat species have been retained and protected by a buffer (i.e. boundary hedgerows). In addition, any new landscaping and lighting will be in line with Section 8.3.1 to reduce impacts.	This will result in <i>likely negligible impacts</i> .
Increased lighting	A sensitive lighting strategy (using information provided in Section 8.3.1) will be devised and implemented.	Once operational the development will result in an unavoidable increase in artificial lighting however with sensitive methods in place the impact is likely to be reduced to a <i>minor negative impact</i> .

14.0 CONCLUSION

The habitats on site are considered to be of at least **local value** given their potential and evidence of supporting protected species. Key features on site include boundary hedgerows with trees and semi-improved grassland. The site is of **local / county value** for Dormice, and **county – regional value** commuting and foraging bats, and of **local value** for breeding birds and Lepidoptera, and of **site value** for reptiles.

The proposed development will be developed with ecology in mind with all key features being incorporated into the scheme and sufficiently protected from both direct and indirect impacts. Sensitive lighting will be implemented throughout.

This report details species specific mitigation, compensation and enhancements to ensure proposals stay in line with application policy and legislation. By introducing new potential bat roost and bird nesting features and enhancing the site through the landscape plan, it is considered the development will result in a net gain for biodiversity.

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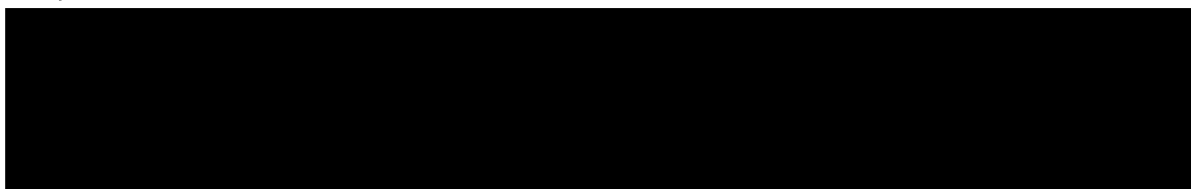
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APPENDIX I – Protected and notable species within 1km of the site boundary provided by SxBRC.

Mammals – Hedgehog (*Erinaceus europaeus*), Brown Hare (*Lepus europaeus*), Hazel Dormouse (*Muscardinus avellanarius*), Polecat (*Mustela putorius*), Barbastelle (*Barbastella barbastellus*), Serotine (*Eptesicus serotinus*), Myotis sp., Noctule (*Nyctalus noctula*), Pipistrelle sp., Nathusius' Pipistrelle (*Pipistrellus nathusii*), Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Brown Long-eared Bat (*Plecotus auritus*), unidentified bat.

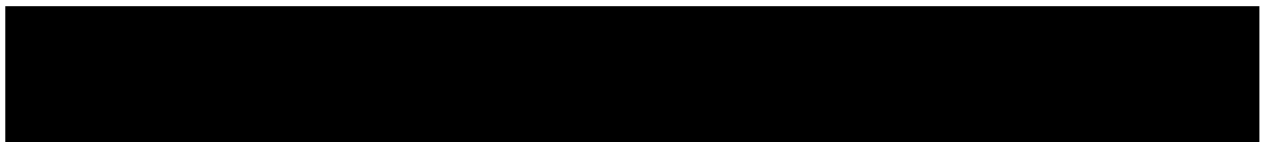
Birds – Mallard (*Anas platyrhynchos*), Tufted Duck (*Aythya fuligula*), Red Kite (*Milvus milvus*), Kestrel (*Falco tinnunculus*), Hobby (*Falco subbuteo*), Curlew (*Numenius arquata*), Woodcock (*Scolopax rusticola*), Common Gull (*Larus canus*), Stock Dove (*Columba oenas*), Turtle Dove (*Streptopelia turtur*), Cuckoo (*Cuculus canorus*), Barn Owl (*Tyto alba*), Tawny Owl (*Strix aluco*), Nightjar (*Caprimulgus europaeus*), Swift (*Apus apus*), Green Woodpecker (*Picus viridis*), Lesser Spotted Woodpecker (*Dendrocopos minor*), Wood Warbler (*Phylloscopus sibilatrix*), Willow Warbler (*Phylloscopus trochilus*), Skylark (*Alauda arvensis*), Swallow (*Hirundo rustica*), House Martin (*Delichon urbica*), Tree Pipit (*Anthus trivialis*), Dunnock (*Prunella modularis*), Nightingale (*Luscinia megarhynchos*), Song Thrush (*Turdus philomelos*), Mistle Thrush (*Turdus viscivorus*), Whitethroat (*Sylvia communis*), Firecrest (*Regulus ignicapillus*), Willow Tit (*Poecile montanus*), Marsh Tit (*Poecile palustris*), Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Linnet (*Carduelis cannabina*), Bullfinch (*Pyrrhula pyrrhula*), Hawfinch (*Coccothraustes coccothraustes*), Yellowhammer (*Emberiza citrinella*), Reed Bunting (*Emberiza schoeniculus*).

Reptiles – Slow-worm (*Anguis fragilis*), Common Lizard (*Zootoca vivipara*), Grass Snake (*Natrix helvetica*), Adder (*Vipera berus*).

Amphibians – Palmate Newt (*Lissotriton helveticus*), Smooth newt (*Lissotriton vulgaris*), Common Frog (*Rana temporaria*), Common Toad (*Bufo bufo*).

Invertebrates – Lepidoptera: Pearl-bordered Fritillary (*Boloria euphrosyne*), Small Heath (*Coenonympha pamphilus*), White Admiral (*Limenitis camilla*), Grizzled Skipper (*Pyrgus malvae*), Knot Grass (*Acronicta rumicis*), Mouse Moth (*Amphipyra tragopoginis*), Mottled Rustic (*Caradrina morpheus*), Dark Crimson Underwing (*Catocala sponsa*), White-spotted Pinion (*Cosmia diffinis*), Wood Grass-veneer (*Crambus silvella*), Small Square-spot (*Diarsia rubi*), Dusky Thorn (*Ennomos fuscantaria*), Maple Pug (*Eupithecia inturbata*), Rustic (*Hoplodrina blanda*), Rosy Rustic (*Hydraecia micacea*), Scarce Tissue (*Rheumaptera cervinalis*), Shoulder-striped Wainscot (*Leucania comma*), Lackey (*Malacosoma neustria*), Rosy-striped Knot- horn (*Oncocera semirubella*), Feathered Beauty (*Peribatodes secundaria*), Tawny Wave (*Scopula rubiginata*), Blair's Wainscot (*Sedina buettneri*), White Ermine (*Spilosoma lubricipeda*), Buff Ermine (*Spilosoma luteum*), Blood-vein (*Timandra comae*), Cinnabar (*Tyria jacobaeae*), Oak Hook-tip (*Watsonalla binaria*). True Flies: Eight species. Grasshoppers/Crickets: Long-winged Conehead (*Concocephalus discolor*), Woodland Grasshopper (*Omocestus rufipes*). Coleoptera: Stag Beetle (*Lucanus cervus*), Black-headed Cardinal Beetle (*Pyrochroa coccinea*), three other species. Ants/Bees/Sawflies/Wasps: 34 species.

Flora – Heather (*Calluna vulgaris*), Chicory (*Cichorium intybus*), Crosswort (*Cruciata laevipes*), Hound's-tongue (*Cynoglossum officinale*), Bell Heather (*Erica cinerea*), Dwarf Spurge (*Euphorbia exigua*), Eyebright (*Euphrasia* spp.), Wild Strawberry (*Fragaria vesca*), Fine-leaved Fumitory (*Fumaria parviflora*), Hawkweed (*Hieracium* spp.), Bluebell (*Hyacinthoides non-scripta*), Field Scabious (*Knautia arvensis*), Corn Mint (*Mentha arvensis*), Tubular Water-dropwort (*Oenanthe fistulosa*), Wood-sorrel (*Oxalis acetosella*), Annual Beard-grass (*Polypogon monspeliensis*), Tormenitil (*Potentilla erecta*), Lesser Spearwort (*Rununculus flammula*), Wild Clary (*Salvia verbenaca*), Sanicle (*Sanicula europaea*), Goldenrod (*Solidago virgaurea*), Corn Spurrey (*Spergula arvensis*), Devil's-bit Scabious (*Succisa pratensis*), Strawberry Clover (*Trifolium fragiferum*), Heath Speedwell (*Veronica officinalis*).



[illegible]

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	0.1 - 0.5 ha lost or damaged	0.5
Land 100-250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.4
Land >250m from any breeding pond(s)	0.1 - 0.5 ha lost or damaged	0.005
Individual great crested newts	No effect	0
Maximum:		0.5
Rapid risk assessment result:	AMBER: OFFENCE LIKELY	

Pond 2

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	0.001 - 0.01 ha lost or damaged	0.05
Land 100-250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.4
Land >250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.001
Individual great crested newts	No effect	0
		Maximum: 0.4
Rapid risk assessment result:	AMBER: OFFENCE LIKELY	

Pond 3

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	0.001 - 0.01 ha lost or damaged	0.05
Land 100-250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.4
Land >250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.001
Individual great crested newts	No effect	0
		Maximum: 0.4
Rapid risk assessment result:	AMBER: OFFENCE LIKELY	

Ponds 4 and 5

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.01
Land >250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.04
Individual great crested newts	No effect	0
		Maximum: 0.04
Rapid risk assessment result:	GREEN: OFFENCE HIGHLY UNLIKELY	

Ponds 6, 7 and 8

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.01
Land >250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.04
Individual great crested newts	No effect	0
		Maximum: 0.04
Rapid risk assessment result:	GREEN: OFFENCE HIGHLY UNLIKELY	

Pond 9

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.01
Land >250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.04
Individual great crested newts	No effect	0
Maximum:		0.04
Rapid risk assessment result:	GREEN: OFFENCE HIGHLY UNLIKELY	

Pond 10

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	National offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	No effect	0
Land >250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.04
Individual great crested newts	No effect	0
Maximum:		0.04
Rapid risk assessment result:	GREEN: OFFENCE HIGHLY UNLIKELY	

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 22/04/2020

Date Reported: 24/04/2020

Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
0614	Walberton 1	SU 96357 06022	Pass	Pass	Pass	Negative	0

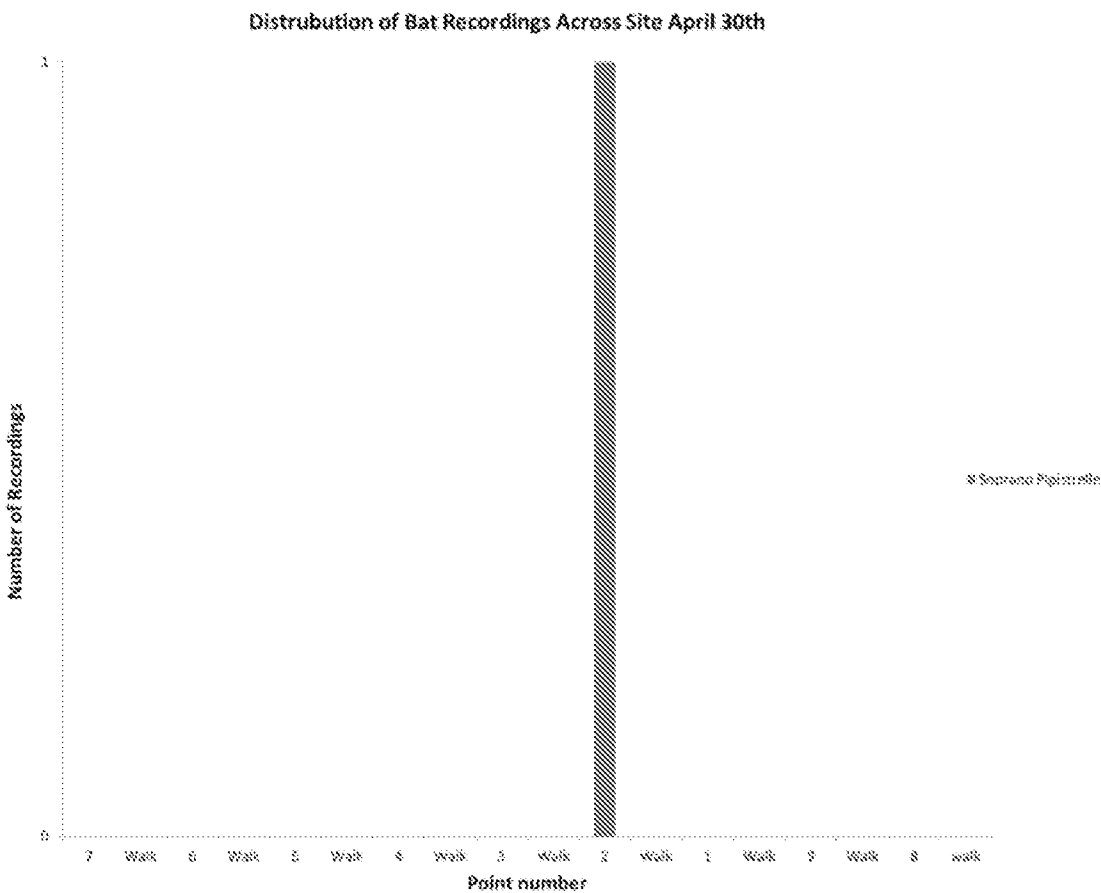
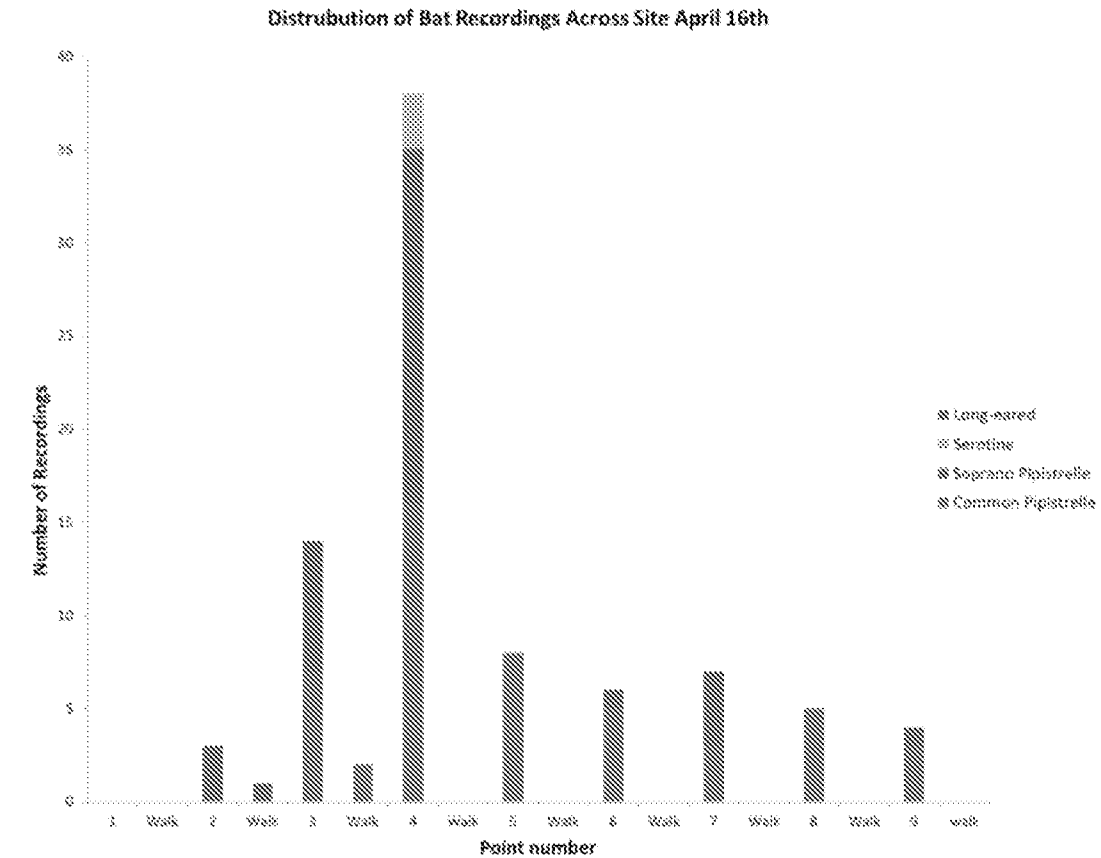
If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Sarah Evans

