Ecological Survey Report

Woodland parcel at Queen Victoria Hospital Holtye Road East Grinstead RH19 3DZ

26th November 2019

PJC Consultancy

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This report has been prepared by

PJC Consultancy Ltd on behalf of Queen Victoria Hospital

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EXECUTIVE SUMMARY

PJC Consultancy Ltd was commissioned by Queen Victoria Hospital to undertake a suite of phase 2 protected species surveys leading on from recommendations set out within the 2018 Preliminary Ecological Appraisal, for a parcel of woodland within the hospital's ownership accessed via Hoylte Road, East Grinstead, RH19 3DZ.

Development proposals were not fully known at the time of writing this report, however it is understood that an area of semi-natural deciduous woodland will be removed for the construction of a residential development. The proposals shall aim to retain mature trees, important boundary habitats as well as enhancing the existing on-site pond for both wildlife and amenity value.

The phase 2 surveys were completed during 2019, the purpose of the surveys was to ascertain the presence/likely absence of reptiles, hazel dormice and great crested newts within the Site as well as determining breeding bird territories and identify any important foraging/commuting bat features and habitats within the Site.

The surveys were designed to assess the overall value of the Site for protected species and identify any ecological impacts and associated constraints to the proposed development, recommend any licensing requirements and detail suitable ecological mitigation, compensation and enhancement measures.

This report recommends that a Landscape and Ecological Management Plan is produced to provide a detailed strategy to facilitate the development, incorporating any mitigation, compensation and ecological enhancement measures into the design proposals.



1 INTRODUCTION

1.1 INSTRUCTION

1.1.1 PJC Consultancy Ltd was commissioned by Queen Victoria Hospital to undertake a suite of phase 2 ecology surveys as outlined within the PEA report (3947AO/18, PJC Consultancy, 2018) land within a parcel of woodland adjacent to Queen Victoria Hospital (QVH), Holtye Road, East Grinstead, RH19 3DZ (hereafter referred to as the 'Site).

1.2 DOCUMENTS AND INFORMATION PROVIDED

- 1.2.1 PJC Consultancy Ltd was provided with the following information:
 - Preliminary Ecological Appraisal (document reference: 3947AO/18, PJC Consultancy Ltd, 2018);
 - Ecological Assessment letter report connecting woodland block to the proposed development land at QVH (document reference: 3967AO/18 PJC Consultancy, 2018);
 - Arboricultural Survey (document reference: 4993/18-01, PJC Consultancy, 2018);
 - QVH Sketch Scheme 01 (document reference: 24.10.18 SK0010. For discussion, Cowan Architects, 2018);
 - Site location plan demarcating the Site boundary and proposed site sketch plan (Drawing no: 2182-CAL-00-ZZ-M3-A-001, Cowan Architects, 2018);
 - Extended Phase 1 Ecological Assessment (Mott MacDonald, August 2008); and
 - QVH response from Natural England letter relating to previous planning application on adjacent land (document reference: 09/02468/OUT, Natural England, September 2009).

1.3 SURVEY OBJECTIVES

- 1.3.1 This report has been produced in accordance with BS 42020:2013 'Biodiversity. Code of practice for planning and development' and Good Practice Guidelines (Froglife, 1999, English Nature, 2006, BCT, 2016 and BTO, 2015) and as such seeks to:
 - Ascertain the presence/likely absence of species, namely great crested newts (GCN), reptiles, bats and dormice, within the survey area;
 - Ascertain the breeding bird status within the Site and estimate the breeding bird territories; and
 - Provide recommendations for further survey, mitigation and enhancements measures to minimise impacts on biodiversity and provide net gains where possible, in line with Chapter 15 of the National Planning Policy Framework (NPPF).

1.4 SCOPE OF THIS REPORT

1.4.1 This report is only concerned with the habitats and features within the boundaries of the Site, or in areas that have the potential to be affected by the proposed new development.



1.5 BACKGROUND INFORMATION AND PROPOSALS

- 1.5.1 The PEA report completed by PJC Consultancy in September 2018 identified a number of semi-natural habitats and ecological features, which had potential to support a number of protected species and habitats, namely; mixed deciduous woodland, bats, dormice, birds, GCN and widespread reptile species. Furthermore, two ponds were recorded within 250m of the Site, approximately 170m north (P3) and approximately 170m southwest (P2) (for pond locations see Figure 5), and as such, the PEA recommended a habitat suitability index (HSI) assessment of both ponds to ascertain whether further presence/likely absence GCN surveys are required.
- 1.5.2 The current proposals were not fully known at the time of writing this report, however they shall seek to remove an area of semi-natural deciduous woodland for a new residential development with associated parking, access and gardens. The on-site pond (P1) located within the southern portion of the Site is to be retained and enhanced for both amenity and ecological value. In addition, the mature and veteran trees within the Site and the woodland boundaries are to be retained throughout the development.
- 1.5.3 Works associated with the proposed development of the application site, for example, clearance of woodland habitat, could therefore result in the death or injury of any protected species present within the Site. As such, a suite of phase 2 protected species surveys were recommended, which included the following:
 - Breeding birds;
 - Bat activity surveys;
 - Dormouse presence/likely absence surveys;
 - Reptile presence/likely absence surveys;
 - GCN Habitat Suitability Index assessments; and
 - GCN eDNA surveys.
- 1.5.4 These surveys were recommended to determine any requirements for further survey work, mitigation, compensation and/or licenses to facilitate the proposed development.
- 1.5.5 In addition to the proposed development site, the client also owns large parcels of connecting deciduous woodland, which was assessed in 2018 (see document 3967AO/18) to ascertain whether, if protected species were found within the Site, the adjacent land could be utilised for mitigation and/or compensatory habitat creation and/or enhancement.

1.6 SITE DESCRIPTION

1.6.1 The Site measures approximately 2ha and comprises predominantly semi-natural deciduous woodland which for the majority is considered to be less than 50 years old. This determination was estimated using historical satellite imagery.



- 1.6.2 A large duck pond (P1) is present within the southern portion of the Site and a dirt access track intercepts the centre of the Site. The Site is bordered to the north and northeast by further parcels of deciduous woodland, much of which is owned by QVH. The QVH is located immediately adjacent to the southeast of the Site, with residential developments on all remaining aspects. The Site is located more broadly to the northeast of East Grinstead town centre and to the south of the Surrey county border.
- 1.6.3 The location of the Site within its environs can be seen in Figure 1, below.



Figure 1: Site Location Plan (Google Earth Pro, 2018).

- 1.7 LEGISLATION AND PLANNING POLICY
- 1.7.1 This report has been compiled with reference to relevant wildlife and countryside legislation, planning policy and the UK Biodiversity Framework. Their context and applicability is explained as appropriate in the relevant sections of the report and additional details are presented in Appendix I.
- 1.7.2 The key articles of relevance are:
 - The Conservation of Habitats and Species Regulations 2017 (as amended) (Habitats Regulations);
 - The Wildlife and Countryside Act 1981, as amended (WCA);
 - The Countryside and Rights of Way (CRoW) Act 2000;
 - The Natural Environment and Rural Communities (NERC) Act 2006;



- National Planning Policy Framework (NPPF) 2019 (Ministry of Housing, Communities and Local Government, 2019);
- The UK Post-2010 Biodiversity Framework (2011-2020); and
- Mid Sussex District Plan (2014-2031).
- 1.7.3 GCN, bats and hazel dormice are all European protected species and are afforded protection under the Conservation of Habitats and Species Regulations 2017 (as amended). GCN, bats, dormice, many bird species and our native, widespread reptile species (common or viviparous lizard *Zootoca vivipara*, adder *Vipera berus*, grass snake *Natrix helvetica* and slow worm *Anguis fragilis*) are also afforded protection under the Wildlife and Countryside Act, 1981 (as amended) and are also listed as SPI under the NERC Act 2006 and are Sussex priority species.
- 1.7.4 Due to the high level of protection afforded to GCN, bats and dormice and their habitats, mitigation is governed for these species by a strict licensing procedure administered by Natural England (planning permission must be obtained before a licence can be sought).
- 1.7.5 Licensing is subject to three tests, as defined under the Habitats Regulations 2017; the planning authority must apply these before granting permission for activities affecting dormice. For permission to be granted the following criteria must be satisfied:
 - The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
 - *'There is no satisfactory alternative'*; and
 - The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.



2 METHODOLOGY

2.1 BAT ACTIVITY SURVEY

2.1.1 Bat activity surveys were undertaken between April and October 2019 following best practice methodology (BCT, 2016) incorporating both walked transect surveys and automated static detector surveys. The purpose of the walked transect surveys is to provide information on the commuting and foraging behaviour of bats throughout the Site, whilst the automated detector surveys provide a more extensive survey for longer durations of time, thus increasing the likelihood of detecting more cryptic and/or scarce bat species throughout the Site.

