

PADNELL GRANGE

BAT SURVEY REPORT

Prepared for Bellway Homes

by

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HDA ref: 2080.6

October 2018

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CONTENTS

	Page
1 Introduction	1
2 Methodology	3
3 Results	9
4 Evaluation	20
5 Recommendations	22
6 Conclusion	31
7 References	32

HDA Document Control and Quality Assurance Record

APPENDICES

- A Bat Roost Survey Summary Plan
- B Bat Activity Survey Summary Plan
- C Photographs

1 INTRODUCTION

1.1 Site location and summary description

1.1.1 This report describes a suite of bat survey work carried out within approximately 2.7ha of land off Padnell Road, Cowplain hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SU 698 110. The survey was commissioned by Bellway Homes in three phases in June and July 2017 and August 2018.

1.1.2 The site is located on the eastern edge of the settlement of Cowplain in southern Hampshire and forms the grounds of Padnell Grange which comprises a number of buildings in residential and commercial use together with associated hardstanding and formally landscaped grounds. The site is bordered to the south and west by residential development, to the east by Waterlooville Golf Course and to the north by an area of woodland.

1.1.3 A more detailed description of the habitats within the site and its surrounds is given in the Ecological Appraisal (HDA, 2017). The extent of the site is shown on the plan in *Appendix A*.

1.2 Legislative context

1.2.1 All UK bat species are 'European Protected Species' (EPS) protected under the 2017 Conservation of Habitats and Species Regulations, which implements the EC Habitats Directive 92/43/EEC in the United Kingdom. In relation to an EPS, the 2017 Regulations make it an offence to:

- Deliberately capture, injure or kill any wild animal of an EPS;
- Deliberately disturb wild animals of any such species, in particular any disturbance which is likely to: (i) impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or to hibernate or migrate; (ii) affect significantly the local distribution or abundance of the species to which they belong;
- Damage or destroy a breeding site or resting place of such an animal; and/or
- To (a) be in possession of, or to control; (b) to transport any live or dead animal or any part of an animal; (c) to sell or exchange or (d) offer for sale or exchange any live or dead animal or part of an animal of an EPS.

1.2.2 In addition, all UK bats are protected under the 1981 Wildlife and Countryside Act (as amended). All species are listed on Schedule 5 of the Act and are subject to the provisions of Sections 9.4b and 9.4c, which make it an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection; and/or
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a bat.

1.2.3 If works are planned that are likely to constitute an offence under the current legislation, an application for a derogation licence should be made to Natural England.

- 1.2.4 Seven species of bat (Barbastelle, Bechstein's, Noctule, Soprano Pipistrelle, Brown Long-eared, Greater Horseshoe and Lesser Horseshoe) are also identified as Species of Principal Importance under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Section 40 of the Act, together with planning policy and guidance, require planning authorities to regard these species as a material consideration in the planning process.

1.3 Development proposals

- 1.3.1 The site is to be the subject of a planning application for residential development, with associated car parking and landscaping.

1.4 Scope and purpose of the report

- 1.4.1 An extended Phase 1 habitat survey and Phase 1 bat scoping survey carried out in June and July 2017 as part of the Ecological Appraisal (HDA, 2017) identified habitats within the site suitable for use by roosting, foraging and commuting bats.

- 1.4.2 In recognition of the proposed development of the site, the potential for the site to be used by bats, and within the legislative context set out in *Section 1.2*, further bat surveys were undertaken to determine use of the site by bats and to identify any need for licensing or mitigation. Specifically, the aims of the study were:

- i. To identify potential bat roosts in buildings and trees within the site, where potentially affected by the proposed development;
- ii. To determine the presence/likely absence of bats within potential roosts affected by the proposed works and identify species and numbers;
- iii. To determine levels of bat foraging and commuting activity within habitat potentially affected by the proposed development;
- iv. To determine the requirement, if any, for licensing in respect of bats; and
- v. To identify appropriate mitigation and/or enhancement measures to ensure that the development avoids adverse impacts on bats and, where possible, provides enhancements to support the long-term favourable conservation status of bats in accordance with nature conservation legislation, planning policy and the 2006 NERC Act.