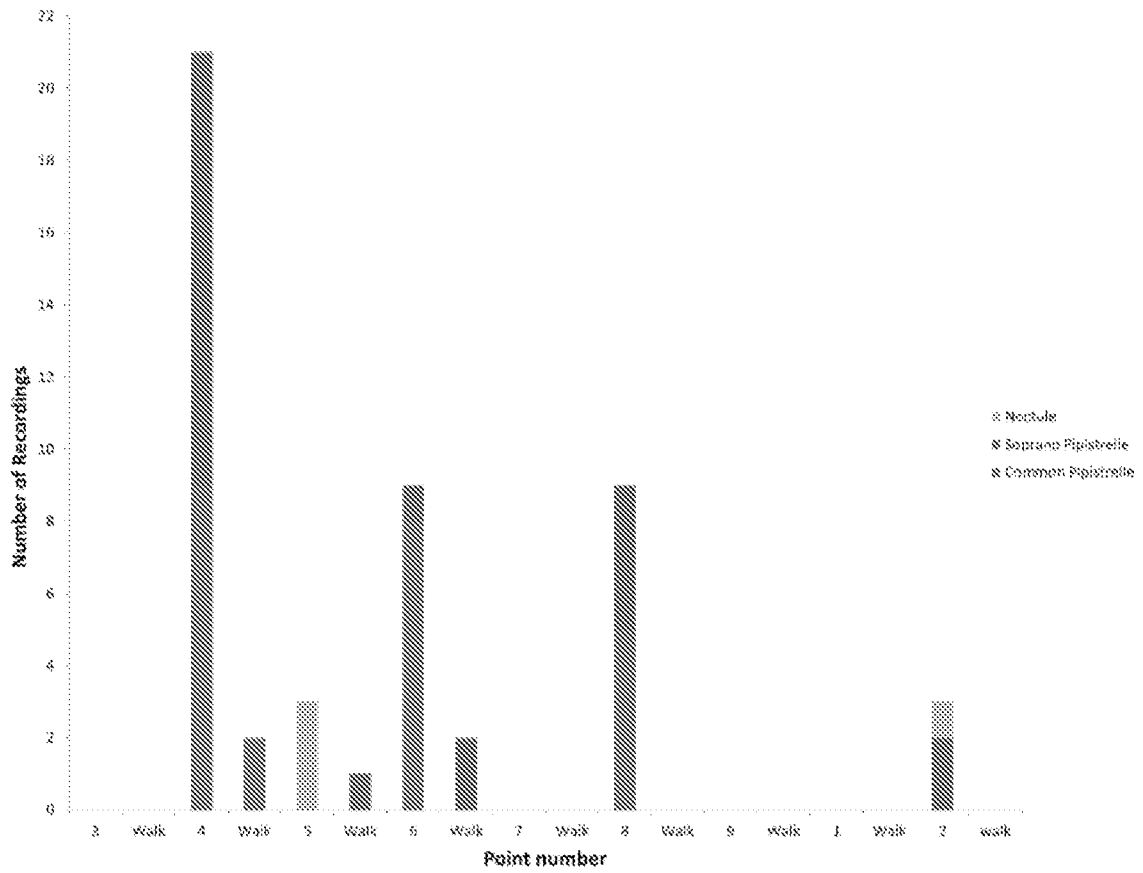
Approved by: Chris Troth



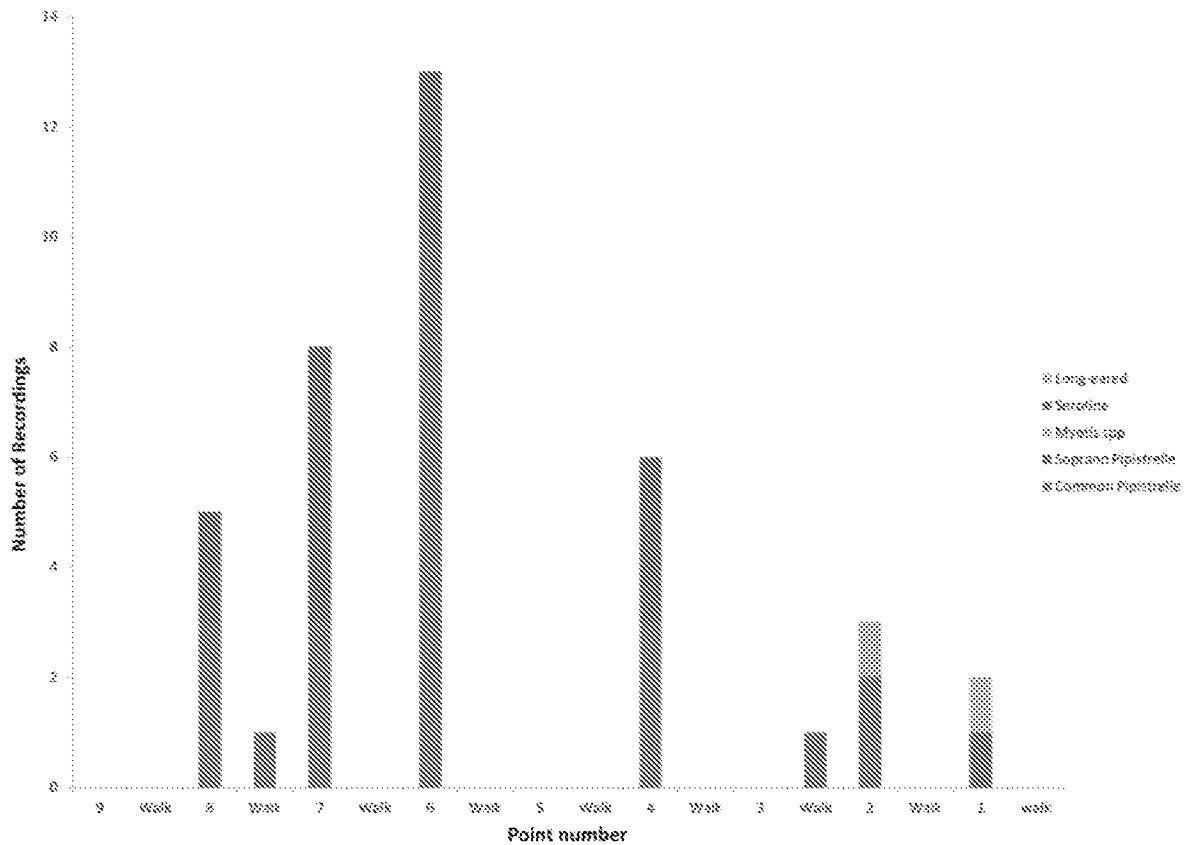
APPENDIX IV – Bat Transect Results.



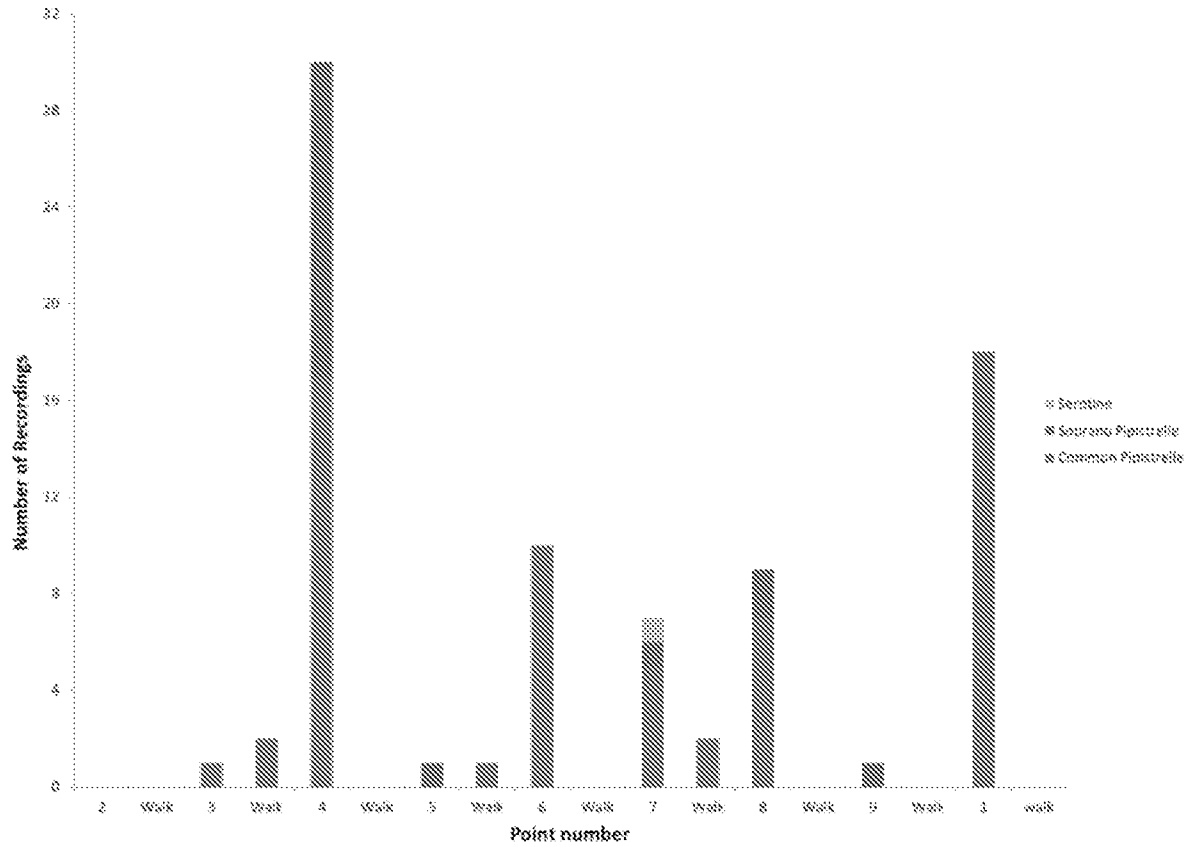
Distrubution of Bat Recordings Across Site May 15th