Transect Surveys

- 2.1.2 A transect route was mapped using Google Earth imagery, which ensured that areas of suitable habitat identified within the original PEA were assessed.
- 2.1.3 Ten relatively evenly distributed listening stations were identified and mapped during a preliminary daytime walkover of the Site. The listening points were positioned to sample all habitats present within the Site, including woodland edge and pond edge habitats. The location of the transect route highlighted in yellow and listening stations in red can be found within Figure 2, below.
- 2.1.4 It should be noted that some areas of the Site, notably the eastern pond edge habitats were not accessible during the transect surveys due to health and safety restrictions.





Figure 2: Location of walked bat transect route and listening stations. (Google Earth Pro, 2018).

- 2.1.5 As the Site was classified as having high habitat suitability during the PEA, two transect surveys were undertaken monthly across the bat active season to allow for seasonal variations in bat behaviour. To allow for variations in bat activity across the Site, the transect start points were rotated each month.
- 2.1.6 As per best practice guidelines, the transect surveys were undertaken in appropriate weather conditions, i.e. during periods of low wind and rainfall and in temperatures above 5°C. The surveys began at sunset and carried on for at least two hours after sunset. The survey carried out in July comprised a dusk and pre-dawn survey within a single 24-hour period, with the pre-dawn survey commencing two hours before sunrise and finishing up to 15 minutes after sunrise.



- 2.1.7 Two surveyors walked the transect route at a constant speed and recorded the number of bat passes, species and behaviour i.e. foraging, socialising or commuting, at each listening station during 10-minute intervals. The surveys were undertaken by Tara Hall BSc(Hons) ACIEEM (Natural England class 2 bat licence holder), Tom Knight BSc(Hons) MSc MCIEEM, Nicolle Stevens BSc(Hons) GradCIEEM (Natural England class 1 bat licence holder), Sam Dawson BSc(Hons) ACIEEM (Natural England class 1 bat licence holder) and Andrew Rowlandson BSc(Hons) MSc (2+ years bat survey experience). Full details of each transect visit can be found within Table 1, below.
- 2.1.8 The surveyors used Echo Meter Touch Pro bat detectors connected to electronic tablets to listen to and record echolocation calls of bats seen and/or heard.

Survey Date	Sunset/Sunrise Time	Start Time	End Time	Weather Conditions
11/04/2019	19:47	19:47	21:50	Dry, no cloud, 4-9°C, no wind.
25/04/2019	20:10	20:10	22:30	Dry, 10% cloud, 11-14°C, no wind.
07/05/2019	20:33	20:33	22:40	Dry, no cloud, 11-12°C, light breeze.
23/05/2019	20:54	20:50	23:00	Dry, no cloud, 14-16°C, light breeze.
03/06/2019	21:07	20:52	23:10	Dry, 20% cloud, 10-20°C, light breeze.
19/06/2019	21:17	21:17	23:17	Light rain, 95% cloud, 15-16°C, light breeze.
03/07/2019	21:15	21:15	23:15	Dry, no cloud, 14-17°C, light breeze.
04/07/2019	04:51	02:50	05:00	Dry, no cloud, 10°C, no wind.
17/07/2019	21:07	21:05	23:10	Dry, 75% cloud, 14°C, light breeze.
01/08/2019	20:48	20:30	22:50	Dry, 20% cloud, 20°C, light breeze.
15/08/2019	20:22	20:20	22:25	Dry, no cloud, 17-18°C, light breeze.
04/09/2019	19:40	19:40	21:40	Dry, 50% cloud, 13-19°C, light breeze.
02/10/2019	18:35	18:30	20:40	Dry, 0% cloud, 10-11°C, light breeze
16/10/2019	18:00	18:00	20:00	Dry, 90% cloud, 12°C, light breeze

Table 1: Bat transect survey details.

Automated Static Detector Surveys

- 2.1.9 In addition to walked transect surveys, automated static detectors were installed within the Site to indicate activity levels of different bat species within different areas of the Site.
- 2.1.10 Three full spectrum Anabat Swift detectors were installed within the Site every month between April to October 2019 and deployed to record over five consecutive nights.
- 2.1.11 For the purpose of this study, bat passes are classified as a sequence of bat pulses captured on an Anabat Swift sound file. An individual bat can pass a particular feature on several occasions whilst foraging and/or commuting. It is therefore not possible to determine whether consecutive sound files have been recorded as the result of multiple bats passing, or by an individual bat repeatedly passing. For these purposes, one sound file is counted as one bat pass. A bat pass is an index of bat activity rather than a measure of number of individuals in a population.



2.1.12 The bat detectors were set to record bat activity from 15 minutes before sunset until 15 minutes after sunrise. The static locations were chosen to incorporate features considered most likely to be used by commuting and/or foraging bats as well as those most likely to be affected by the proposed development. The location of the static bat detectors can be seen within Figure 3, below



Figure 3: Location of static bat detectors (Google Earth Pro, 2018).

- 2.1.13 The Anabat Swift sound files were analysed using the Anabat Insight AutoID software, which allowed for large amounts of data collected to be processed. This software was set with 80% accuracy parameters. With the exception of non-bat or "noise" files and those identified as common or soprano pipistrelle, sound files were then individually verified to genus and where possible, species level.
- 2.1.14 For pipistrelle species, the following criteria, based on measurements of peak frequency and frequency modulated spectrograms typical of the pipistrelle genus, were used to classify calls:
 - Common pipistrelle *Pipistrellus pipistrellus* >42 and <49 kHz;



- Soprano pipistrelle *Pipistrellus pygmaeus* **>**51 kHz; and
- Nathusius pipistrelle Pipistrellus nathusii <39 kHz.
- 2.1.15 The details of each static detector survey can be found in Table 2, below.

Survey Month	Survey Period	Number of Nights Recorded	Weather Conditions (average)
April	25 th – 29 th	5	Mostly dry and mild with temperature ranging from 6-13°C.
May	23 rd – 27 th	5	Light and scattered rainfall with a storm on the final evening. Temperature range 11-22°C.
June	19 th – 24 th	6	Mild with scattered light showers with stronger winds towards the end of the survey period. Temperature range 10-19°C.
July	17 th – 22 nd	6	Warm evenings with light breezes. Temperature range 13.6-24.4°C.
August	15 th – 19 th	4	Mild evenings with light showers and light breezes. Temperature range 12.3-16.5°C.
September	4 th – 9 th	5	Mild evenings with colder evenings towards the end of the survey period, no rainfall. Temperature range 5-20°C.
October	16 th – 21 st	6	Mild days with cool evenings and light breezes. Temperature range 6-17°C.

Table 2: Details of the automated static bat detector surveys.

2.2 BREEDING BIRD SURVEY

- 2.2.1 A breeding bird survey was undertaken using a survey methodology adapted from the Common Bird Census (CBC) territory mapping methodology (Gilbert, Gibbons, & Evans, 1998) and undertaken by Calista Tardivel MSc (6+ years of breeding bird survey experience). A preliminary visit was conducted in April, followed by four survey visits between April and June in 2019. The purpose of the breeding bird survey was to identify the presence and distribution of breeding birds within the Site.
- 2.2.2 During the preliminary visit, a transect route was devised to enable full coverage of the Site. Survey visits were carried out in the early morning (avoiding the hour prior to sunrise) and in suitable weather conditions, according to the CBC guidelines. During each survey visit, the route was walked at a slow and constant pace with frequent stops to scan for singing or calling birds. The details of each visit can be found in Table 3, below.

Survey Date	Time	Temp. (°C)	Cloud Cover (%)	Weather Conditions
06/04/2019	06:30	5	100	Dry, SE wind 13mph
15/04/2019	06:15	4	50	Dry, E wind 10mph
05/05/2019	06:00	2.5	0	Dry, N wind 8mph
25/05/2019	05:30	14.5	90	Dry, N wind 8mph
23/06/2019	05:30	12.5	60	Dry, NE wind 7mph

Table 3: Breeding bird survey visit details



- 2.2.3 Birds within the Site and immediately adjacent habitats were recorded and mapped and their activity was recorded. Birds were confirmed to be breeding if:
 - Evidence of nesting activity was observed, such as presence of nests, eggs or young, adults copulating, nest building or carrying food; and/or
 - Evidence of breeding or territorial behaviour was observed in suitable habitat (according to species), such as males singing or calling. Where these behaviours were recorded on only one visit, it was considered that neither permanent territory establishment nor successful breeding had taken place.
- 2.2.4 Birds which were recorded during the surveys where nesting or breeding behaviour was not observed but for which the habitat did provide good opportunities for nesting, were considered to have 'probable' breeding status.
- 2.2.5 Birds which showed no sign of breeding or nesting behaviour and for which the habitat is not considered to be suitable for nesting were considered unlikely to be breeding on the Site. The results of the surveys were then combined into a single map, indicating all probable bird territories.