2 METHODOLOGY

2.1 Introduction

- 2.1.1 The methodology followed in relation to all bat survey work undertaken at the site is consistent with current legislation and good practice guidelines set out by the Bat Conservation Trust (BCT, 2016). The following sections detail the suite of surveys

undertaken to inform the assessment of the proposed development on bats and the results of these surveys are provided in *Section 3*.

2.2 Phase 1 bat scoping survey

2.2.1 The site was initially subject to a Phase 1 bat scoping survey by Julie Watson MCIEEM of Hankinson Duckett Associates on the 26th June and 3rd July 2017. All buildings and trees within the site were assessed for their potential to support roosting bats and classified according to their potential.

Phase 1 building survey

2.2.2 All buildings within the site were inspected externally from ground level using binoculars and a powerful torch to identify and investigate any potential entry and exit points such as missing roof tiles, loose fascias and lifted lead flashing, and to look for evidence of entry/exit in the form of staining, discolouration and/or scratch marks.

2.2.3 Internally, buildings were searched exhaustively where possible, to look for evidence of current or former occupation by bats. A powerful torch was also used to investigate any accessible cavities, crevices and recesses in each building.

2.2.4 In view of the findings of the internal/external inspections, the potential of the buildings to support roosting bats ('confirmed roost', 'high', 'moderate', 'low' or 'negligible') was assessed in accordance with current best practice guidelines. Assessment of bat roosting potential requires consideration of a number of criteria, including the design and construction of the building or structure, the size and location of potential features and access points, the position of the building or structure, aspect, geographical location, surrounding land use and adjacent landscape linkages.

Phase 1 tree survey

2.2.5 All trees within the site were inspected from ground-level with the aid of binoculars and a powerful torch to identify potential features suitable for use by roosting bats. Potential features include splits, cracks and cavities, peeling bark, woodpecker holes, broken branches and a covering of Ivy where this is of a sufficient age to provide a suitable microclimate between the tree and Ivy stem(s).

2.2.6 In accordance with current best practice guidelines (BCT, 2016), trees were placed into one of five categories. Categorisation was based on the nature, size, location and quality of features present in each tree:

- Negligible suitability - Trees with no or negligible features for roosting bats;

- Low suitability - Trees of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential;
- Moderate suitability - Trees with one or more potential roost sites that could be used by bats but are unlikely to support roost types of high conservation status;
- High suitability - Trees with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time; or
- Known or confirmed bat roost.

2.3 Phase 2 roost surveys

2.3.1 The results of the Phase 1 bat scoping survey of buildings and trees were used to determine the need for Phase 2 survey work of buildings and trees potentially affected by the emerging development proposals. Emergence/re-entry surveys were conducted to determine presence/probable absence of roosting bats and, where present, identify species and numbers. The level of survey effort conducted was determined with reference to the identified bat roosting potential of each feature in accordance with best practice guidelines.

2.3.2 Surveyors with electronic bat detectors¹ were positioned around each feature to record bats emerging from or entering the building/tree. Surveyors were positioned to provide adequate coverage of all potential emergence points on each feature surveyed. Dusk emergence surveys generally began 15 minutes before sunset, ending approximately 1.5 hours after sunset. Dawn re-entry surveys generally began approximately 1.5 hours before sunrise and ended at sunrise or shortly thereafter. Records were made of any emergences and entries, and incidental records were also made of bat commuting and foraging activity in the vicinity of each surveyor.

2.3.3 Details of the date and timing of the Phase 2 bat roost surveys are provided in *Table 1* below.

Table 1: Timing and conditions of Phase 2 bat roost surveys

Building/Tree	Date/Time	Sunset/ Sunrise	Conditions
B1	09.08.2017 20:20 – 22:05	20:35	100% cloud cover, Beaufort Scale = 2, rain, 13°C
	25.08.2017 04:37 – 06:07	06:07	20% cloud cover, Beaufort Scale = 1, dry, 11-10°C
B2	11.08.2017 04:15 – 05:45	05:45	0% cloud cover, Beaufort Scale = 2, dry, 11-10°C

¹ Pettersson D240x heterodyne and time-expansion detector with MP3 recorder, Anabat Walkabout, Anabat Express and Anabat SD2 with 'Analook' recording software.