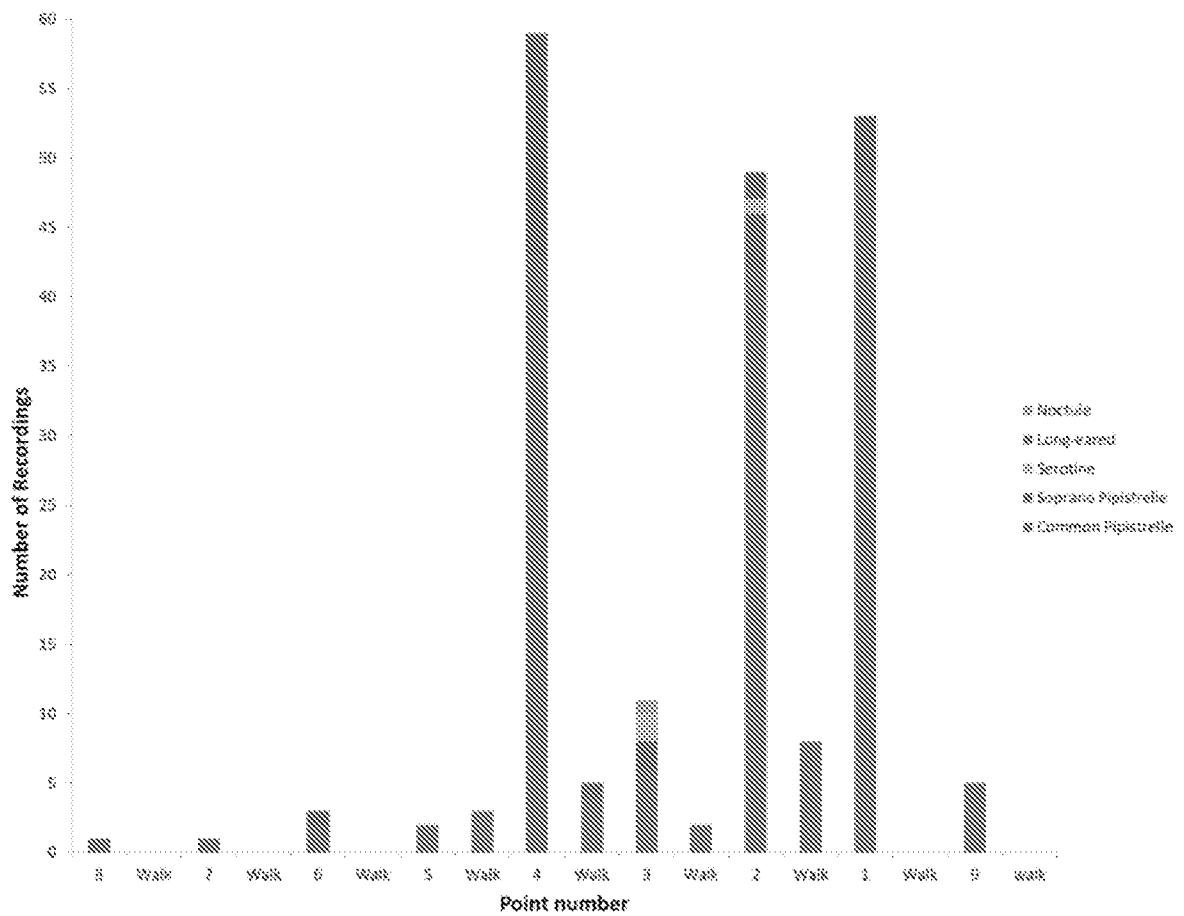
Distrubution of Bat Recordings Across Site May 27th



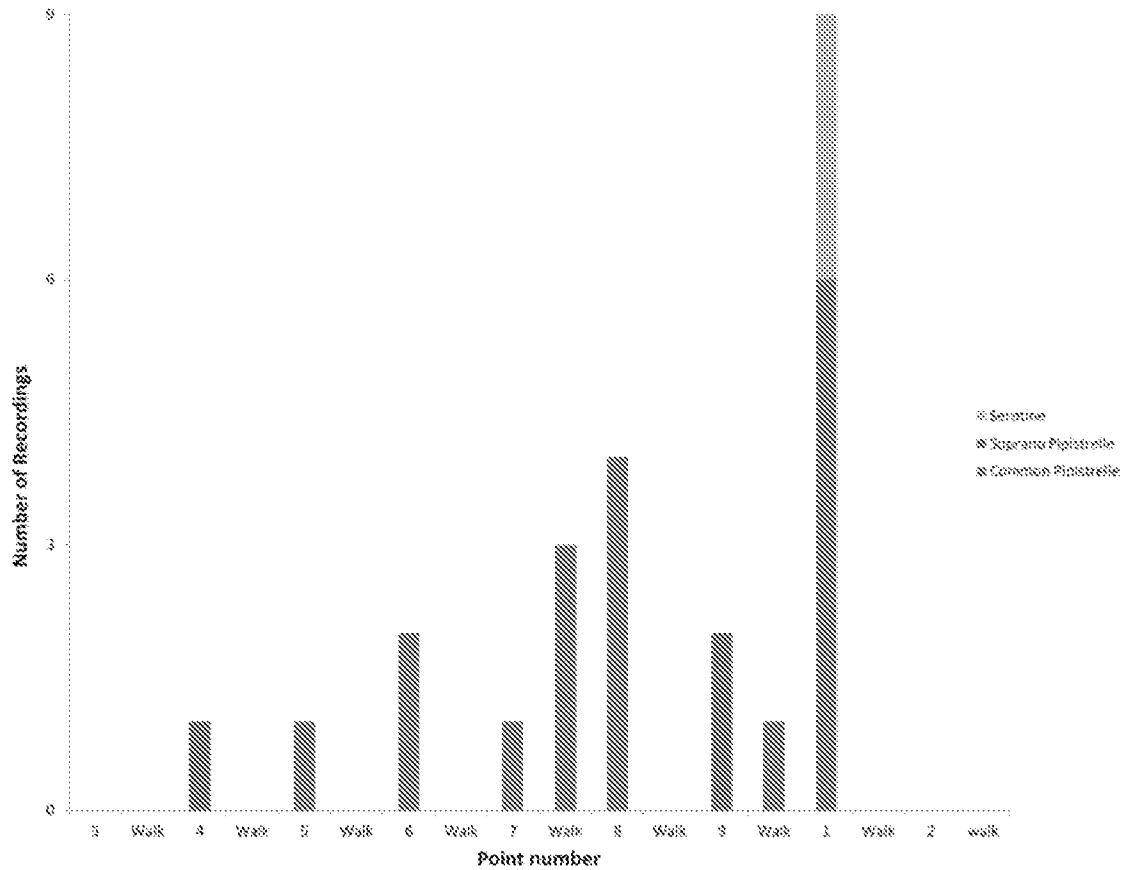
Distribution of Bat Recordings Across Site June 15th



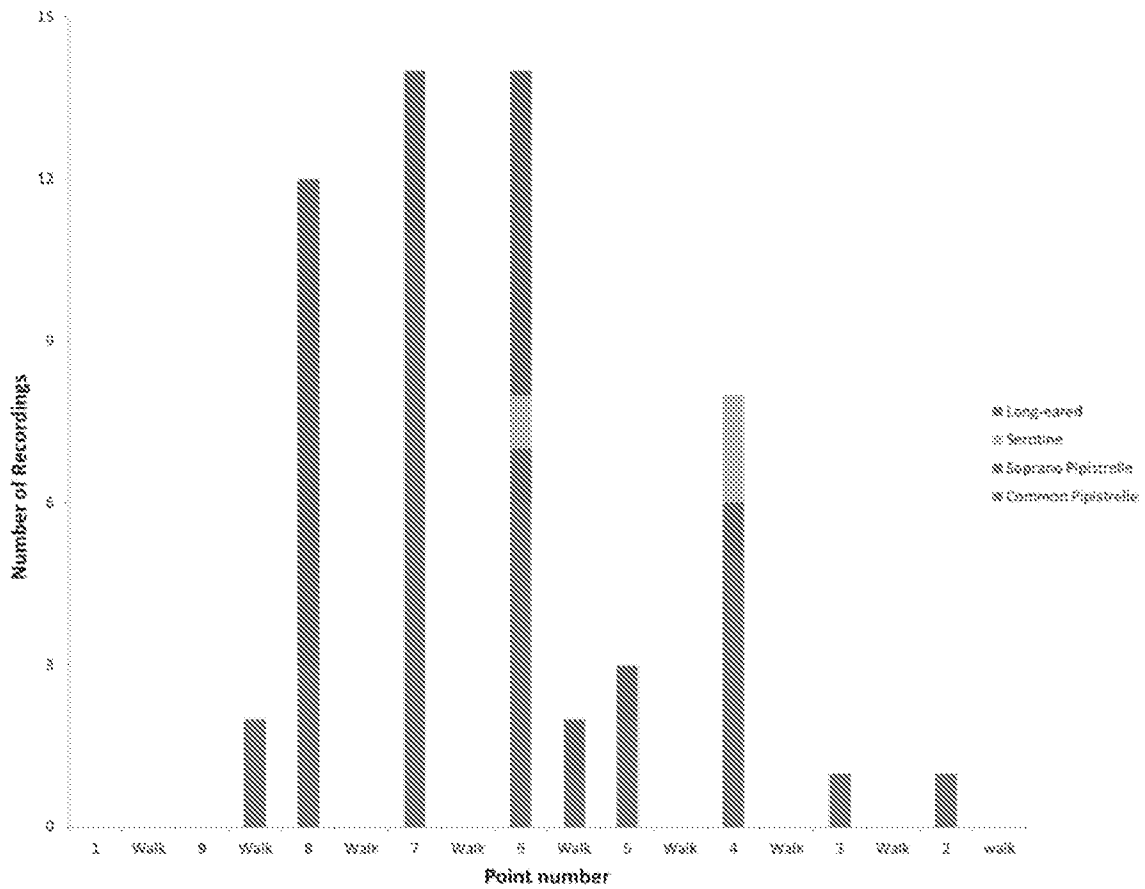
Distribution of Bat Recordings Across Site June 29th



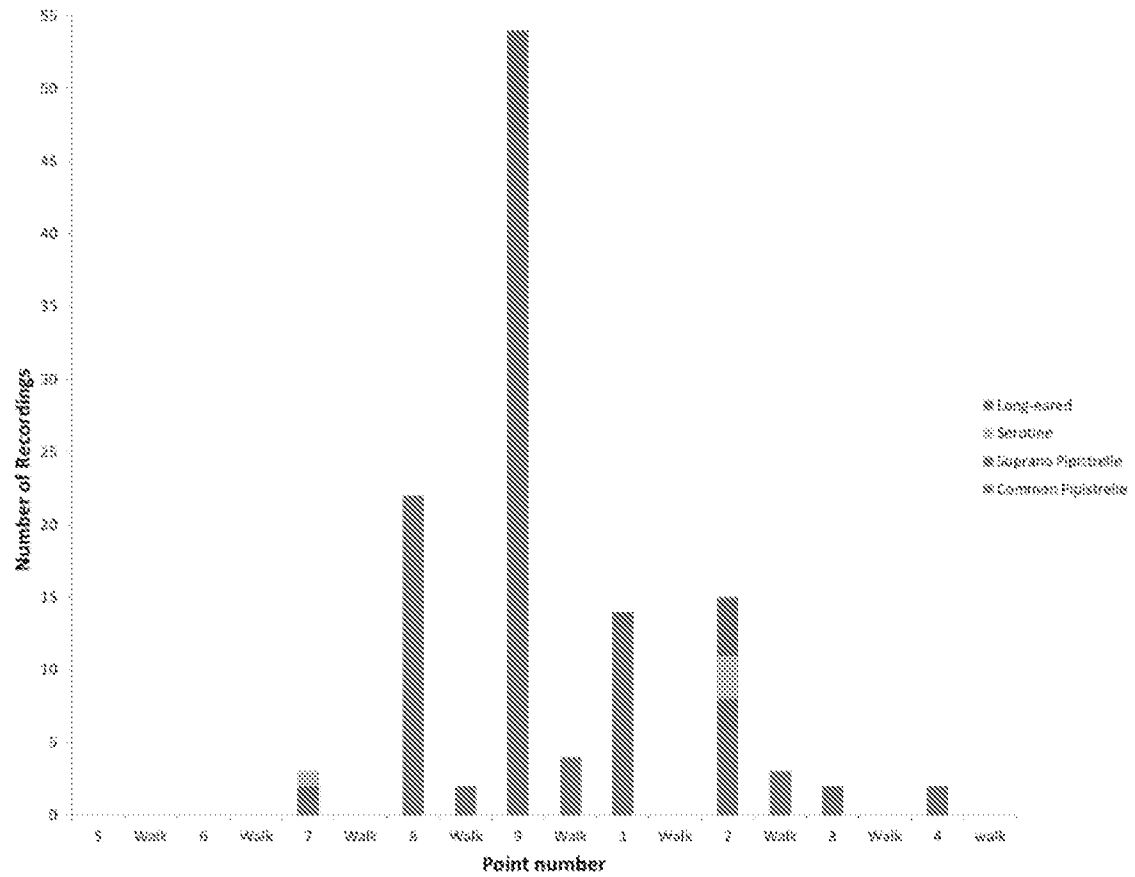
Distrubution of Bat Recordings Across Site July 16th