2.3 DORMOUSE PRESENCE/LIKELY ABSENCE SURVEY

- 2.3.1 A dormouse presence/likely absence survey was carried out using best practice guidance set out in the Dormouse Conservation Handbook, 2006 and undertaken by Tara Hall BSc(Hons) ACIEEM (Natural England class 1 dormouse licence holder), Calister Tardivel MSc (Natural England class 1 dormouse licence holder) and Thomas Knight BSc(Hons) MSc MCIEEM. The purpose of the survey was to classify the presence or likely absence of hazel dormice within the Site and if possible, determine whether the Site is being utilised as breeding habitat.
- 2.3.2 A total of 50 dormouse nest tubes were placed within the suitable dormouse habitat within and connecting habitat adjacent to the Site, with tubes spaced approximately 20m apart. Grid references accurate to 4m were taken for each dormouse nest tube and then mapped. The location of each tube can be found within Figure 4, below.





Figure 4: Dormouse tube locations (Google Earth Pro, 2018).

- 2.3.3 The nest tubes were left unchecked to 'bed in' for approximately four weeks before the first survey visit was carried out. This allows for any potential dormice within the Site to locate and become habituated to the nest tubes.
- 2.3.4 Unless dormice presence is confirmed earlier, the nest tubes remain in-situ until the final survey visit, which is completed in October 2019 (after achieving a final survey score of 22). The Dormouse Conservation Handbook provides an Index of Probability of finding dormice present in nest tubes in any one month (see Table 4). Using this Index, a minimum survey score of 20 needs to be achieved, which will provide adequate survey effort to deliver accurate findings.

Table 4: Index of Probability for finding dormice in nest tubes



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

2.3.5 Survey visits were spread evenly with one survey completed each month. During each visit, nest tubes were checked for the presence of dormice or evidence of dormouse presence, such as individual dormice, nests or shredded bark used as nesting material. The details of each survey visit are presented in Table 5 below.

Table 5. Dormouse survey visit details

Survey Date	General weather conditions	Precipitation
13/05/2019	Fair, light breeze.	None
23/06/2019	Fair, light breeze.	None
24/07/2019	Fair, light breeze.	None
20/08/2019	Warm, no breeze.	None
23/09/2019	Fair, light breeze,	None
16/10/2019	Fair, light breeze.	None

2.4 GCN HABITAT SUITABILITY INDEX (HSI) ASSESSMENT

2.4.1 Any ponds identified within the original PEA located outside of the Site were subject to a habitat suitability index (HSI) assessment, completed on 11th April 2019 by Tara Hall BSc(Hons) ACIEEM (Natural England class 1 GCN licence holder) and Tom Knight BSc(Hons) MSc MCIEEM (Natural England class 1 GCN licence holder). The location of each pond, including the on-site pond P1, can be found within Figure 5, below.





Figure 5: Location of ponds identified within 250m radius of the Site. (Magic Maps, 2019)

2.4.2 The HSI is a tool that enables an assessment of the likelihood of a standing waterbody to support GCN. It incorporates 10 suitability indices (SI), all of which are factors thought to affect GCN, as detailed in Table 6 below.

Table 6: HSI Suitability Indices.

Suitability Indices	Description
SI1	Geographic location
SI ₂	Pond area
SI ₃	Permanence
SI4	Water quality
SI5	Shade
SI ₆	Waterfowl
SI ₇	Fish
SI8	Pond count
Sl9	Terrestrial habitat



SI10	Macrophytes

2.4.3

Each variable is assessed separately and then mathematically combined in the following formula, HSI = (SI1*SI2*SI3*SI4*SI5*SI6*SI7*SI8*SI9*SI10)^{1/10} to provide the geometric mean, which is a numerical index between 0 and 1. A lower score indicates a less suitable habitat whereas a higher score represents optimal conditions favourable for GCN as detailed in Table 7 below. There is a positive correlation between the scores and the resulting incidence of GCN observed in ponds. However, whilst the HSI can be used to help inform the likelihood of presence or absence it is not sufficiently precise to allow conclusion that a higher score confirms presence and likewise a lower score absence. HSI is therefore used as a guide to help determine the need for further GCN surveys.

Table 7: Categorisation of HSI Scores.

HSI	Pond Suitability
<0.5	Poor
0.5–0.59	Below Average
0.6–0.69	Average
0.7–0.79	Good
>0.8	Excellent



2.5 GCN EDNA ASSESSMENT

- 2.5.1 An eDNA survey was carried out on pond P1 on 25th April 2019 during daylight hours and when newts are most likely to be present (mid-April to late-June). Samples of water were taken from the pond by Tara Hall BSc(Hons) ACIEEM (Natural England class 1 GCN licence holder) and Sam Dawson BSc(Hons) ACIEEM (Natural England class 1 GCN licence holder).
- 2.5.2 When GCN inhabit a pond, cells containing their environment DNA (eDNA) are continually shed into the water via their saliva, urine, faeces, skin cells and dead individuals etc. This eDNA may persist for several weeks and can be collected through water sampling, and analysed in a controlled laboratory environment to assess the presence/likely absence of GCN within a water body.
- 2.5.3 The eDNA collection was undertaken in accordance with best practice survey standards (Biggs et al., 2014). Samples were taken from 20 suitable sampling sites around the perimeter of the pond. The 20 samples were combined, and a pipette used to transfer 15ml of the water in to preserve filled sample tubes where they were combined with the preservative. These water samples were stored and transported in accordance with best practice protocols for subsequent laboratory analysis.

2.6 REPTILE PRESENCE/LIKELY ABSENCE SURVEY

- 2.6.1 A reptile presence/likely absence survey was carried out in accordance with best practice guidelines (Froglife, 1999) and undertaken by Tara Hall BSc(Hons) ACIEEM, Thomas Knight BSc(Hons) MSc MCIEEM and Nicolle Stevens BSc(Hons) GradCIEEM.
- 2.6.2 Overall, 20 artificial reptile refugia, comprising bitumen felt tiles, cut to measure approximately 0.5m² were distributed across the Site within areas of suitable reptile habitat such as woodland edge, scrub and on any south facing banks, which provide suitable cover and basking opportunities for reptiles (for refugia locations see Figure 6, below). The refugia were allowed to "bed in" for a minimum of 14 days prior to the survey commencing to allow for any reptiles present to become habituated to their presence. Survey visits were spread across the reptile active season to ensure robust baseline data was collected. The details of each survey visit are presented in Table 8 below.
- 2.6.3 The Site measures approximately 2ha and therefore the refugia were laid at a density of 10 tiles per hectare, as defined in good practice guidelines (Froglife, 1999).





Figure 6: Reptile refugia locations (Google Earth Pro, 2018).

2.6.4 As well as checking the refugia, observational surveys were also undertaken of any suitable habitat, which included visual searches of suitable basking and refuge points around the Site. Surveys were conducted during time periods suitable for the summer months (short periods in the morning and evening), in dry conditions of low wind and with air temperatures between 9°C and 18°C.

Survey Date	Temp. (°C)	Cloud Cover (%)	Wind (B'fort Scale)	Precipitation
25/04/19	15	50	B1	None
13/05/19	15	100	B1	None
28/05/19	15	100	B1	Light rain
13/06/19	14	95	B2	Light rain
25/06/19	18	100	B1	None
24/07/19	17	0	B0	None
01/08/19	17.5	40	B1	None

Table 8. Reptile survey visit details



2.6.5 Good practice guidance states that ideally 20 survey visits should be undertaken to ascertain population sizes on a site, however a minimum of seven survey visits is required to determine the presence/likely absence of a species and as such, a total of seven survey visits were carried out. The population assessment is therefore an estimate of each species, which was assessed according to Table 9 below (Froglife, 1999). The population score refers to the peak count of adults seen by observation and/or under reptile refugia by one person in one day.