	24.08.2017 19:51 – 21:36	20:06	40% cloud cover, Beaufort Scale = 2, dry, 16-14°C
B3	27.07.2017 20:42 – 22:27	20:57	60% cloud cover, Beaufort Scale = 4, dry, 16-15°C
	10.08.2017 04:13 – 05:43	05:43	90% cloud cover, Beaufort Scale = 1, dry, 12°C
	26.09.2017 18:39 – 20:24	18:54	100% cloud cover, Beaufort Scale = 1, dry, 16-15°C
B5	28.07.2017 03:54 – 05:24	05:24	80% cloud cover, Beaufort Scale = 2, dry, 13°C
	24.08.2017 19:51 – 21:36	20:06	40% cloud cover, Beaufort Scale = 2, dry, 16-14°C
	26.09.2017 18:39 – 20:24	18:54	100% cloud cover, Beaufort Scale = 1, dry, 16-15°C
B6	10.08.2017 20:18 – 22:03	20:33	30% cloud cover, Beaufort Scale = 1, dry, 15-12°C
B7	10.08.2017 20:18 – 22:03	20:33	30% cloud cover, Beaufort Scale = 1, dry, 15-12°C
	24.08.2017 19:51 – 21:36	20:06	40% cloud cover, Beaufort Scale = 2, dry, 16-14°C
	19.09.2017 18:53 – 20:38	19:08	20% cloud cover, Beaufort Scale = 1, dry, 13-11°C
B9	11.08.2017 04:15 – 05:45	05:45	0% cloud cover, Beaufort Scale = 2, dry, 11-10°C
B10	09.08.2017 20:20 – 22:05	20:35	100% cloud cover, Beaufort Scale = 2, rain, 13°C
	25.08.2017 04:37 – 06:07	06:07	20% cloud cover, Beaufort Scale = 1, dry, 11-10°C
	26.09.2017 18:39 – 20:24	18:54	100% cloud cover, Beaufort Scale = 1, dry, 16-15°C
B11	28.07.2017 03:54 – 05:24	05:24	80% cloud cover, Beaufort Scale = 2, dry, 13°C
	25.08.2017 04:37 – 06:07	06:07	20% cloud cover, Beaufort Scale = 1, dry, 11-10°C
B13	10.08.2017 04:13 – 05:43	05:43	90% cloud cover, Beaufort Scale = 1, dry, 12°C
	19.09.2017 18:53 – 20:38	19:08	20% cloud cover, Beaufort Scale = 1, dry, 13-11°C
	26.09.2017 18:39 – 20:24	18:54	100% cloud cover, Beaufort Scale = 1, dry, 16-15°C
T1	23.08.2018 19:55 – 21.40	20.10	20% cloud cover, Beaufort Scale = 1, rain from 21.26 until end, 17-15°C
	20.09.2018 18.53 – 20.38	19.08	80% cloud cover, Beaufort Scale = 3, occasional showers, 19-18°C
T2	23.08.2018 19:55 – 21.40	20.10	20% cloud cover, Beaufort Scale = 1, rain from 21.26 until end, 17-15°C
	30.08.208 19.40 – 21.25	19.55	20% cloud cover, Beaufort Scale = 1, dry, 18-16°C
	20.09.2018 18.53 – 20.38	19.08	80% cloud cover, Beaufort Scale = 3, occasional showers, 19-18°C

T5	11.08.2017 04:15 – 05:45	05:45	0% cloud cover, Beaufort Scale = 2, dry, 11-10°C
	25.08.2017 04:37 – 06:07	06:07	20% cloud cover, Beaufort Scale = 1, dry, 11-10°C
T7	24.08.2018 04.33 – 06.18	06.03	0-80% cloud cover, Beaufort Scale = 0, dry, 11-9°C
	20.09.2018 18.53 – 20.38	19.08	80% cloud cover, Beaufort Scale = 3, occasional showers, 19-18°C
T10	20.09.2018 18.53 – 20.38	19.08	80% cloud cover, Beaufort Scale = 3, occasional showers, 19-18°C
	24.08.2018 04.33 – 06.18	06.03	0-80% cloud cover, Beaufort Scale = 0, dry, 11-9°C