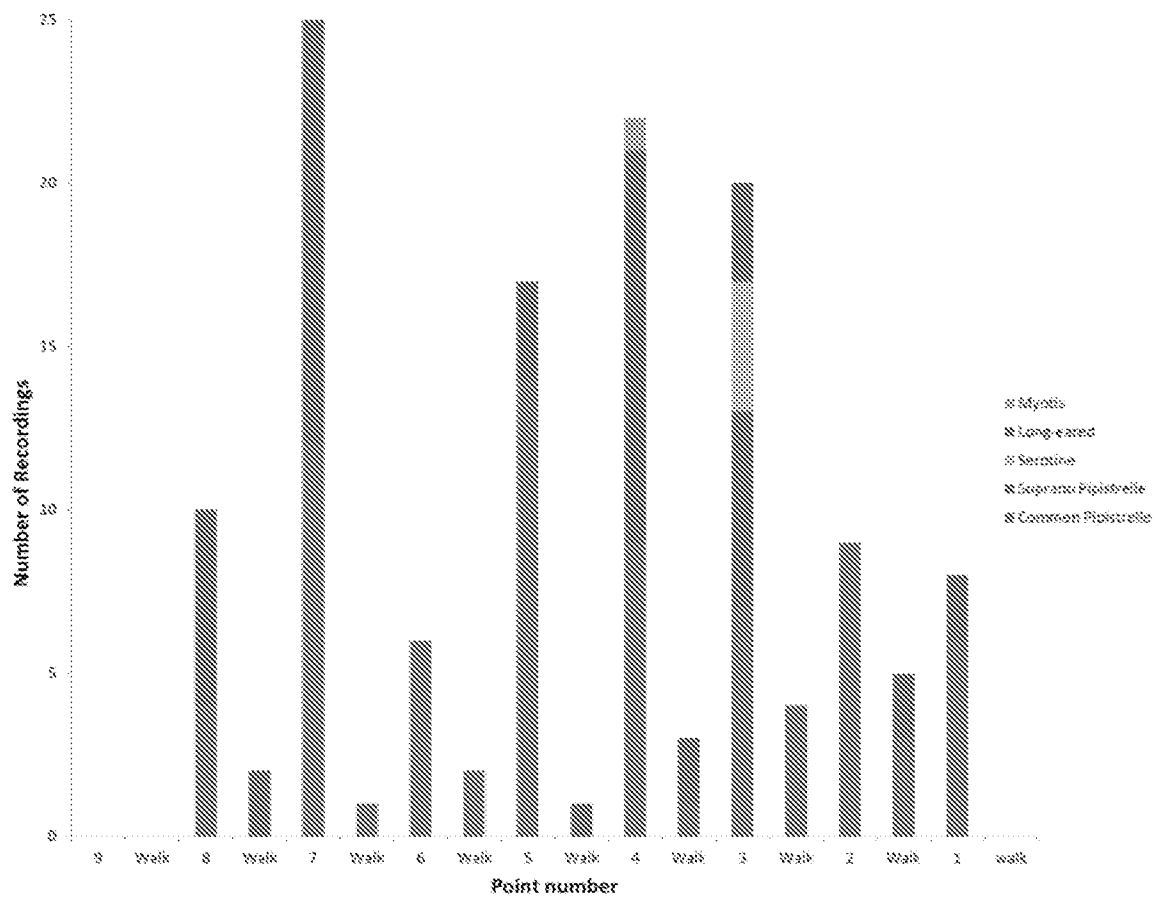
Distrubution of Bat Recordings Across Site July 29th



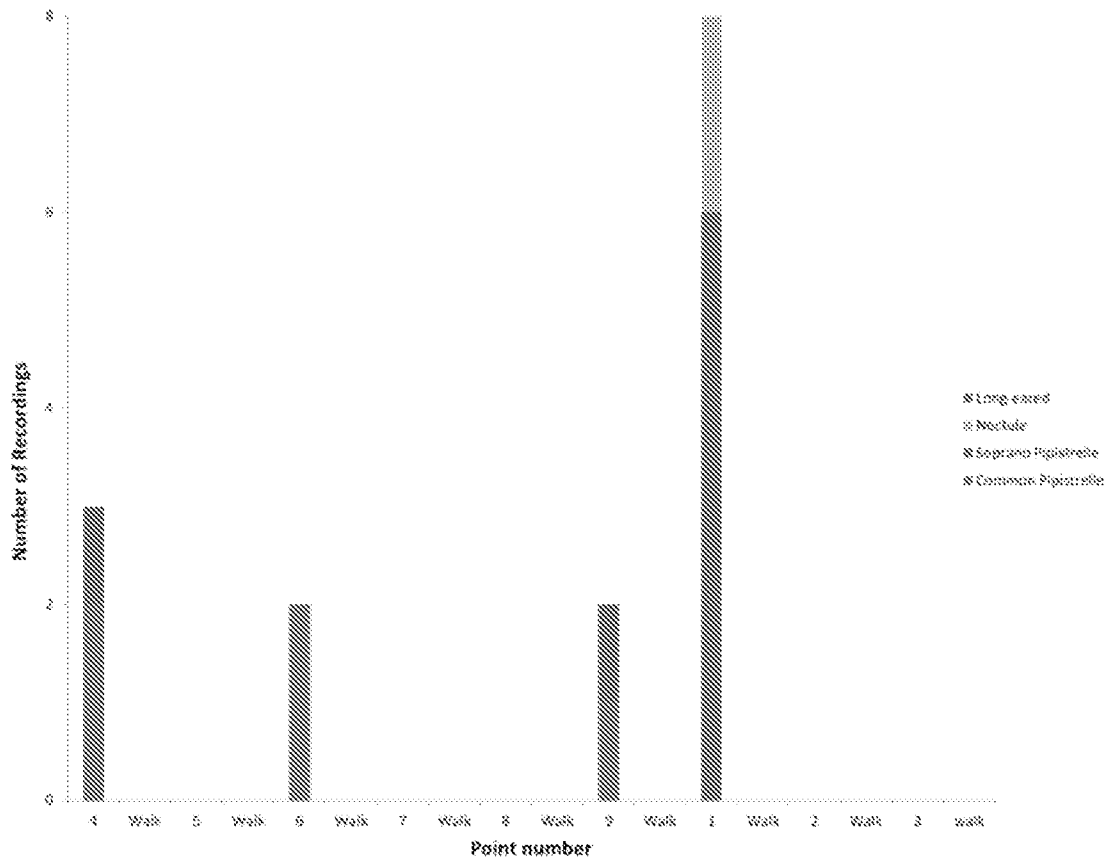
Distrubution of Bat Recordings Across Site August 12th



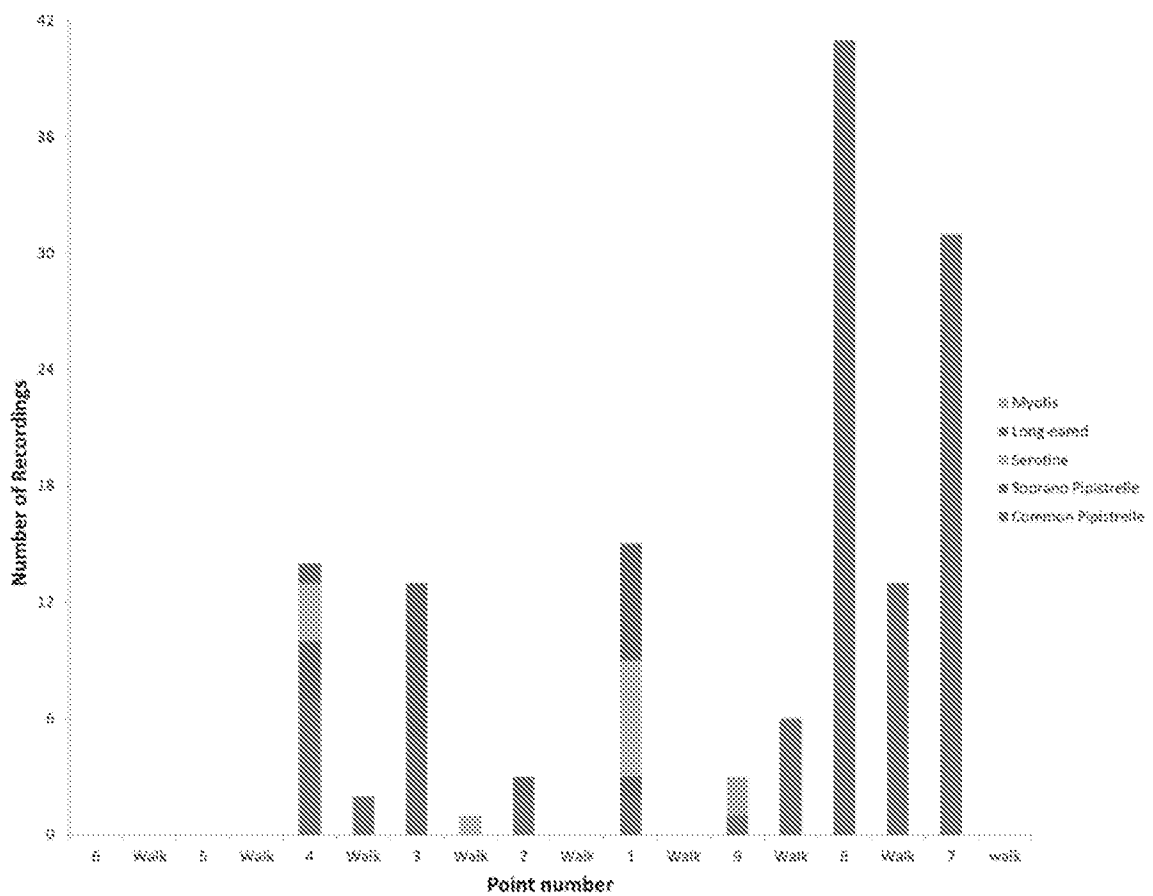
Distribution of Bat Recordings Across Site August 27th



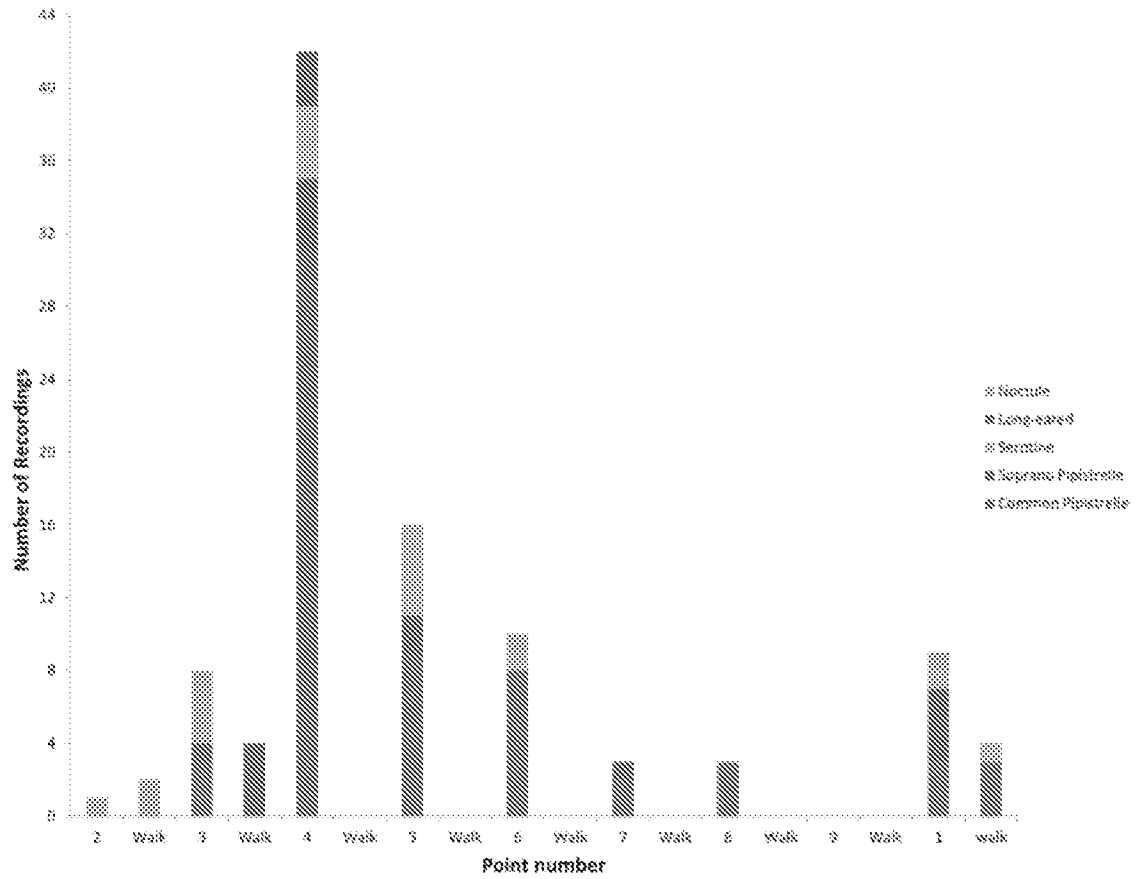
Distribution of Bat Recordings Across Site August 28th