Table 9. Reptile population assessment scores

Species	Low population Score 1	Good population <i>Score 2</i>	Exceptional population Score 3
Adder	<5	5 - 10	>10
Grass snake	<5	5 - 10	>10
Common lizard	<5	5 - 20	>20
Slow worm	<5	5 - 20	>20

2.7 SURVEY LIMITATIONS

- 2.7.1 It should be noted that whilst every effort has been made to provide a comprehensive description of the Site, no single investigation could ensure the complete characterisation and prediction of the natural environment.
- 2.7.2 The habitats present, and their management are likely to change over time, thus the findings of the surveys presented within this report are only considered valid for a period of up to two years.
- 2.7.3 All breeding bird surveys were carried out in suitable conditions and time of day according to the CBC guidelines, however no dusk surveys were conducted, and nocturnal species may therefore have been missed. It is important to note that the mapped territory locations do not indicate nest locations and may change in numbers and locations from year to year.
- 2.7.4 It is not possible to accurately identify certain bat species to species level by sound analysis alone. Therefore, the following categories were used for calls which cannot be identified with confidence due to an overlap in call characteristics: *Myotis* sp., *Plecotus* sp., and *Nyctalus* sp.
- 2.7.5 Automated static detector 1 failed to record on six consecutive nights during the month of July. However, this is not considered to be a significant limitation to the survey as the dataset is considered sufficient to provide a comprehensive assessment of the Site's bat community.
- 2.7.6 A total of seven dormouse nest tubes were continually interfered with throughout the dormouse surveys primarily along the northern Site boundaries, which is adjacent to an area of open green space. This area of the woodland is subject to higher levels of disturbance which reduces the likelihood of dormice utilising the habitat and therefore the lack of dormouse tubes present in this area is not considered likely to affect the results of the survey.



2.7.7 This document has been prepared for the stated proposal (1.5.1) and should not be relied upon or used for any other project without an additional check being carried out by the author as to its suitability in relation to any updated proposals. PJC Consultancy accepts no responsibility or liability for the consequence of this document being used for a purpose other than the purposes for which it was commissioned. PJC Consultancy accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned.



3 RESULTS

3.1 BAT ACTIVITY SURVEY

Transect Surveys

- 3.1.1 The walked transect surveys undertaken twice a month between April-October 2019 recorded a total of four species/species groups, which included the following:
 - Common pipistrelle;
 - Soprano pipistrelle;
 - Nyctalus sp. (likely noctule); and
 - Myotis sp.
- 3.1.2 A summary of the transect survey visits can be found within Table 10, below.

Table 10: Summary of results for transect surveys.

Listening Station	Common pipistrelle	Soprano pipistrelle	Nyctalus sp.	Myotis sp.	TOTAL
1	30	0	0	0	30
2	4	0	1	0	5
3	2	0	1	0	3
4	7	0	1	0	8
5	47	1	1	0	49
6	51	0	1	0	52
7	5	0	0	0	5
8	58	0	1	0	59
9	29	0	0	2	31
10	29	0	0	1	30
TOTAL	262	1	6	3	272
% of all passes	96.3	0.4	2.2	1.1	

- 3.1.3 Bats were recorded at every listening station, the vast majority (96.3%) of all bat calls were made by common pipistrelle, with most activity recorded at listening stations 5, 6 and 8, which are located at the woodland edges on the western and southeastern Site boundaries.
- 3.1.4 Only common pipistrelles were recorded at listening stations 1 and 7 and the lowest levels of all bat activity overall were recorded at listening stations 2, 3, 4 and 7.
- 3.1.5 Myotis sp. were only recorded at listening stations 9 and 10, whilst a single soprano pipistrelle pass was recorded at listening station 5.
- 3.1.6 The lowest number of bats recorded was in April (a total of eight passes), with the highest months being July (84 passes) and September (73 passes), followed by October (36 passes), August (33 passes), June (26 passes) and May (12 passes).



3.1.7 A map indicating the areas of highest bat activity can be seen in Figure 7, below. The red highlighted areas indicate areas of "high" bat activity (i.e. over 40 calls recorded), the amber areas indicate areas of "moderate" bat activity (i.e. 20–39 calls recorded) and the green areas indicate areas of "low" bat activity (i.e. 1–19 calls recorded).



Figure 7: Overview of areas of bat activity within the Site. (Google Earth Pro, 2018).

Automated Static Detector Surveys

- 3.1.8 The three Anabat Swift static bat detectors that were deployed monthly between April October 2019 recorded a total of six species/species groups, which included the following:
 - Common pipistrelle *Pipistrellus pipistrellus*;
 - Soprano pipistrelle *Pipistrellus pygmaus*;
 - Nathusius pipistrelle Pipistrellus nathusii;
 - Long-eared species (likely brown-long eared) *Plecotus* sp;
 - Nyctalus sp. (likely noctule); and
 - Myotis sp.



3.1.9 A total of 9588 bat passes were recorded across the three static detectors, with common pipistrelle equating to 88% of all recordings. Figure 8 below presents the number of bat passes recorded per species across the entire survey period.



- 3.1.10 The months with the highest level of bat activity recorded were May, July and September, with the peak number of passes recorded in May. Static 3 recorded the highest number of bat passes overall, peaking in September. Static 1 recorded the lowest level of activity
 - bat passes overall, peaking in September. Static 1 recorded the lowest level of activity consecutively each month except in October. However, it should also be noted that static 1 failed to record across five consecutive nights in July.
- 3.1.11 Static 3 is located along the northwestern Site boundary adjacent to nearby houses, whilst static 1 is located within the centre of the woodland parcel, along the eastern Site boundary.
- 3.1.12 Although at least six species of bat were recorded during the surveys, the only detector to record all six species was static 3. Static 2 recorded four species and static 1 recorded five different species. The only month that static 3 recorded at least six species was in July.





3.1.13 The monthly bat activity levels can be seen within Figures 9 and 10, below.





Figure 10: Bat activity recorded per static detector, per month.

3.2 **BREEDING BIRD SURVEY**



Desk Study

- 3.2.1 The desk study undertaken as part of the 2019 PEA report obtained bird records from the Sussex Biological Records Centre (SxBRC), which returned 97 species records in the zone of influence.
- 3.2.2 Many of the birds identified are associated with nearby wetland and farmland habitat, which is not present on Site. Appendix II identifies any records within the desk study where the deciduous woodland and pond habitats within the Site could potentially provide foraging or nesting opportunities. No additional species were found during the review of recent sightings lists.
- 3.2.3 Of the species listed in Appendix II, two are designated under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (Brambling and Black Redstart). Brambling is a winter visitor to this area of the UK and is not considered to have breeding potential within the Site. Black Redstart is extremely scarce in the UK and has not been recorded in the desk study area since 1994 and is therefore considered highly unlikely to be breeding within the Site.

Field Survey

- 3.2.4 No birds listed on Schedule 1 part 1 of the Wildlife and Countryside Act 1981 (as amended) were recorded as present or breeding within the Site.
- 3.2.5 The results of the breeding bird survey can be found in Table 11, below. This table identifies the assessed breeding status and the conservation status of each species, the breeding behaviour and number of breeding territories estimated.

Table 11: Summary of breeding bird survey visits



Species	Scientific Name	Conservation Status	Breeding Status	Breeding Behaviour*	No. Territories Identified
House Sparrow	Passer domesticus	Red NERC S41	Confirmed	Cavity nest (typically in buildings). Breeding season: March- September.	10+ (Nesting in nearby houses)
Starling	Sturnus vulgaris	Red NERC S41	Confirmed	Cavity nest (typically in buildings). Breeding season: March-July.	2-3 (Nesting in nearby houses)
Song Thrush	Turdus philomelos	Red NERC S41	Confirmed	Open cup nest in vegetation, normally 1- 4m above the ground. Breeding season: March-September.	2
Dunnock	Prunella modularis	Amber NERC S41	Confirmed	Open cup nest in vegetation, normally 15–150cm above the ground. Breeding season: March- September.	3
Woodpigeon	Columba palumbus		Confirmed	Platform nest in vegtation, normally 3– 5m above the ground. Breeding season April– October but may extend from February– December in urban areas.	3
Blue Tit	Cyanistes caeruleus		Confirmed	Cavity nest (typically in tree or wall), normally 0-5m above ground. Breeding season April- July.	2
Great Spotted Woodpecker	Dendrocop os major		Confirmed	Cavity nest in decaying wood, normally 3-5m above ground. Breeding season: April- June.	1
Robin	Erithacus rubecula		Confirmed	Open cup nest, highly variable site but usually below 2m and sometimes on the ground. Breeding season: February-July.	3
Moorhen	Gallinula chloropus		Confirmed	Platform nest in marginal aquatic vegetation. Breeding season: March- October.	1



Pied Wagtail	Motacilla alba		Confirmed	Open cup nest on a ledge or hole, normally below 2m and sometimes on the ground. Breeding season: April- September.	1
Great Tit	Parus major		Confirmed	Cavity nest (typically in a tree or wall), normally 0-5m above ground. Breeding season: April- August.	3
Chiffchaff	Phylloscopu s collybita		Confirmed	Domenestinherb/shrubvegetation,normally10-30cmaboveground.Breeding season:April-August	1
Nuthatch	Sitta europaea		Confirmed	Cavity nest, usually in tree 2-6 m above ground. Breeding season: April-July.	1
Blackcap	Sylvia atricapilla		Confirmed	Open cup nest in dense vegetation, normally below 1m. Breeding season: April-August.	1
Wren	Troglodytes troglodytes		Confirmed	Dome nest in crevice, hole or dense vegetation. Normally 0-5m above ground. Breeding season: March-August.	4–5
Blackbird	Turdus merula		Confirmed	Open cup nest in vegetation, usually below 4m. Breeding season: March- September.	5
Long-tailed Tit	Aegithalos caudatus		Probable	Dome nest in dense vegetation, usually 1- 3m above ground. Breeding season: March-July.	
Mallard	Anas platyrhynch os	Amber	Probable	Nest usually close to water, concealed in riparian vegetation. Breeding season: March-August but may extend from February- December in urban areas.	
Carrion Crow	Corvus corone		Probable	Bulky nest, normally high in a tall tree. Breeding season: March-July.	