2.4 Phase 2 bat activity survey

Bat activity transects

- 2.4.1 In order to provide an assessment of the importance of the site for foraging and commuting bats, dusk activity surveys were undertaken between June and September 2017. Surveyors carrying hand-held bat detectors walked transects of the site, with listening stops at regular intervals for periods of up to 5 minutes. Visual observations of bats and bat call registrations were noted, recording time, location, activity and, where known, species. Recordings of foraging and/or commuting activity made using digital devices were subsequently analysed to determine the identity of any unconfirmed species recorded during the surveys. Times and dates of surveys are given in *Table 2* below, along with weather conditions.

Table 2: Details of bat activity surveys

Date	Sunset	Time	Weather conditions
22.06.2017	21:20	21:20-23:20	80% cloud cover, Beaufort Scale = 1, dry, 17-15°C
27.07.2017	20:57	20:57-22:57	60% cloud cover, Beaufort Scale = 4, dry, 16-15°C
19.09.2017	19:08	19:08-21:08	20% cloud cover, Beaufort Scale = 1, dry, 13-11°C

Automated surveys

- 2.4.2 Automated surveys were carried out as a supplement to the activity transect surveys and to gain further information on the species and frequency of bat activity at the site. A programmable electronic bat detector² was positioned in suitable habitat and left in place on three occasions between June and September 2017. The detector was programmed to record all bat activity. Details of the times and dates of automated bat detector deployment are provided in *Table 3* below and the location of each detector deployed is shown in *Appendix B*.

² Anabat Express

Table 3: Details of automated bat detector deployment

Location *	Deployment and collection date	Sunset/Sunrise	Temp. Max./Min. (°C)
A	30/06/2017 – 01/07/2017	21:20 / 04:56	17 / 15
	01/07/2017 – 02/07/2017	21:19 / 04:56	18 / 16
	02/07/2017 – 03/07/2017	21:19 / 04:57	18 / 14
	03/07/2017 – 04/07/2017	21:18 / 04:58	18 / 12
	04/07/2017 – 05/07/2017	21:18 / 04:59	17 / 14
C	26/09/2017 – 27/09/2017	18:52 / 06:59	18 / 14
	27/09/2017 – 28/09/2017	18:49 / 07:00	16 / 14
	28/09/2017 – 29/09/2017	18:47 / 07:02	17 / 14
	29/09/2017 – 30/09/2017	18:45 / 07:04	15 / 10
	30/09/2017 – 01/10/2017	18:43 / 07:05	15 / 13
	01/10/2017 – 02/10/2017	18:40 / 07:07	16 / 13
	02/10/2017 – 03/10/2017	18:38 / 07:08	12 / 6

* Static detector B deployed between 27th July - 10th August 2017 failed to record.

2.5 Limitations of surveys

2.5.1 The failure of the static detector to record in July 2017 is not considered a significant constraint to the findings of the activity surveys in view of: (i) the static surveys are a supplement to the activity surveys, which were successfully completed across the whole of the survey season with no limitations encountered; (ii) the small size of the site and limited extent of bat foraging habitat in comparison to wider survey area; and (iii) substantially greater recording effort than that required under current guidelines were made at other static recorder locations on what is a relatively small site.

2.5.2 Although periods of rain were experienced on two of the 2017 emergence surveys and two of the 2018 emergence surveys this was not found to have significantly affected levels of bat foraging and commuting activity in the vicinity of the surveyors and is not considered a significant constraint to the findings of the Phase 2 bat surveys.

2.5.3 With due regard to the limitations described above, the suite of bat surveys carried out at the site followed best practice guidelines and were conducted at an appropriate time of

year, under favourable weather conditions and with an appropriate level of survey effort both in terms of the number of surveyors used and number of survey visits undertaken. The level of survey work carried out at the site to date is therefore considered sufficient to inform an assessment of the likely effects of the proposed development on bats and inform the recommendations provided in *Section 5* of this report with regard to the protection of individual bats during works and the maintenance of the favourable conservation status of the local bat population.