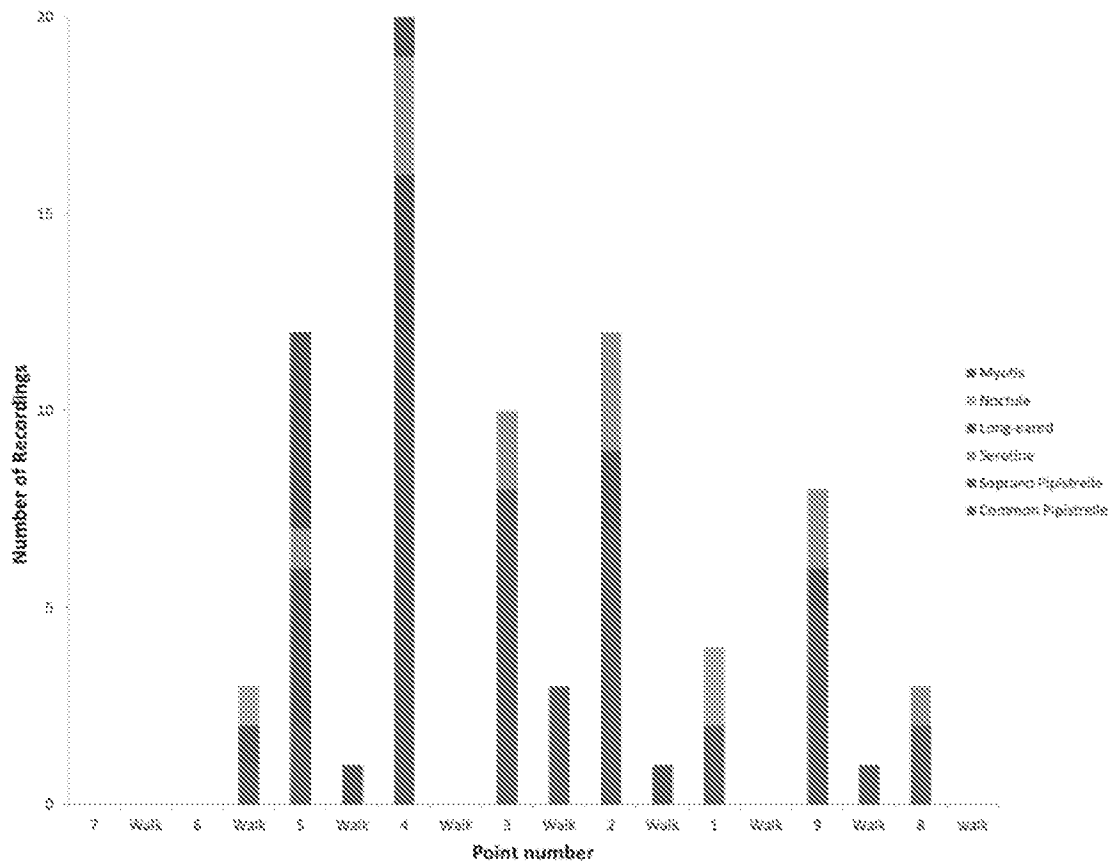
Distribution of Bat Recordings Across Site September 17th

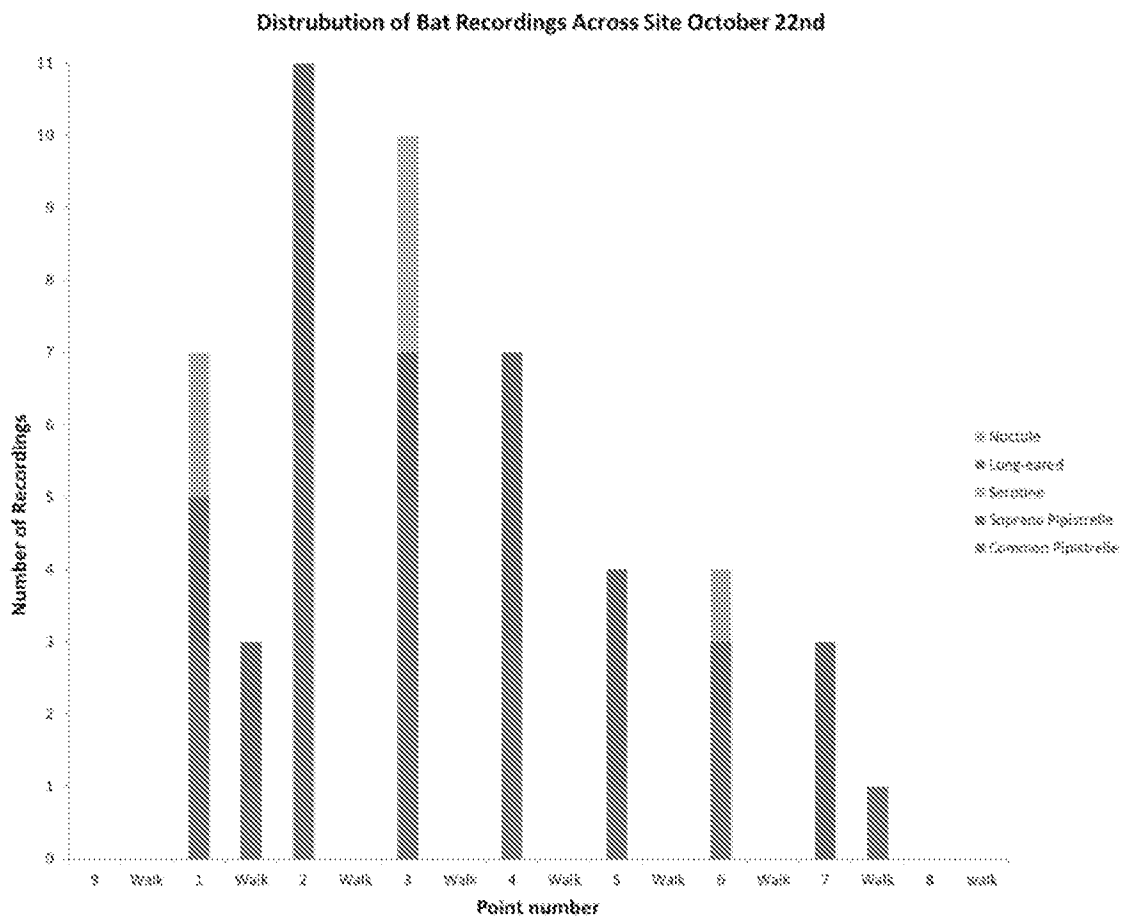


Distribution of Bat Recordings Across Site September 28th



Distribution of Bat Recordings Across Site October 7th





APPENDIX V – Bat Static Data Results. Total number of bat passes per each static bat recorder across all 14 data collection surveys

Month	Date	(No. 1 = Static 1, No. 2 = Static 2, No. 3 = Static 3).									Long-eared spp			Noctule			Myotis spp			Nathusius' Pipistrelle		
		Common Pipistrelle			Soprano Pipistrelle			Serotine														
		No. 1	No. 2	No. 3	No. 1	No. 2	No. 3	No. 1	No. 2	No. 3	No. 1	No. 2	No. 3	No. 1	No. 2	No. 3	No. 1	No. 2	No. 3	No. 1	No. 2	No. 3
April 1	2 nd	103	49	5	25	7	6	5	-	2	-	-	-	-	-	-	-	-	-	-	-	-
	3 rd	49	12	6	16	9	10	2	5	2	-	-	-	-	-	-	-	-	-	-	-	-
	4 th	2	4	10	14	3	13	6	2	5	-	-	1	-	-	-	-	-	-	-	-	-
	5 th	105	34	26	55	12	19	10	8	7	11	1	1	-	-	-	2	-	-	-	-	-
	6 th	22	26	7	16	15	16	7	2	4	1	1	0	-	-	-	-	-	-	1	-	-
Total		281	125	54	126	46	64	30	17	20	12	2	2	-	-	-	2	-	-	1	-	-
April 2	16 th	12	10	22	9	4	52	3	9	15	2	-	1	-	-	-	-	1	-	2	1	-
	17 th	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18 th	7	5	10	7	10	26	4	5	10	-	-	1	-	1	-	-	1	-	-	-	-
	19 th	-	4	12	3	3	44	2	4	3	-	-	3	-	-	-	-	-	-	-	-	-
	20 th	1	23	23	4	3	37	4	3	2	1	-	2	-	-	-	-	1	-	-	-	-
Total		20	42	67	23	20	161	13	21	30	3	-	7	-	1	-	-	3	-	2	1	-

May 1	1 st	59	30	4	42	13	8	36	33	45	1	-	-	-	-	-	-	1	-	-	-	-
	2 nd	13	6	15	14	17	18	10	33	51	-	-	1	-	-	-	-	-	-	-	-	-
	3 rd	46	28	25	25	21	29	21	41	367	1	-	-	-	-	-	-	2	-	-	-	-
	4 th	5	12	18	14	3	22	10	144	185	-	-	5	-	-	-	-	-	-	-	-	-
	5 th	2	2	8	3	1	34	14	103	145	-	-	-	-	-	-	-	-	-	-	-	-
Total		125	78	70	98	55	111	91	354	793	2	-	6	-	-	-	-	3	-	-	-	-
May 2	16 th	17	14	18	9	21	19	7	27	30	-	3	1	-	-	-	-	-	-	-	-	-
	17 th	45	28	31	11	11	23	8	23	33	-	1	-	-	-	2	-	-	-	-	-	-
	18 th	19	21	20	2	13	15	15	39	20	-	-	-	2	-	-	-	-	-	-	-	-
	19 th	24	19	28	8	12	15	6	18	29	6	-	-	-	-	-	-	-	-	-	-	-
	20 th	27	15	40	9	18	27	4	15	28	6	3	-	1	-	-	-	-	-	-	-	-
Total		132	97	137	39	75	99	40	122	140	12	7	1	3	-	2	-	-	-	-	-	-
June 1	1 st	16	128	67	8	7	36	8	4	8	-	-	-	-	-	-	-	-	-	-	-	-
	2 nd	54	64	83	40	8	23	2	15	11	-	-	-	-	-	-	-	-	-	-	-	-
	3 rd	94	24	61	20	9	15	1	4	6	-	-	-	-	-	1	-	-	1	-	-	-
	4 th	17	126	22	7	12	16	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
	5 th	235	176	15	54	19	9	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-

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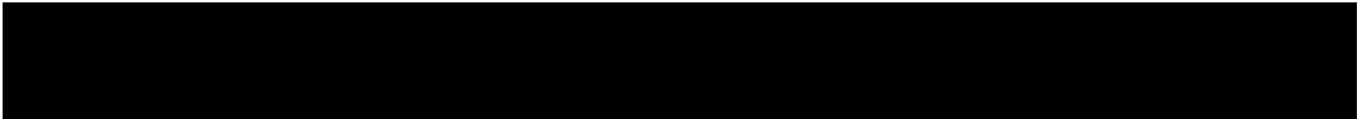
Total		416	518	248	129	55	99	14	25	25	-	-	-	-	-	1	-	1	1	-	-	-
June 2	15 th	150	17	30	52	22	7	4	4	6	4	-	-	3	-	-	4	-	-	-	-	-
	16 th	165	11	31	31	12	13	1	2	2	6	1	-	-	-	-	-	-	-	1	-	-
	17 th	200	26	37	45	7	7	7	2	4	-	-	-	1	-	-	-	-	-	-	-	-
	18 th	728	61	20	361	27	12	7	7	6	-	3	-	-	-	-	2	-	-	-	-	-
	19 th	406	29	11	16	6	8	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Total		1649	144	129	505	74	47	20	15	18	10	4	-	6	-	-	6	-	-	1	-	-
July 1	2 nd	110	39	43	51	8	3	3	4	7	-	4	-	4	-	1	-	-	-	-	-	-
	3 rd	519	58	14	820	9	3	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	4 th	941	18	52	692	9	2	8	-	2	-	-	-	-	-	-	-	-	-	-	-	-
	5 th	851	121	18	198	13	1	10	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	6 th	61	11	56	3	4	5	5	5	7	7	-	-	-	-	-	-	-	-	-	-	-
Total		2482	247	183	1764	43	14	32	13	18	7	4	-	4	-	1	-	-	-	-	-	-
July 2	18 th	58	12	53	6	5	23	10	4	3	-	4	-	3	-	1	-	-	-	-	-	-
	19 th	64	43	34	5	6	8	6	2	3	-	-	-	-	-	-	-	-	-	-	-	-
	20 th	85	92	149	8	17	5	5	5	3	-	22	-	-	-	-	-	-	-	-	-	-
	21 st	76	21	107	23	11	6	10	6	6	-	-	-	-	-	-	-	-	-	-	-	-

	22 nd	132	37	143	19	10	6	6	3	7	-	-	-	1	-	-	-	-	-	-	-	-
Total		415	205	486	61	49	48	37	20	22	-	26	-	4	-	1	-	-	-	-	-	-
August 1	4 th	372	74	135	121	4	9	13	4	3	-	-	-	-	-	-	-	2	-	-	-	-
	5 th	295	100	160	48	13	10	16	3	-	-	-	-	4	-	-	-	-	-	-	-	-
	6 th	153	14	102	15	11	14	14	7	7	-	-	-	2	1	-	-	-	-	-	-	-
	7 th	124	50	138	16	3	17	12	11	5	-	-	-	2	-	1	-	-	-	-	-	-
	8 th	92	52	86	7	5	12	13	7	12	-	-	-	1	-	1	-	-	-	-	-	-
Total		1036	290	621	207	36	62	68	32	27	-	-	-	9	1	2	-	2	-	-	-	-
August 2	26 th	91	28	82	24	31	11	4	5	1	-	-	-	3	1	1	-	-	-	-	-	-
	27 th	230	112	34	259	59	10	5	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	28 th	37	90	47	31	41	7	4	3	-	-	-	-	1	-	-	-	-	-	-	-	-
	29 th	4	50	12	18	23	8	2	4	1	-	-	-	-	-	-	-	3	-	-	-	-
	30 th	48	44	32	19	12	18	5	1	5	-	-	-	-	1	-	-	-	-	-	-	-
Total		410	324	208	351	167	54	20	15	7	-	-	-	4	2	3	-	3	-	-	-	-
September 1	7 th	1234	211	19	229	43	4	8	3	6	-	-	-	8	-	1	-	-	-	-	-	-
	8 th	195	12	8	38	17	13	12	6	3	-	-	-	7	-	-	-	-	-	-	-	-
	9 th	77	100	31	30	20	20	3	7	4	-	-	-	1	-	-	-	-	-	-	-	-



	10 th	34	24	11	37	13	13	3	6	1	-	-	-	-	-	-	-	-	-	-	-
	11 th	72	11	27	19	14	23	6	4	-	-	-	-	2	-	-	-	-	-	-	-
Total		2622	359	96	243	107	14	32	26	14	-	-	-	18	-	1	-	-	-	-	-
September 2	20 th	20	47	109	10	40	35	6	14	-	-	-	-	-	-	-	-	-	-	-	-
	21 st	51	6	10	22	18	17	3	2	3	-	-	-	2	-	-	-	-	-	-	-
	22 nd	179	25	50	184	2	25	12	9	1	-	-	-	5	-	-	-	-	-	-	-
	23 rd	136	98	111	120	28	35	2	-	4	-	-	-	1	1	-	-	-	-	-	-
	24 th	6	4	4	11	11	19	1	-	-	-	-	-	-	-	-	-	-	3	-	-
Total		392	180	284	347	99	131	24	25	8	-	-	-	8	1	-	-	-	3	-	-
October 1	8 th	14	12	2	4	24	4	5	7	-	-	-	-	-	-	-	1	4	-	-	-
	9 th	1	8	2	29	38	-	4	4	4	-	-	-	-	-	-	-	-	-	-	-
	10 th	87	27	-	372	43	1	1	-	-	-	-	-	-	-	-	-	4	-	-	-
	11 th	8	53	7	14	22	1	3	5	2	-	-	-	-	-	-	-	-	-	-	-
	12 th	119	45	1	134	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		229	145	12	553	131	9	13	16	6	-	-	-	-	-	-	1	8	-	-	-
October 2	23 rd	111	42	10	179	25	5	-	-	5	-	-	-	-	-	-	-	-	-	-	-
	24 th	137	44	3	945	128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	25 th	2	11	3	60	12	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
	26 th	9	9	-	10	11	7	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
	27 th	75	7	-	211	62	-	1	-	-	-	-	-	-	-	-	7	-	-	-	-	-
Total		334	113	16	1405	238	14	2	2	5	-	-	-	-	-	-	9	-	-	-	-	-
Overall Total		8183	2867	2611	5851	1195	927	436	703	1133	46	43	16	56	5	11	18	20	4	4	1	-



APPENDIX VI – Lepidoptera Transect Results.