Jackdaw	Corvus monedula		Probable	Platform nest, high in building or hollow tree. Breeding season: April- July.	
Coal Tit	Periparus ater		Probable	Cavity nest, usually in or near ground. Breeding season: April-August.	
Magpie	Pica pica		Probable	Bulky nest, normally high in vegetation (up to 25m). Breeding season: February- August.	
Green Woodpecker	Picus viridis		Probable	Cavity nest normally excavated in live wood at 2–5m above ground. Breeding season: April– July	
Goldcrest	Regulus regulus		Probable	Cup nest suspended under branch, usually 1-12m above ground. Breeding season: March-September.	
Feral Pigeon	Columba livia domestica		Not Breeding		
Herring Gull	Larus argentatus	Red NERC S41	Not breeding		

*(Ferguson-Lees, Castell, & Leech, 2011)

3.2.6 A map of the breeding bird territories can be found within Figure 11, below. Territories identified by singing males are circled in blue. Territories identified by presence of nest, nest building, mating or presence of young are circled in green. Species are recorded using BTO Breeding Bird Survey codes.





Figure 11: Map of breeding bird territory locations.

3.3 DORMOUSE PRESENCE/LIKELY ABSENCE SURVEY



3.3.1 No dormice or evidence of dormice occupation has been recorded within the nest tubes or surrounding habitats during the survey. The results of the dormouse survey are presented in Table 12 below.

Date	Dormice and/or evidence of dormice	Any other observations
13/05/2019	None	Dry leaves and moss in tube 23 -
		most likely from a bird.
		Tubes 1, 2, 3, 4, 5, 18 and 20 all
		damaged/missing.
23/06/2019	None	Dry leaves and moss in tubes 22
		and 23 – most likely from a bird.
		Tubes 1, 2, 3, 4, 5, 18 and 20
		reinstated.
24/07/2019	None	1 wood mouse present in tube
		23.
		Tubes 1, 2, 3, 4, 5, 18, 20 and
		40 all damaged/missing.
20/08/2019	None	None.
23/09/2019	None	None.
16/10/2019	None	None.

Table 12: Summary of dormouse survey visits.

3.4 GCN HSI ASSESSMENT

- 3.4.1 The on-site pond P1 was subject to an HSI assessment during the original PEA assessment and received an overall "poor" habitat suitability score, primarily due to the poor water quality, lack of suitable aquatic vegetation and presence of waterfowl.
- 3.4.2 The results of the HSI assessment for P2 are presented within Table 13, below.

Table 13: Summary of HSI Results for P2.

Pond Name	P2
National Grid Reference	TQ 39499 39242
Date	11.04.19
Criteria	HSI Score
Location	1
Pond Area	0.6
Pond Drying	0.9
Water Quality	0.67
Shade	0.7
Fowl	0.67
Fish	0.67
Ponds	0.6
Terrestrial Habitat	0.5
Macrophytes	0.8
Overall Score	0.69 = "Average"



3.4.3 At the time of the survey, pond P3 was completely dry and filled densely with vegetation and as such, an HSI assessment was not possible. Due to the maturity of vegetation present, it is considered highly likely that P3 has been dry for a number of years. GCN require water to breed and as such, P3 has negligible potential to support breeding GCN.

3.5 GCN EDNA SURVEY

- 3.5.1 The result of the analysis for P1 returned as "negative", meaning that GCN eDNA was not detected and GCN are therefore considered likely absent from the on-site pond P1 (see Appendix I: eDNA Technical Report).
- 3.5.2 Due to ownership and access restrictions, it was not possible to obtain water samples from P2 to ascertain the presence or likely absence of GCN and therefore an eDNA survey was not undertaken on this waterbody.

3.6 REPTILE PRESENCE/LIKELY ABSENCE SURVEY

- 3.6.1 Reptiles, namely slow worms and grass snakes were recorded on three of the seven survey visits. A peak count of one adult slow worm and one sub-adult grass snake was recorded during the surveys. However, an adult male and an adult female slow worm were recorded throughout the surveys, indicating that at least two individuals are present within the Site.
- 3.6.2 In addition to the reptiles recorded, a peak count of four juvenile common frogs and a single juvenile smooth newt were also observed beneath refugia during the surveys.
- 3.6.3 All reptiles recorded were found within the centre of the Site close to the dirt track that intersects the Site. The results of the surveys are presented in Table 14 below.

	Slow worm			Grass snake			
Date	Adult Female	Adult Male	Juvenile	Adult Female	Adult Male	Sub- adult/Juve nile	
25/04/19	0	0	0	0	0	0	
13/05/19	0	1	0	0	0	1	
28/05/19	0	0	0	0	0	0	
13/06/19	1	0	0	0	0	1	
25/06/19	0	0	0	0	0	0	
24/07/19	0	0	0	0	0	0	
01/08/19	0	0	0	0	0	1	

Table 14: Summary of reptile survey visits

3.6.4 The results of the population assessment are presented in Table 15 below.

Table 15. Population assessment results

Species	Peak Adult Count	Population Size/Ha	Population Score
Grass snake	1	1	Low
Slow worm	2	1	Low



4 DISCUSSION AND RECOMMENDATIONS

4.1 BATS

Transect Surveys

- 4.1.1 The monthly transect surveys confirmed the presence of at least four species of bat within the woodland Site boundaries and adjacent habitats, with the highest level of bat activity recorded in July, which corresponds directly with the presence of juveniles and adults leading on from the bat birthing season (May–June). The overall activity during the transects was low and dominated by common pipistrelle, equating to over 96% of all passes recorded.
- 4.1.2 The areas which recorded the most activity was at the woodland edge and hedgerow habitats along the southwest boundary of the Site and the eastern portion of the Site, immediately north of the adjacent hospital buildings.
- 4.1.3 Low levels of activity were recorded within the northern portion of the Site, at listening stations 2 and 3. This is likely due to the presence of an amenity green space immediately north of the Site, comprising species-poor grassland and is artificially lit at night. The artificial lighting could be drawing out the insect prey and thus reducing the foraging opportunities within the Site along this woodland boundary.
- 4.1.4 In addition, individual passes from *Myotis* species were recorded within the centre of the Site and at the southern end of the Site along the hedgerow. Individual *Nyctalus* sp. passes were recorded throughout the Site, considered likely to be commuting across the Site to preferred foraging sites as they are associated with open habitats such as pasture and farmland. This is also reflected within the static detector results, which detected a low number of *Nyctalus* passes, typical of commuting passes with long flat pulses.
- 4.1.5 The majority of common pipistrelle passes recorded were single commuting passes, however low numbers of bats were observed on many of the transects utilising the woodland edge and hedgerow habitats for foraging and as such, it is considered that these areas of the Site comprise part of their core foraging habitat and it is recommended that these habitats are retained. Pipistrelles are a common and widespread species (Wray et al, 2010) which can adapt to utilise a number of different habitat types; however, their preferred habitats include woodlands, hedgerows and water, which form the majority of the on-site habitats and therefore typical of their range.

Static Detector Surveys

4.1.6 The three automated detectors left in-situ for at least five consecutive nights each month recorded the presence of at least six species of bat within the woodland, with the highest level of activity recorded on static 3. Static 3 was positioned along the western Site boundaries, adjacent to a row of residential properties. As seen with the transect surveys, the most bat activity was recorded by common pipistrelles, which were detected on all three detectors, accounting for 88% of all bat passes.