Survey date	Lepidoptera activity on site
21/04/2020	Summary: Activity was considered to be low during the first survey, a total of nine butterflies, from three species, were recorded across the entire transect. Breeding behaviour was observed in Section 1. Section 1: Two Peacock butterflies were recorded dog fighting along the base of the western hedgerow. Section 2: One Large White butterfly commuted from the center of section 2, across the field towards the western hedgerow. Section 3: One Red Admiral butterfly commuted across the section towards the northern hedgerow, then commuted over the hedgerow and off site. Section 4: Two Peacock butterflies were observed sunning themselves on the ground, near the base of the northern hedgerow. Section 5: One Large White butterfly commuted from the east to the west along the northern hedgerow and one Peacock butterfly commuted across the site, then over the fence of a neighboring property along the southern boundary. Section 6: One Peacock butterfly was flushed from the Nettle patch by the surveyor and landed nearby on the ground then sunned itself.
06/05/2020	Summary: Activity was considered to be low during the second survey, a total of eight butterflies, from four species, were recorded across the entire transect. Breeding behaviour was observed in Section 4. Section 1: One Large White butterfly was recorded commuting from the north to the south along the western hedgerow. Section 2: One Holly Blue butterfly was observed circling around a flowering Hawthorn in the top north-western corner of the site. Section 3: One Large White butterfly commuted from section three, towards the western hedgerow then commuted north along the hedgerow. Section 4: One Green-veined White butterfly was seen feeding from a Cuckoo flower. Two Small White butterflies were recorded dog fighting along the northern hedgerow. Section 5: One Large White butterfly commuted from the northwest to the east along the northern hedgerow. Section 6: No Lepidoptera species were observed in this section.
22/05/2020	Summary: Activity was considered to be very low during the third survey, a total of two butterflies, from two species, were recorded across the entire transect. No breeding behaviour was observed. Section 1: No Lepidoptera species were observed in this section. Section 2: One Small Skipper butterfly was recorded sunning itself on the ground. Section 3: No Lepidoptera species were observed in this section. Section 4: No Lepidoptera species were observed in this section. Section 5: One Common Blue butterfly was seen sunning itself on the ground. Section 6: No Lepidoptera species were observed in this section.

28/05/2020	Summary: Activity was considered to be low during the fourth survey, a total of four adult butterflies, from three species, were recorded across the entire transect. Furthermore, one adult moth was also recorded, as well as one moth larva and five clusters of butterfly larva were also observed. Section 1: One Small Skipper butterfly was recorded commuting from the west to the east across the section. Section 2: One Small Skipper butterfly commuted from the southeast to the north west across the section. Section 3: No Lepidoptera species were observed in this section. Section 4: One 4th instar Vapourer moth larva was seen resting on Common Sorrel after recently having shed its skin. Five clusters of Peacock butterfly larva were recorded feeding on Nettles. Furthermore, one Large White butterfly commuted from the south to the north across the section. Section 5: One Mother Shipton moth commuted from the west to the east across the section after being flushed from the grass by the surveyor. Section 6: One Meadow Brown butterfly was seen sunning itself on the ground.
22/06/2020	Summary: Activity was considered to be high during the fifth survey, a total of 94 butterflies, from five species, were recorded across the entire transect. Breeding behaviour was observed in Section 1 and 2. Section 1: A total of five Marbled White butterflies were recorded in this section, including two that were dog fighting, two commuting across the section and one was observed egg laying across common grass species. Furthermore, four Small Skipper butterflies were also seen, including two dog fighting, one commuting from the south to the north along the western hedgerow and one egg laying on common grass species. A total of 11 Meadow Brown butterflies were seen commuting across the section, feeding from Bramble flowers in the western hedgerow and one was observed egg laying. Furthermore, three Large skipper butterflies were seen, two were dog fighting and one was recorded egg laying on common grass species. Section 2: One Marbled White butterfly was seen egg laying across common grass species. A total of nine Small Skippers were recorded commuting across the site, including seven of which that were commuting back and forth between Section 2 and Section 3. A total of 26 Meadow Brown butterflies were recorded commuting within this section, six of which were mainly staying around the top north-western corner and 20 commuting back and forth between Section 2 and Section 3. Section 3: Two Marbled White, three Small Skippers and four Meadow Brown butterflies were seen commuting across the site. Section 4: Five Small Skippers and 11 Meadow Brown butterflies were recorded commuting across the site. Section 5: Six Small Skippers, three Meadow Browns and one Large white were recorded commuting across the section. Section 6: Two small Skippers were observed commuting across this section.
26/06/2020	Summary: Activity was considered to be very high during the sixth survey, a total of 355 butterflies, from 12 species, and two moths from one species, were recorded across the entire transect. Breeding behaviour was observed in Section 1 and 3. Section 1: A total of 47 Meadow Brown butterflies were recorded in this section, including four that were egg laying across common grass species, and one mating pair. Six Small Skippers were observed feeding from Bramble flowers in the western hedgerow and five commuted within the section. One Large White commuted from the west to the east along the southern hedgerow and one Marbled White commuted across the section, it was intercepted by a Meadow Brown displaying territorial behaviours. Furthermore, one Gatekeeper and one Six-spot Burnet moth were seen resting on common grass species.

	Section 2: A total of 24 Small Skippers, 47 Meadow Browns, three Large Whites, one Marbled White, one Red Admiral and one Ringlet were recorded commuting within this section. Two Gatekeepers were also observed feeding from Bramble flowers in the western hedgerow. One Six-spot Burnet mot and one Large Skippers were also recorded resting on common grass species. Additionally, one Holly Blue was recorded circling above the north-western hedgerow at the top north-western corner of the site. Section 3: A total of 33 Meadow Browns, 28 Small Skippers, two Six-spot Burnet moths, two Marbled Whites, one Large White, one Large Skipper and one Dark Green Fritillary were seen commuting across the section. Furthermore, one Small Copper was also recorded looking for egg laying sites. Section 4: A total of 20 Meadow Browns, 16 Small Skippers, two Gatekeepers and one Large White were observed commuting across this section. Section 5: A total of 24 Meadow Browns, 14 Small Skippers, three Marbled Whites, two Gatekeepers and one Red Admiral were recorded commuting across this section. Additionally, three Ringlets were observed sunning themselves in the northern hedgerow. Section 6: A total of 22 Meadow Browns, 32 Small Skippers, four Marbled Whites, two Gatekeepers and one Cinnabar moth were recorded commuting within this section.
07/07/2020	Summary: Activity was considered to be high during the seventh survey, with a total of 122 butterflies, from nine species were recorded across the entire transect. Breeding behaviour was observed in Section 1, 3 and 4. Section 1: A total of 10 Meadow Browns, one Large White, Four Gatekeepers and one Peacock butterflies were observed utilizing the Bramble flowers in the western hedgerow. One Large Skipper and one Small White were also observed commuting across the site. Furthermore, two Meadow Browns were recorded dog fighting. Section 2: One Comma, one Small Skipper and one Meadow Brown were recorded utilizing the Thistle and Nettle patch for feeding and sunning purposes. Nine Gatekeepers, seven Meadow Browns, four Small Skippers, One Red Admiral and one Large White were also observed commuting across the section. Furthermore, one Small Skipper and one Meadow Brown were seen feeding from Ragwort flowers. Section 3: A total of seven Meadow Browns, seven Small Skippers, six Gatekeepers, and one Large White were recorded commuting across this section. Additionally, two Small Skippers were observed dog fighting. Section 4: A total of five Gatekeepers, five Meadow Browns, five Small Skippers and one Large White were observed commuting across this section. One Small Skipper was also seen drinking from Knapweed. Two Small Skippers were also seen mating. Section 5: Three Small Skippers, three Meadow Browns and one Large White were recorded commuting across this section. One Small Skipper was also seen drinking from Knapweed and then Yarrow flowers. Furthermore, nine Meadow Browns, six Small Skippers and two Gatekeepers were observed in a Thistle patch sunning themselves and drinking from the flowers. Section 6: A total of four Meadow Browns, three Small Skippers and one Gatekeeper were recorded commuting across this section.
23/07/2020	Summary: Activity was considered to be low during the eighth survey, with a total of 27 butterflies, from three species were recorded across the entire transect. No breeding behaviour was observed. Section 1: A total of four Gatekeepers and two Meadow Browns were recorded commuting across the site. Furthermore, nine Gatekeepers were observed feeding from Bramble flowers in the western hedgerow. Section 2: One Gatekeeper was observed commuting across this section and two Meadow Browns were recorded feeding from Bramble flowers in the western hedgerow.



	Section 3: One Large White was recorded commuting from the west to the east along the northern hedgerow. Section 4: Two Meadow Browns and two Gatekeepers were recorded commuting across this section. Section 5: No Lepidoptera species were observed in this section. Section 6: Two Gatekeepers and two Meadow Browns were recorded commuting across this section.
31/07/2020	Summary: Activity was considered to be very low during the ninth survey, with a total of 11 butterflies, from four species, and one moth, were recorded across the entire transect. No breeding behaviour was observed. Section 1: Three Gatekeepers and one Meadow Brown was recorded commuting across this section. Section 2: One Meadow Brown was observed commuting across this section. Section 3: No Lepidoptera species were observed in this section. Section 4: One Meadow Brown was observed commuting across this section. Section 5: One Small White, one Meadow Brown, one Gatekeeper, two Red Admirals and one Vapourer moth were observed commuting across this section. Section 6: Two Gatekeepers were observed commuting in this section.
05/08/2020	Summary: Activity was considered to be low during the tenth survey, with a total of 24 butterflies, from four species were recorded across the entire transect. No breeding behaviour was observed. Section 1: One Speckled Wood, three Gatekeepers and one Large White were recorded commuting across the site. One Gatekeeper was also observed sunning itself on Bramble in the western hedgerow. Section 2: Four Gatekeepers and one Large White were recorded commuting across this section. One Meadow Brown was also observed sunning itself on Bramble in the western hedgerow. Section 3: One Meadow Brown commuted across this section. Section 4: Three Meadow Browns and one Large White commuted across this section. Section 5: Two Large Whites and one Gatekeeper were seen commuting across this section. Section 6: One Large White, three Gatekeepers were recorded commuting across this section.
12/08/2020	Summary: Activity was considered to be very low during the eleventh survey, with a total of five butterflies, from three species, and one moth, were recorded across the entire transect. No breeding behaviour was observed. Section 1: Two Meadow Browns were observed commuting across this section. Section 2: One Holly Blue was observed circling above the north-western hedgerow in the top north-western corner of the site. One Vapourer moth was also seen commuting from the southeast to the northwest along the northern hedgerow. Section 3: One Small White was seen commuting from the west to the east along the northern hedgerow. Section 4: No Lepidoptera species were observed in this section. Section 5: One Small White commuted from the west to the east along the southern fence line boundary. Section 6: No Lepidoptera species were observed in this section.
26/08/2020	Summary: Activity was considered to be very low during the twelfth survey, with a total of five butterflies, from four species were recorded across the entire transect. No breeding behaviour was observed.