- 4.1.7 Low numbers of long-eared (likely brown-long eared) species were also recorded on the statics, which were not detected during the transect surveys. Long-eared bats are difficult to detect due to their quiet echolocation calls which are generally only detected within a 5m range. It is therefore considered likely that brown long-eared bats are present in higher numbers than detected throughout the surveys as they are a common and widespread species and can be associated with woodland and woodland edge habitats.
- 4.1.8 A total of three nathusius pipistrelle passes were recorded across statics 1 and 3 and a total of 111 *Nyctalus* sp. passes (accounting for 1% of all overall activity) were recorded on all three detectors. Due to the low level of passes from these species, it is considered likely that the Site is used for commuting purposes as opposed to being part of their core foraging habitat.
- 4.1.9 There was a peak in bat activity in May and July, particularly with common pipistrelles along the western boundary. This pattern of activity is indicative that a potential maternity roost is located nearby potentially within one of the adjacent residential properties. Pregnant females enter maternity roosts in April/May and by late July/early August the mothers leave the roost and the young are flying independently.
- 4.1.10 However, it should be noted that automated detectors cannot decipher the difference between a single bat passing many times, or many bats passing on one occasion and as such, the high frequency of passes recorded cannot confirm the presence of a nearby maternity roost.
- 4.1.11 Higher levels of activity were also recorded on static 2, which was positioned along a potential bat flight path towards the on-site pond P1. The highest number of *Myotis* sp. passes was also recorded on static 2 and it is considered likely that bats are utilising the waterbody for foraging, particularly as Daubenton's bat *Myotis daubentonii* is a specialist in foraging over water and wetland habitats (BCT, 2016).

Assessment of Impacts

- 4.1.12 Guidelines for valuing bat commuting and/or foraging habitat (Wray et al, 2010) were followed to classify the Site's value for the bat species present. Based on the results of the bat activity surveys, the Site is classified as being of "County" importance for all bat species identified.
- 4.1.13 The full proposals were not known at the time of writing this report, however it is understood that an area of deciduous woodland within the centre of the Site shall be removed to facilitate a residential development. Bats have been recorded commuting and foraging throughout the Site; however, bat activity was lower within the centre of the Site, compared to the woodland edge and pond habitats. The highest number of bat passes were recorded along the western Site boundaries, indicating that this area is an important bat foraging and/or commuting corridor.



- 4.1.14 The removal of deciduous woodland habitat will reduce the overall foraging and commuting opportunities for bats present within or near-to the Site. However, as the majority bats found to be present within the woodland are common and widespread species (Wray et al, 2010), the overall conservation status of bat species within the Site shall not be affected, providing the edge habitats, on-site pond and mature trees within the Site are retained throughout the development. In addition, the mitigation and enhancement measures detailed below must be adhered to.
- 4.1.15 The proposals which seek to manage and enhance the on-site pond could create better foraging habitat for bats as reducing the tree canopy cover and incorporating suitable aquatic plants will encourage invertebrates and flying insects into the Site, which are a valuable food source to the bat species utilising the Site.
- 4.1.16 Without the implementation of suitable avoidance and mitigation measures, the proposed development will lead to an impact on bats at a County level.

Recommendations

- 4.1.17 It is recommended that a Landscape and Ecological Management Plan (LEMP) be produced to detail all mitigation measures and the proposals for habitat management and biodiversity enhancement, including any compensation planting for the loss of deciduous woodland habitat.
- 4.1.18 An outline of recommended avoidance, mitigation, compensation and enhancement measures in respect to bats that shall be incorporated into the LEMP are presented in further detail below.
- 4.1.19 Artificial bat boxes should be installed onto any new buildings at a ratio of at least one box per three houses. In addition, tree mounted bat boxes should be positioned along the woodland edge habitats and positioned around the pond. Bat boxes can include, but are not limited to:
 - Installation of 'Improved Cavity Bat Boxes' (or similar) onto any suitable retained trees. The boxes should be installed prior to the development commencing and be placed at a minimum height of 3m above ground and on slightly different aspects.
 - Installation of 1WQ Schwegler Summer & Winter Bat Boxes (or similar) to be set into external walls of new residential houses, ideally positioned at the apex on gable ends.
 - Lifted ridge or bat access roof tiles.
- 4.1.20 The new residential development may lead to indirect impacts to bats through spillage of artificial lighting. As only low numbers of widespread bat species are likely to be affected, the indirect impacts are considered to be low.
- 4.1.21 Nevertheless, bats are highly sensitive to artificial lighting and rely on dark corridors for foraging and commuting. As such, it is important that the proposals incorporate a sensitive lighting strategy throughout the construction and operational phases of the development and in addition, ensure that dark corridors are implemented around the retained woodland boundaries and on-site pond.



- 4.1.22 The sensitive lighting strategy will:
 - Use minimum light levels necessary. For example, there should be times throughout the evening (when bats are most active) when all outdoor security lights on the new properties are unlit to avoid affecting bat activity. Lighting can also be installed using a timer or movement sensor to avoid long periods of an area being lit at night;
 - Lighting should be a warm white spectrum and feature peak wavelengths higher than 550nm to lower the range of species affected by lighting. Using LED luminaires where possible and avoid luminaires with UV elements, specifically avoiding metal halide and fluorescent sources (Institute of Lighting Professionals, 2018); and
 - Internal luminaries will be recessed where installed in proximity to windows to reduce glare (Institute of Lighting Professionals, 2018) and light spill and use hoods, louvres or other similar design features to avoid light spill and direct light away from all areas of mature vegetation and wetland habitats.
- 4.1.23 The woodland edge habitats, pond and mature trees within the Site are to be retained, which means the significant foraging and commuting areas will remain largely unaffected. If any areas of woodland edge habitat require removal, for example to provide road access, then these habitats should be replanted on a like for like basis to compensate for their loss, prior to works commencing. Any breaks in woodland edge habitats should be sensitively lit to limit the impact of these breaks on commuting and foraging bats.
- 4.1.24 The hedgerow present along the southwestern Site boundary bordering the pond should be retained, enhanced and managed to benefit wildlife. Bats benefit from hedgerows that are managed sensitively which encourages a varied and diverse structure i.e. cut on rotation, once every 2–3 years. This will increase the foraging opportunities for bats around the pond.
- 4.1.25 The on-site pond P1 is currently in poor condition and unlikely to support a wide range of species. The proposals seek to enhance this pond and any enhancements and future management should be completed to support wildlife. P1 should be enhanced and managed to support a a diverse structure, shallow shelved edges with marginal vegetation which are beneficial for invertebrates. The central areas of the pond should be deep enough to limit the growth of emergent plans, allowing for open water from which bats can drink as well as increasing the likelihood of the pond retaining water year-round, i.e. a depth of at least 1.5m.
- 4.1.26 The vegetation surrounding P1 should be managed with consideration for bats. Trees around the edges of waterbodies provide shelter from wind and rain as well as increasing invertebrate activity, trees in proximity to waterbodies are also particularly attractive to bats as roosts. It is also recommended that some areas are left free from vegetation to provide an approach route for larger bats, excessively shaded banks can also reduce the abundance of invertebrates such as *Diptera*.
- 4.1.27 The pond edges should be seeded with a range of grass and flower species, suitable for the wet soil conditions. Night scented flowers such as soapwort *Saponaria officinalis*, jasmine *Jasminum officinale* and night scented catchfly *Silene noctiflora* should also be planted to encourage night flying invertebrates, which are a main food source for bats.

4.2 BIRDS



Breeding Bird Evaluation

- 4.2.1 The breeding bird assemblage recorded within the Site is considered to be typical of the habitats present within the Site and its context in the wider landscape, with the notable absence of finch species.
- 4.2.2 A total of 26 species were recorded on the Site during field surveys, 24 for which breeding was either confirmed or probable.
- 4.2.3 No Schedule 1 part 1 species were observed during field surveys. Five Species of Principal Importance (SPI) were observed during field surveys, four of which were considered to be breeding on or adjacent to the Site. Three are of high (red) conservation concern (house sparrow, starling and song thrush) and one is of medium (amber) conservation concern (dunnock).
- 4.2.4 Nesting house sparrow were found to be particularly abundant, and together with starling, were predominantly associated with the houses and gardens adjacent to the western boundary of the Site. Song thrush and dunnock territories were recorded in the woodland habitat within the Site boundaries. Mallard, a species of medium (amber) conservation concern, was recorded on the pond, but not seen breeding.
- 4.2.5 A fifth SPI was also recorded, herring gull, but was considered not to be breeding on the Site as no appropriate nesting habitat is available. Herring gull was recorded on the eastern boundary of the Site and may be associated with the large flat rooved hospital buildings.
- 4.2.6 No dusk surveys were carried out; however, it should be noted that tawny owl was heard during a bat transect survey in April and the woodland habitat within the Site are considered highly favourable for tawny owl. Tawny owl is of medium (amber) conservation concern.

Assessment of Impacts

- 4.2.7 Removal of any vegetation (including trees, shrubs and low-lying vegetation) during the breeding season is highly likely to impact on nesting birds. This would give rise to an offence under the Wildlife and Countryside Act 1981 (as amended).
- 4.2.8 The proposed development will result in a reduction in area of both foraging and nesting habitat within the Site and as a result, the diversity and abundance of birds utilising the Site will be reduced. Species likely to be affected include two SPI and conservation concern (song thrush and dunnock). However, given that species recorded are widespread and commonly encountered, it is unlikely that the conservation status of any species recorded would be affected in the wider context and it is noted that similar areas of foraging and nesting habitat are available within the immediate and wider landscape.
- 4.2.9 A few species, including two SPI (house sparrow and starling), which are associated with houses and gardens, may benefit and increase in abundance due to the proposed development, particularly if mitigation recommendations are implemented.

Recommendations



- 4.2.10 If Site clearance work takes place during the breeding season this could destroy active nests and would result in an offence. To avoid committing an offence it is strongly recommended that the clearance of any nesting habitat is carried out between October and mid-February (inclusive).
- 4.2.11 The assemblage of species recorded on Site have a wide range of breeding habitats, including a number of ground nesting species. Therefore, nesting habitat includes all trees, shrubs, herbaceous vegetation and long grass. Resultant brash may also provide nesting habitat and should be removed from the Site before the nesting period begins. After clearance, any vegetation growth should be managed at ground level to avoid new nesting opportunities arising.
- 4.2.12 If vegetation clearance is unavoidable during the breeding season (March-August for most UK breeding bird species), a suitably experienced ecologist should carry out careful checks for nesting birds. If no nests are found, vegetation should be removed immediately. If nests are discovered, the area should be left undisturbed and checked regularly by the ecologist until the fledglings have left the area or the nest has failed naturally.
- 4.2.13 All the vegetation should be re-checked by the ecologist before clearance in case further nests have been built. Nests can be extremely cryptic so this should be a last resort and restricted to small patches of vegetation.
- 4.2.14 In order to retain areas of suitable bird habitat, it is recommended that where possible, areas of deciduous woodland are retained. Retained woodland should include a diverse habitat structure (mature and young woodland, scrub and bramble) to provide a variety of bird nesting and foraging opportunities.
- 4.2.15 It is also recommended to retain the hedgerow currently bordering the southern end of the Site, and to extend, enhance and repair this with native trees and shrubs of local provenance so that it runs the length of the Site to function as a corridor and allow movement of species between the habitats within the wider environment and the proposed pond enhancement.
- 4.2.16 Of particular ecological importance are the mature oaks *Quercus* sp., which are scattered across the Site. Oak is a slow growing tree which may take decades to mature but provides a large number of nesting opportunities for birds, (particularly species which nest in cavities such as blue tit, great tit, woodpeckers and nuthatch) and an important habitat for the invertebrates which provide food for these species. The proposals include the retention, where possible of the mature trees within the Site, however, loss of nesting cavities shall be mitigated by providing a variety of nest boxes (include both open fronted and enclosed boxes, and those designed specifically for tawny owl and nuthatch) within areas of retained habitats and the wider parcels of woodland currently under the clients ownership.
- 4.2.17 Since several of the bird species recorded do occur in residential and garden habitats, it is recommended that additional foraging and nesting opportunities for birds in the areas to be developed are provided.
- 4.2.18 It is recommended that a LEMP be produced to include areas of native trees and shrubs of local provenance, incorporating berry producing species to provide foraging and dense areas of vegetation for nesting, which will benefit garden bird species.



- 4.2.19 House sparrow, a species which is of high (red) conservation concern and has experienced steep decline in recent years, was found to be abundant around the boundary of the Site. Suitable nest boxes installed on the proposed buildings could further encourage this species. House sparrows prefer to live in colonies and nest boxes should be arranged in small groups to accommodate this. Starling boxes would also be appropriate.
- 4.2.20 The proposed enhancement of the pond could provide new opportunities for birds, for example mallard, which is considered to be of medium conservation concern. However, the enhancement must include the retention of some areas of dense scrub and wet woodland in this area to maintain the current diversity of foraging and nesting opportunities.
- 4.2.21 Pond enhancements should include the creation of shallow areas to allow birds access to forage, drink and bathe and the planting of native marginals and areas of overhanging vegetation to provide new areas of habitat for birds. The creation of an island can also be very beneficial for birds, providing safe nesting opportunities for water birds.

4.3 HAZEL DORMICE

- 4.3.1 No dormice or evidence of dormice have been recorded during the presence/likely absence surveys between May–October 2019.
- 4.3.2 As a probability index score of 22 has been achieved during the surveys and no dormice or evidence of dormice presence has been recorded, dormice are considered likely absent from the Site and immediate surroundings. As such, a EPS dormouse licence is not required to facilitate the proposals.
- 4.3.3 The likely absence of dormice within the Site is potentially due to the lack of management regime within the woodland, which has resulted in an overcrowded tree canopy and low-lying and sparse bramble and hazel understorey. This consequentially has reduced the amount of suitable nesting and foraging opportunities for dormice within the Site. In addition, the Site is bordered to the southeast, south and west by urban development, which may further reduce the likelihood of dormice utilising the Site due to increased levels of footfall, noise and light disturbance.
- 4.3.4 However, that being said, due to the presence of dormice identified within the zone of influence as part of the desk study (within the 2018 PEA report), although unlikely, there is the potential for dormice to naturally disperse into the Site between the time of the survey and the development commencing. As such, it is important that site workers remain vigilant at all times and should evidence of dormice be identified, all works must immediately stop and advice sought from a suitably licensed ecologist, who may deem it necessary to apply for an EPS dormouse licence.
- 4.3.5 In addition to the above, enhancement measures could include the creation of a suitable buffer zone likely comprising additional planting of understory shrubs and trees, between the proposed development and any retained areas of suitable dormouse habitat. Other enhancement measures could include the dissemination of information leaflets advising any new householders (particularly cat owners) that dormice may be present within the wider surroundings and that cats should be brought indoors at night, the period in which dormice are most active.



- 4.3.6 The incorporation of species-rich hedgerows along the Site boundaries will partly compensate for the permanent loss of potentially suitable dormouse habitat within the Site post development. In addition, artificial nest boxes could be installed within the adjacent woodland to increase the number of nesting opportunities available for dormice within the connecting woodland under the applicant's ownership.
- 4.3.7 All enhancement and management measures and shall be provided in detail within the LEMP.
- 4.4 GREAT CRESTED NEWTS AND OTHER AMPHIBIANS
- 4.4.1 The eDNA results for the on-site pond, P1, returned as negative confirming that GCN are likely absent from the waterbody.
- 4.4.2 The HSI assessment score for P2 was 0.69, which has classified the pond as having "average" potential to support GCN.
- 4.4.3 P3 was completely dry at the time of the survey and therefore not capable of supporting breeding GCN, which require water for male mating displays and juvenile development as well as submerged vegetation for egg laying. As P3 was densely filled with mature vegetation, it is considered likely that P3 has been dry for some years and likely only capable of supporting any significant amounts of water after periods of heavy rainfall.
- 4.4.4 An eDNA survey was recommended for P2, however as the pond is located outside of the applicants ownership boundaries, the applicant was not able to gain access from the relevant land owner to survey for the presence or likely absence of GCN and as such, no survey information for P2 is available.
- 4.4.5 The only pond located within a 250m radius of P2 is the on-site P1 and eDNA results have confirmed likely absence of GCN from P1. Therefore, it is considered highly unlikely that GCN would be present within P2, but not P1 as they are located within 170m of each other and GCN will utilise a network of waterbodies within a 250m radius of their core habitat. In addition, the terrestrial habitat connecting the un-surveyed P2 to the Site for the majority, comprises roads, houses and small residential gardens, which are either unsuitable or provide only sub-optimal terrestrial habitat for GCN.
- 4.4.6 As such, the lack of survey data for P2 is not considered likely to be a significant constraint to the development despite receiving an "average" HSI score. It is considered highly unlikely that GCN would utilise P2 to breed in and therefore also highly unlikely to be present within the Site.
- 4.4.7 The desk study records obtained from SxBRC as part of the original PEA report identified a total of 37 GCN records within the zone of influence, the closest records are within a 10m radius of the on-site P1, submitted in 2009.
- 4.4.8 Although no previous presence/likely absence survey information was available for P1 at the time of writing this report, it is understood that P1 was identified as having potential to support GCN during the phase 1 survey undertaken by Mott MacDonald in 2008, and as such, further surveys were undertaken and GCN presence was confirmed within P1.