	Section 1: One Meadow Brown was recorded commuting across this section. Furthermore, one Red Admiral was observed feeding from Bramble berries. Section 2: Two Meadow Browns were recorded commuting across this section. Section 3: No Lepidoptera species were observed in this section. Section 4: No Lepidoptera species were observed in this section. Section 5: One Small White was recorded commuting from the east to the west along the southern fence line boundary. Section 6: No Lepidoptera species were observed in this section.
02/09/2020	Summary: Activity was considered to be low during the thirteenth survey, with a total of nine butterflies, from four species, and one moth, were recorded across the entire transect. Breeding behaviour was observed in Section 1 and 2. Section 1: Two Small Whites and one Mother Shipton moth were observed commuting across this section. Furthermore, one Small Copper was observed egg laying, for the duration of time spent in this section, three eggs were found by the surveyors. Section 2: No Lepidoptera species were observed in this section. Section 3: Two Small Whites were observed dog fighting. Section 4: One Large White and one Small White were observed commuting across this section. Section 5: Two Brown Argus were observed sunning themselves. Section 6: One Vapourer moth was observed commuting across this section.
07/09/2020	Summary: Activity was considered to be very low during the fourteenth survey, with a total of six butterflies, from four species, and one moth, were recorded across the entire transect. Breeding behaviour was observed in Section 1. Section 1: One Small White was observed commuting across this section and one Green-veined White was observed feeding from a Knapweed flower. Furthermore, one Small Copper was seen sunning itself and another Small Copper was recorded egg laying. Section 2: One Speckled Wood was observed commuting across this section and one Small Copper was seen sunning itself. Section 3: No Lepidoptera species were observed in this section. Section 4: No Lepidoptera species were observed in this section. Section 5: No Lepidoptera species were observed in this section. Section 6: One Vapourer moth was seen commuting across this section.
17/09/2020	Summary: Activity was considered to be very low during the fifteenth survey, with a total of, three butterflies, from two species were recorded across the entire transect. No breeding behaviour was observed. Section 1: One Small Copper was recorded sunning itself. Section 2: No Lepidoptera species were observed in this section. Section 3: No Lepidoptera species were observed in this section. Section 4: One Small Copper was observed sunning itself.

	Section 5: One Small White commuted from the west to the east along the southern fence line boundary. Section 6: No Lepidoptera species were observed in this section.
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APPENDIX VII – Hedgerow Assessment.

Hedgerow	Woody Species Recorded	Woodland Plants	Additional Features							Path / Bridleway	Presence of scheduled/red data book species	Important Hedgerow
			Bank / Wall	Gaps <10%	Standard Trees	Ditch	Connection score	Parallel Hedge	Minimum 3 Schedule 2 woodland species			
1	Ac, Qr, Sn, Cm, Ps	None present	N	N	Y	Y	1	N	N	N	N	N
2	Qr, Sn, Ps, Cm, Sc	<i>Arum maculatum</i>	N	N	Y	Y	2	N	N	N	Y	Y
3	Qr Um, Ps, Cm, Sn, Ac, Fe, Ia	<i>Teucrium scorodonia</i>	N	N	Y	N	1	N	N	N	Y	Y

The following abbreviations have been used:

- Ac – *Acre campestre*
- Cm – *Crataegus monogyna*
- Fe – *Fraxinus excelsior*
- Ia – *Ilex aquifolium*
- Ps – *Prunus spinosa*
- Qr – *Quercus robur*
- Sn – *Samubus nigra*
- Um - *Ulmus procera*

APPENDIX VIII – Badger Survey Results.

Date (all within September 2020)	Summary of species observed
4 th	No species observed.
5 th	During the night, one Rabbit was recorded foraging near the entrance of the mammal hole and one Mouse was seen commuting.
6 th	During the day, a total of two Rabbits (at different times), were observed commuting near the mammal hole. During the night, one Rabbit was recorded entering and exiting the mammal hole.
7 th	During the day, one Robin, Dunnock and two Rabbits were recorded foraging near the mammal hole.
8 th	During the day, one Song Thrush and one Rabbit were observed commuting near the mammal hole. During the night, 11 Rabbits (at separate times) were observed commuting around the mammal hole. Furthermore, one Rabbit was seen entering, and another exiting the mammal hole as well as another rabbit recorded grooming outside of the mammal hole.
9 th	During the day, a total of three Song Thrush clips were recorded commuting and one Robin.
10 th	No species observed.
11 th	During the day, a total of two Song Thrush, three Dunnock and one Robin clips were recorded, commuting and foraging around the mammal hole. During the night, a total of four Mice were observed commuting near the mammal hole.
12 th	During the day, two Song Thrush clips were recorded and one Rabbit, commuting near the mammal hole. During the night, one Rabbit was recorded commuting near the mammal hole and seven Mice were observed commuting.
13 th	During the day, one Song Thrush was observed near the mammal hole.

	During the night, two Rabbits were observed exiting the mammal hole and another entered. Furthermore, five Rabbits were recorded commuting around the hole and three Mice were observed commuting.
14 th	During the day, one Grey Squirrel and one Dunnock were recorded commuting near the mammal hole. During the night, one Mouse was seen commuting.
15 th	During the night, four Mice were observed commuting near the mammal hole.
16 th	During the day, one Rabbit was seen exiting the mammal hole. During the night, eight Mice were observed commuting.
17 th	During the day, one Dunnock and Robbin were recorded commuting and foraging near the mammal hole. During the night, five Mice and one Rabbit were seen commuting, as well as one Rabbit entered the mammal hole.
18 th	During the day, one Dunnock was seen foraging. During the night, one Rabbit was seen entering the mammal hole. Furthermore, six (at different times) Rabbits were seen commuting around the mammal hole, as well as three Mice.
19 th	During the day, one Song Thrush was recorded commuting near the mammal hole. During the night, 12 Mice were recorded commuting.
20 th	During the day, one Robin was seen foraging. During the night, four Mice and two Rabbits were observed commuting.
21 st	During the day, one House Sparrow was recorded. During the night, five Mice were recorded commuting by the mammal hole.



22 nd	During the day, one Grey Squirrel was recorded commuting. During the night, six mice were recorded commuting.
23 rd	During the day, one Dunnock was seen foraging. During the night, six Mice were recorded commuting. Furthermore, one Fox was observed at a distance, sniffing the air whilst facing the mammal hole.
24 th	During the day, two Dunnocks, two Song Thrush and one Robin was recorded commuting and foraging around the mammal hole. During the night, two Mice and one Rabbit was recorded commuting.

APPENDIX VIII – Assessment of Trees to Support Roosting Bats.

Assessment of suitability of Potential Roosting Features (PRF’s) on site for roosting bats (and nesting birds), and subsequent requirement for further ecological surveys are written in accordance with the Bat Conservation Trust ‘Bat Surveys for Professional Ecologists’ Good Practice Guidelines (3rd Edition) (2016). All Figure numbers relate to **Appendix VIII** only.

Tree and Figures		PRFs Description and Evidence of Presence
TREE 1 (T2 in Arb report): Mature Oak situated along the southern site boundary on the western side of the current access gate.		
Current suitability for roosting bats and nesting birds:		NEGLIGIBLE suitability for roosting bats HIGH suitability for nesting birds
Figure 1. Tree 1 and Tree 2 (semi-mature oaks). 		Figure 2. Close up of Tree 1, showing thin Ivy coverage.  ▪ Part of the main trunk and some branches have thin Ivy coverage, this is unsuitable for roosting bats (Figures 1 and 2). ▪ No holes or crevices were observed on the tree. ▪ No evidence of bats nor any bats themselves were observed. ▪ No signs of nesting birds were visible; however, the maturity of the tree and its location provides ample opportunities for nesting birds.

TREE 2 (T1 in Arb report): Semi-mature Oak situated along the southern site boundary on the western side of the current access gate.

Current suitability for roosting bats and nesting birds:

LOW suitability for roosting bats

HIGH suitability for nesting birds

Figure 3. Close up of Tree 2 showing Ivy coverage.



Figure 4. Close-up of the Ivy coverage on Tree 2.



- The majority of the main trunk has Ivy coverage, which potentially provides roosting opportunities for bats, particularly as it could be concealing crevices on the tree that were not visible at the time of the assessment (Figures 1, 3 and 4).
- It was not possible to survey the entire main body of the tree due to the Ivy coverage. Areas of the main tree that were visible were relatively smooth with no crevices recorded.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and its location provides ample opportunities for nesting birds.

TREE 3 (G33 in Arb report): Mature Hawthorn situated along the southern site boundary on the western side of the current access gate.

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats HIGH suitability for nesting birds (Confirmed by presence of historic nest)

Figure 5. Mature Hawthorn on the southern boundary.



Figure 6. Historic bird nest (red oval).



- The majority of the main trunk has thin Ivy coverage, which potentially provides a roosting opportunity for bats as it could obscure roosting features beneath (**Figures 5 and 6**).
- It was not possible to survey the entire main body of the tree due to the Ivy coverage. Areas of the main tree that were visible were relatively smooth with no crevices recorded.
- One historic bird nest was identified (**Fig 6**).
- No evidence of bats nor any bats themselves were observed.

TREE 4 (G33 in Arb report): Semi-mature Field Maple situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds:

NEGLIGIBLE suitability for roosting bats

HIGH suitability for nesting birds

Figure 7. Semi-mature Field Maple located on the southern boundary.



Figure 8. Close up of the Semi-mature Field Maple, showing the thin, dead, Ivy coverage.



- The bark is generally very smooth with no splits or crevices observed (**Figures 7 and 8**).
- The tree has a very thin dead Ivy coverage which provides no crevices for any bat(s) to roost within, and further reduces the tree's ability to provide potential roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and its location provides ample opportunities for nesting birds.

TREE 5 (G33 in Arb report): Very mature Blackthorn situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: NEGLIGIBLE suitability for roosting bats HIGH suitability for nesting birds

Figure 9. Very mature Blackthorn on the southern boundary.

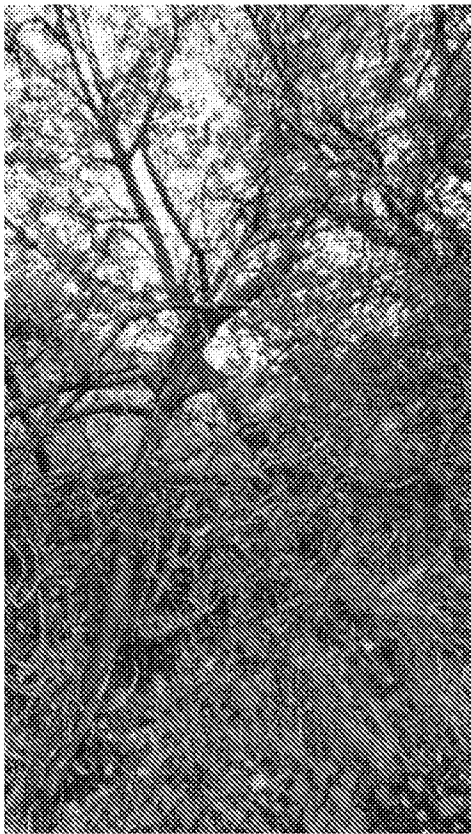
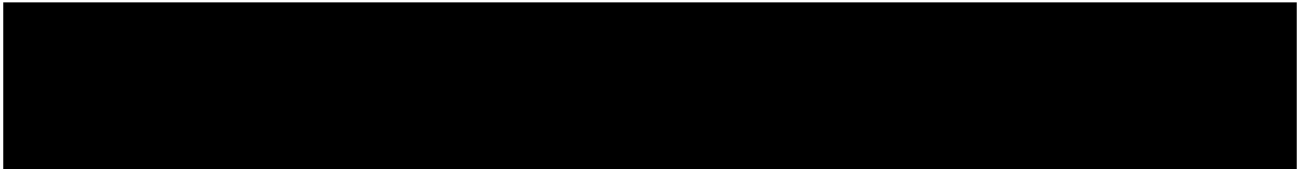


Figure 10. Close up of the very mature Blackthorn on the southern boundary.



- The bark is generally very smooth with no splits or crevices observed (**Figures 9 and 10**).
- The tree is absent of any Ivy coverage, further reducing its ability to provide potential roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.



TREE 6 (G33 in Arb report): Semi-mature Field Maple situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: NEGLIGIBLE suitability for roosting bats HIGH suitability for nesting birds

Figure 11. Semi-mature Field Maple on the southern boundary.



Figure 12. Close up of the semi-mature Field Maple on the southern boundary.



- The bark is generally very smooth with no splits or crevices observed (**Figures 11 and 12**).
- The tree has a small amount of thin Ivy coverage near the lower half of the main trunk, further reducing its ability to provide potential roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

TREE 7 (G33 in Arb report): Semi-mature Field Maple situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: NEGLIGIBLE suitability for roosting bats HIGH suitability for nesting birds

Figure 13. Semi-mature Field Maple on the southern boundary.



Figure 14. Close up of the semi-mature Field Maple on the southern boundary.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figures 13 and 14**).
- A small area of damage was recorded on the tree (**Figure 15** see next page). However, this is superficial and is not suitable for use by roosting bats. This tree also has a small amount of thin Ivy coverage although it is unsuitable for roosting bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

Tree 7 continued next page.



TREE 7 contd.

Figure 15. Close up of the damage on the tree.



TREE 8 (G33 in Arb report): Very mature Hawthorn situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats HIGH suitability for nesting birds

Figure 16. Very mature Hawthorn on southern boundary.



Figure 17. Close up of the very mature Hawthorn.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figures 16 and 17, and Fig 18** see next page).
- Mature, dead, Ivy, covers the majority of the main trunk of the tree and some of its branches (**Figure 17 and Figure 18** see next page). It is possible the Ivy could be blocking potential roosting features on the tree, or it may be a potential roosting feature for bats itself.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

Tree 8 continued next page.



TREE 8 contd. Figure 18. Second close up of the very mature Hawthorn.



TREE 9 (G33 in Arb report): Semi-mature Field Maple situated along the southern site boundary on the eastern side of the current access gate. This tree has three main trunks (Figure 28).

Current suitability for roosting bats and nesting birds:

NEGLIGIBLE suitability for roosting bats

HIGH suitability for nesting birds

Figure 19. Semi-mature Field Maple on the southern boundary.