- 4.4.9 Over ten years have passed since the latest GCN record for the Site and zone of influence has been recorded. In addition, P1 received a "poor" habitat suitability score as part of the GCN HSI assessment undertaken as part of the 2018 PEA, and GCN were confirmed as likely absent from the pond during 2019 eDNA surveys. The pond's potential to support GCN has reduced substantially within a decade due to heavy shading and presence of waterfowl which all lead to poor water quality and increased levels of GCN predation.
- 4.4.10 The eDNA results confirm that GCN are not present within P1 and therefore it is highly unlikely that they will be present within the Site.
- 4.4.11 Common frogs and smooth newts were recorded during the reptile presence/likely absence survey and it is likely that these species are utilising P1 as breeding habitat as they are much more widespread species that can tolerate lower water quality.
- 4.4.12 Although the proposals include the enhancement of P1, full enhancement measures to improve both aquatic and terrestrial habitat for GCN and other amphibians shall be detailed within the LEMP.

4.5 REPTILES

- 4.5.1 Low populations of both slow worms and grass snakes were recorded within the Site. Slow worms and grass snakes were all recorded within the centre of the Site, where the woodland vegetation is less dense and as such provides more suitable opportunities for basking.
- 4.5.2 As reptiles have been identified within the Site, works associated with the proposed development, for example, habitat clearance and brash/log pile clearance, could therefore result in the death or injury of any reptiles present within the Site.
- 4.5.3 The habitats on-site are considered to be only sub-optimal for reptiles due to the lack of tussocky grassland, the dense tree canopy leading to heavily shaded ground habitats and thus reduced foraging and basking opportunities. This is reflected within results of the reptile survey. As only individual animals were found during the surveys, a full reptile translocation is not considered necessary to facilitate the development.
- 4.5.4 Instead, in order to comply with current planning policy and relevant legislation pertaining to reptiles, all vegetation clearance must be completed under ecological supervision. The suitably qualified ecologist shall carefully capture and relocate any reptiles found to retained areas of suitable reptile habitat, which include adjacent woodland parcels under the applicant's ownership and areas around the on-site pond, which shall be enhanced to support reptiles all details of which shall be detailed within a LEMP. These areas are well connected in the wider landscape to other suitable reptile habitat and thus, the proposed development shall not lead to the fragmentation or isolation of the on-site reptile population.
- 4.5.5 It is recommended that clearance of all vegetation over 150mm within the Site be undertaken using a sensitive vegetation clearance approach whereby a two phased cut is undertaken.



- 4.5.6 First, the vegetation should be reduced to 150mm above ground level, and then after a 24hr period, reduced to ground level. Vegetation clearance should be undertaken in a north to south direction, making these areas unsuitable for reptiles. This will encourage them to naturally disperse into the retained semi-natural habitats immediately east of the Site and to the habitats surrounding the pond that will be enhanced for wildlife. The timing of these works should coincide with reptiles being active (generally greater than 9°C air temperature) during the months of April September, and potentially into October if the ecologist deems appropriate.
- 4.5.7 Once the vegetation has been reduced to ground level, it is important that it is maintained at this level to prevent vegetation regrowth, which could encourage reptiles to re-colonise the habitat. If vegetation is allowed to re-grow above 150mm, the sensitive vegetation clearance methodology detailed above will need to be undertaken again.
- 4.5.8 In addition, any potential hibernation features present within the Site, such as log and brash piles or tree stumps, should be deconstructed and reassembled in suitable locations outside of the Site under the supervision of a suitably qualified ecologist and outside of the core reptile hibernation period (generally between November to March), thus making the Site unsuitable to support hibernating reptiles. Should construction materials require storing on-site, these should be located on areas of hard-standing or grassland of a short sward (below 50mm) at a distance of no less than approximately 15m from any areas of retained suitable reptile habitat.

4.1 INVASIVE SPECIES

- 4.1.1 Section 14(1) of the Wildlife and Countryside Act 1981 (as amended) makes it illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 of the Act including Japanese knotweed *Fallopia japonica*.
- 4.1.2 It is understood that an isolated stand of Japanese knotweed has been identified within the western portion of the Site, adjacent to the existing residential garden boundaries (for exact location, see BRD document reference: BRD3591–OP5–A, November 2019).
- 4.1.3 Works associated with any proposed development of the Site, for example habitat clearance, could therefore result in the spread of Japanese knotweed. On this basis, invasive plant species are therefore considered a potential ecological constraint. In order to comply with legislation regarding invasive plant species the mitigation measures detailed below should be adhered to.
- 4.1.4 Any works associated with the proposed development of the Site should be undertaken in accordance with a detailed invasive plant species method statement adhering to the Environment Agency Japanese Knotweed Code of Practice (Environment Agency, 2013). In addition, a specialist contractor should be employed to manage and remove Japanese knotweed from the Site in order to prevent its spread.
- 4.1.5 Full details of how the control and management of any Japanese knotweed within the Site shall be detailed within the LEMP.



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Date: 26th November 2019



APPENDICES

APPENDIX I: GCN EDNA TECHNICAL REPORT



Folio No:	E4768
Report No:	1
Order No:	QVH
Client:	PJC Consultancy
Contact:	Tara Hall
Contact Details:	tara@pjcconsultancy.com
Date:	02/05/2019

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

Date sample received at Laboratory:	29/04/2019
Date Reported:	02/05/2019
Matters Affecting Results:	None

RESULTS Lab Sample No.	Site Name	O/S Reference	SIC		DC		IC		Result	Pos Repl	itive icates	
0822	QVH Woodland East Grinstead	TQ 39742 39197	Pass		Pass		Pass		Negative		0	

SUMMARY

When Great Crested Newts (GCN); Triturus cristatus inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the unique sample identity.

RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

Site Name- Information on the pond.



O/S Reference - Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted. An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. It may be assumed that small fractions of positive analyses suggest low level presence but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive.

METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd also participate in Natural England's proficiency testing scheme and we also carry out inter-laboratory



checks on accuracy of results as part of our quality procedures.

Reported by: Troy Whyte

Approved by: Derry Hickman

End Of Report



APPENDIX II: BREEDING BIRD DESK STUDY



Species	Scientific Name	BOCC Status	National/International
			Designation
Brambling	Fringilla montifringilla		WCA Schedule 1
Black Redstart	Phoenicurus ochruros	Red	WCA Schedule 1
Lesser Redpoll	Acanthis cabaret	Red	NERC S41
Lesser Spotted	Dendrocopos minor	Red	NERC S41
Woodpecker			
Spotted Flycatcher	Muscicapa striata	Red	NERC S41
House Sparrow	Passer domesticus	Red	NERC S41
Willow Tit	Poecile montana	Red	NERC S41
Marsh Tit	Poecile palustris	Red	NERC S41
Turtle Dove	Streptopelia turtur	Red	NERC S41
Starling	Sturnus vulgaris	Red	NERC S41
Song Thrush	Turdus philomelos	Red	NERC S41
Dunnock	Prunella modularis	Amber	NERC S41
Bullfinch	Pyrrhula pyrrhula	Amber	NERC S41
Nightingale	Luscinia megarhynchos	Red	
Grey Wagtail	Motacilla cinerea	Red	
Woodcock	Scolopax rusticola	Red	
Mistle Thrush	Turdus viscivorus	Red	
Common Redpoll	Acanthis flammea	Amber	
Mallard	Anas platyrhynchos	Amber	
Stock Dove	Columba oenas	Amber	
Kestrel	Falco tinnunculus	Amber	
Willow Warbler	Phylloscopus trochilus	Amber	
Tawny Owl	Strix aluco	Amber	
Sparrowhawk	Accipiter nisus		
Long-tailed Tit	Aegithalos caudatus		
Grey Heron	Ardea cinerea		
Buzzard	Buteo buteo		
Goldfinch	Carduelis carduelis		
Treecreeper	Certhia familiaris		
Greenfinch	Chloris chloris		
Feral Pigeon	Columba livia		
	domestica		
Woodpigeon	Columba palumbus		
Carrion Crow	Corvus corone		
Rook	Corvus frugilegus		
Jackdaw	Corvus monedula		
Blue Tit	Cyanistes caeruleus		
Great Spotted	Dendrocopos major		
Woodpecker			
Robin	Erithacus rubecula		
Chaffinch	Fringilla coelebs		
Coot	Fulica atra		
Moorhen	Gallinula chloropus		
Jay	Garrulus glandarius		
Pied Wagtail	Motacilla alba		
Great Tit	Parus major		
Coal Tit	Periparus ater		
Pheasant	Phasianus colchicus		
Chiffchaff	Phylloscopus collybita		
Magpie	Pica pica		



Green Woodpecker	Picus viridis	
Ring-necked Parakeet	Psittacula krameri	
Goldcrest	Regulus regulus	
Nuthatch	Sitta europaea	
Siskin	Spinus spinus	
Collared Dove	Streptopelia decaocto	
Blackcap	Sylvia atricapilla	
Garden Warbler	Sylvia borin	
Whitethroat	Sylvia communis	
Wren	Troglodytes troglodytes	
Blackbird	Turdus merula	