Figure 20. Damage on the tree branch.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (Figure 19).
- One area of damage was recorded on one of the branches (Figure 20), however, this is unsuitable for roosting bats.
- The tree is absent from any Ivy coverage, further reducing its ability to support roosting bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

TREE 10 (G33 in Arb report): Very mature Hawthorn situated along the southern site boundary on the eastern side of the current access gate. There are two main trunks that are growing upright, and a third which has formed an ‘arch’ (**Figure 31**).

Current suitability for roosting bats and nesting birds:

LOW suitability for roosting bats

HIGH suitability for nesting birds

Figure 21. Very mature Hawthorn on the southern boundary.



Figure 22. ‘Arch’ and mature dead Ivy coverage.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figure 21**).
- The tree is covered with a large amount of mature, dead, Ivy (**Figures 21, 22 and 23**). The tree itself appears to be in poor condition. Although it has been in leaf this year, part of the tree appears to either be dead, or dying.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

Tree 10 continued next page.

TREE 10 contd.

Figure 23. One of the branches showing significant mature, dead, Ivy coverage.



TREE 11 (G33 in Arb report): Semi-mature Oak situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats HIGH suitability for nesting birds

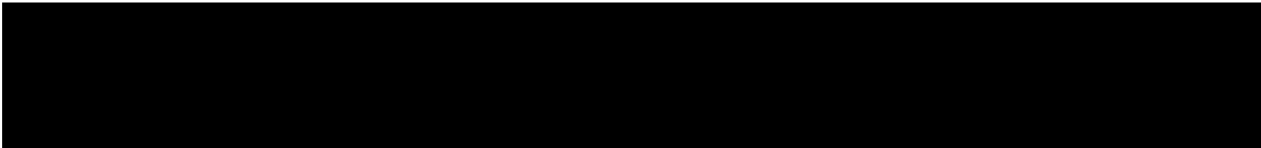
Figure 24. Semi-mature Oak on the southern boundary. Location of hole identified by red circle.



Figure 25. Hole in the semi-mature Oak.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figures 24 and 25**).
- The tree is covered in a thin amount of dead ivy, due to the maturity of the ivy, it is considered not to provide any potential roosting features to bats.
- One hole was identified (**Figures 24 and 25**). It was not possible to determine the depth of the hole, it may provide a potential roosting feature for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.



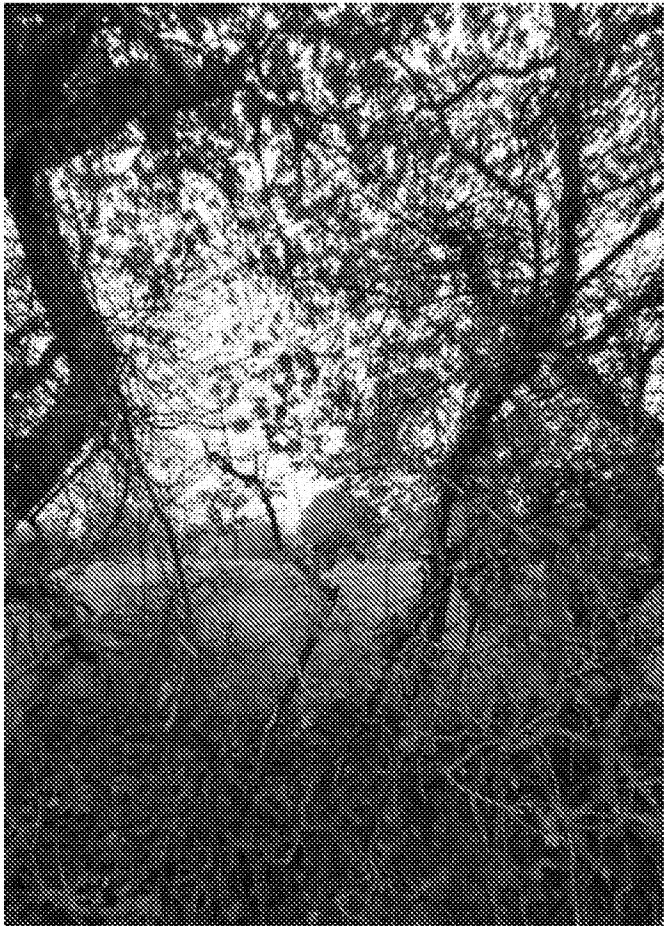
TREE 12: Blackthorn situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds:

NEGLIGIBLE suitability for roosting bats

MODERATE suitability for nesting birds

Figure 26. Blackthorn on the southern boundary.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figure 26**).
- The tree was absent of any Ivy coverage, further reducing its ability to support roosting bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the location of the tree and its level of maturity provides ample opportunities for nesting birds.

TREE 13 (G33 in Arb report): Semi-mature Field Maple situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats High suitability for nesting birds (Confirmed by presence of historic nest)

Figure 27. Semi-mature Field Maple on the southern boundary.



Figure 28. Historic bird nest (red oval) in the semi-mature Field Maple. Dead mature Ivy can also be seen.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figure 27**).
- The tree had matured, dead, Ivy coverage (**Figures 27 and 28**). This may provide some potential roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- One historic bird nest was observed in the tree (**Figure 28**).

TREE 14 (G33 in Arb report): Field Maple situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds:

LOW suitability for roosting bats

HIGH suitability for nesting birds

Figure 29. Field Maple on the southern boundary.



Figure 30. Close up view of the dead, mature, Ivy on one of the branches



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figures 29 and 30**).
- The tree had some mature, dead, Ivy coverage (**Figure 30**). This may provide some roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

TREE 15 (G33 in Arb report): Semi-mature Oak situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats HIGH suitability for nesting birds

Figure 31. Semi-mature Oak on the southern boundary.



Figure 32. Close up view of the Ivy coverage.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figures 31 and 32**).
- The tree had some dead, Ivy coverage (**Figure 32**). This may provide some roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

TREE 16 (G33 in Arb report): Hawthorn situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: NEGLIGIBLE suitability for roosting bats LOW suitability for nesting birds

Figure 33. Hawthorn on the southern boundary.

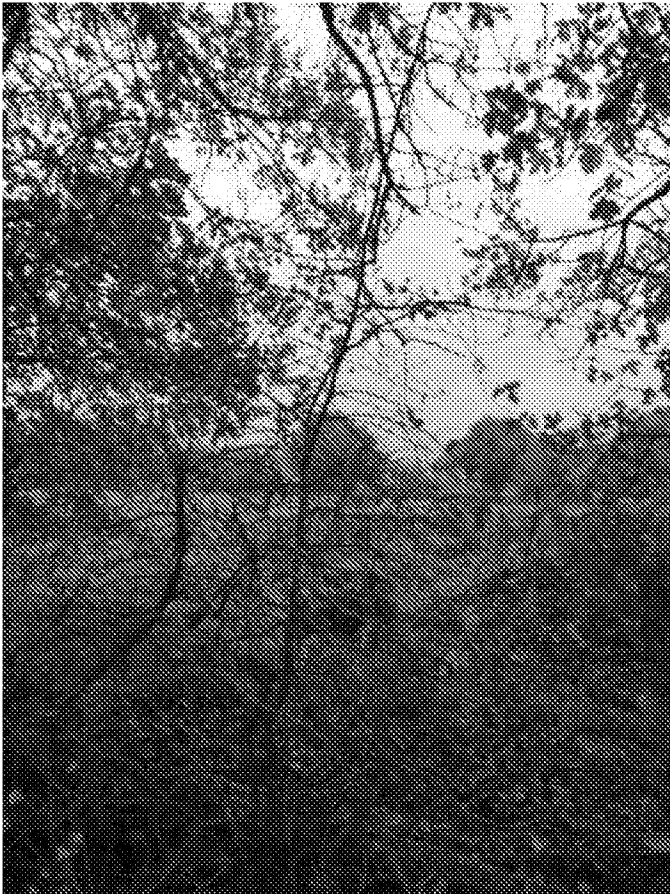


Figure 34. Close up view of the Hawthorn.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figures 33 and 34**).
- The tree was absent of any Ivy coverage, further reducing its ability to support roosting bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible, the location of the tree and its level of maturity provides limited opportunities for nesting birds.



TREE 17 (G33 in Arb report): Semi-mature Field Maple along the southern site boundary on the eastern side of current access gate. There are two main trunks of this tree (Figure 44).

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats HIGH suitability for nesting birds

Figure 35. Semi-mature Field Maple on the southern boundary.



Figure 36. Close up view of the semi-mature Field Maple, showing the Ivy coverage.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (Figures 35 and 36).
- The tree had some dead, Ivy coverage (Figure 36). This may be concealing potential roosting features for bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides ample opportunities for nesting birds.

TREE 18 (G33 in Arb report): Semi-mature Elder situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: LOW suitability for roosting bats HIGH suitability for nesting birds

Figure 37. Semi-mature Elder on the southern boundary.



Figure 38. Location of hole in semi-mature Elder (red circle).



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figure 37**).
- The tree was absent of any Ivy coverage, further reducing its ability to support roosting bats.
- One hole was identified (**Figure 38**). The hole is thought to be approximately 10cm deep, and as such may provide a roosting opportunity for a bat.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible; however, the maturity of the tree and location provides some opportunities for nesting birds.

TREE 19 (G33 in Arb report): Blackthorn situated along the southern site boundary on the eastern side of the current access gate.

Current suitability for roosting bats and nesting birds: NEGLIGIBLE suitability for roosting bats LOW suitability for nesting birds

Figure 39. Blackthorn on the southern boundary.



- The bark is generally very smooth with no splits or crevices observed that would be suitable for bats (**Figure 39**).
- The tree was absent of any Ivy coverage, further reducing its ability to support roosting bats.
- No evidence of bats nor any bats themselves were observed.
- No signs of nesting birds were visible, the maturity of the tree provides limited opportunities for nesting birds.

APPENDIX X – Updating Botanical Survey Results.

Common Name	Scientific Name	DAFOR Scale
Bramble	<i>Rubus fruticosus</i> agg	A
Common Knapweed	<i>Centaurea nigra</i>	A
Common Nettle	<i>Urtica dioica</i>	A
Creeping Buttercup	<i>Ranunculus repens</i>	A
False Oat-grass	<i>Arrhenatherum elatius</i>	A
Fescue	<i>Festuca</i> spp	A
Meadow Buttercup	<i>Ranunculus acris</i>	A
Meadow Foxtail	<i>Alopecurus pratensis</i>	A
Ribwort Plantain	<i>Plantago lanceolata</i>	A
Sheep Sorrel	<i>Rumex acetosella</i>	A
Timothy	<i>Phleum pratense</i>	A
Broad-leaved Doc	<i>Rumex obtusifolius</i>	F
Cleavers	<i>Galium aparine</i>	F
Creeping Bent	<i>Agrostis stolonifera</i>	F
Herb Robert	<i>Geranium robertianum</i>	F
Yorkshire Fog	<i>Holcus lanatus</i>	F
Bird's-foot-trefoil	<i>Lotus corniculatus</i>	O
Cock's-foot	<i>Dactylus glomerata</i>	O
Common Chickweed	<i>Stellaria media</i>	O
Common Sorrel	<i>Rumex acetosa</i>	O
Common Vetch	<i>Vicia sativa</i>	O
Creeping Thistle	<i>Cirsium arvense</i>	O
Dandelion	<i>Taraxacum</i> spp	O
Field Wood-rush	<i>Luzula campestris</i>	O
Garlic Mustard	<i>Alliaria petiolata</i>	O
Germander Speedwell	<i>Veronica chamaedrys</i>	O
Ground Ivy	<i>Glechoma hederacea</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Lesser Stitchwort	<i>Stellaria graminea</i>	O
Selfheal	<i>Prunella vulgaris</i>	O
Silverweed	<i>Potentilla anserina</i>	O
Soft Rush	<i>Juncus effusus</i>	O
Stork's-bill	<i>Erodium cicutarium</i>	O
White Clover	<i>Trifolium repens</i>	O
White Dead-nettle	<i>Lamium album</i>	O
Yarrow	<i>Achillea millefolium</i>	O
Changing Forget-me-not	<i>Myosotis discolor</i>	R
Common Couch	<i>Elytrigia repens</i>	R
Common Dog Violet	<i>Viola riviniana</i>	R
Common Ragwort	<i>Senecio jacobaea</i>	R
Common Toadflax	<i>Linaria vulgaris</i>	R

Cuckoo Flower	<i>Cardamine pratensis</i>	R
European Gorse	<i>Ulex europaeus</i>	R
Flag Iris	<i>Iris pseudacorus</i>	R
Fumitory	<i>Fumaria officinalis</i>	R
Green Alkanet	<i>Pentaglottis sempervirens</i>	R
Lady's Bedstraw	<i>Galium verum</i>	R
Lesser Burdock	<i>Arctium minus</i>	R
Lesser Celandine	<i>Ficaria verna</i>	R
Lords-and-Ladies	<i>Arum maculatum</i>	R
Meadow Cranesbill	<i>Geranium pratense</i>	R
Pendulous Sedge	<i>Carex pendula</i>	R
Red Campion	<i>Silene dioica</i>	R
Redshank	<i>Persicaria maculosa</i>	R
Silver Birch sapling	<i>Betula pendula</i>	R
Smooth Hawk's-beard	<i>Crepis capillaris</i>	R
Spanish Bluebell	<i>Hyacinthoide hispanica</i>	R
Wood Sage	<i>Teucrium scorodonia</i>	R
Woody Nightshade	<i>Solanum dulcamara</i>	R