3 RESULTS

3.1 Phase 1 building scoping survey

3.1.1 All buildings within the site were inspected during the Phase 1 bat scoping survey. The results of the Phase 1 building survey are summarised in *Table 4* below and the location of the buildings are shown in *Appendix A*. Photograph references relate to the photographs provided in *Appendix C*.

Table 4: Results of the Phase 1 bat scoping building survey

Building	Description	Findings	Bat roost potential
B1 (Photo 1 and 2)	Two storey 'L' shaped residential house with brick and flint walls and a hipped, valley slate tiled roof. The building is connected on its western elevation to B2.	External: Potential bat access opportunities include gaps in the soffit on the western, eastern and southern elevations. Internal: The loft space is split into three voids, two of which were accessible for an internal survey. The roof voids were lined with roofing felt and insulation. No evidence of bats recorded.	Moderate
B2 (Photo 3)	Single storey double garage with brick and flint walls clad with wooden shiplap on the northern elevation. The roof comprises a pitched gable slate tiled roof. The building is connected on its eastern elevation to B1.	External: Potential bat access opportunities include slipped and raised ridge tiles and holes under barge boards on the western elevation. Internal: No loft space present. No evidence of bats recorded.	Moderate

Building	Description	Findings	Bat roost potential
B3 (Photo 3)	Elevated hexagonal 'grain store' with timber framing infilled with bricks and a conical tiled roof.	External: Potential bat access opportunities include gaps and missing tiles, hole in soffit on southern elevation and a slit in the wooden beams on the western elevation. Internal: Internal survey not possible due to health and safety reasons. No evidence of bats recorded.	Moderate
B4 (Photo 4)	Hexagonal garden house with wooden walls and a tiled roof.	External: No suitable features for roosting bats recorded and well lit within. Internal: No loft space present. Roof is lined with underfelt. No evidence of bats recorded.	Negligible
B5 (Photo 5)	Single storey office building with brick and flint walls and a pitched valley slate tiled roof. The roof void has been converted and gable windows are present on the eastern elevation. The building is connected on its western elevation to B6.	External: Potential bat access opportunities include gaps under tiles, hanging tiles around the gable windows, lifted lead flashing and a hole at the gable on the northern elevation. Internal: The roof void has been converted into offices. No evidence of bats recorded.	Moderate
B6 (Photo 6 and 7)	Single storey 'T' shaped office building used for archiving, with brick walls and a flat felt roof. The building is connected on its eastern elevation to B5 and western elevation to B7.	External: Potential limited bat access opportunities include gaps around pipework and in the soffit on the southern elevation and gaps under boards at the top of the wall on the northern elevation. Internal: No loft space present. No evidence of bats recorded.	Low

Building	Description	Findings	Bat roost potential
B7 (Photo 7)	Single storey shed with wooden shiplap and brick and flint walls partially clad with wooden weatherboarding. The roof is pitched and slate tiled. Connected to the southern elevation is a lean-to with partially-open brick walls and a sloped corrugated metal roof. The building is connected on its western elevation to B8 and on its eastern elevation to B6 and B10.	External: Potential bat access opportunities include missing tiles on the western and eastern elevations and gaps in the wooden feather boarding on the southern elevation. Internal: The building is in a state of disrepair with many holes in the roof and walls. The building is open to the rafters, with no loft space present. There is no internal rendering to the property, with many exposed beams and wooden joists. No evidence of bats recorded.	Moderate
B8 (Photo 8)	Single storey shed with corrugated metal walls and a pitched corrugated metal and plastic roof. The building is connected on its eastern elevation to B7 and western elevation to B9.	External: No suitable features for roosting bats recorded, well-lit and subject to temperature variations. Internal: No loft space present. No evidence of bats recorded.	Negligible
B9 (Photo 8)	Single storey shed with corrugated metal walls and a pitched gable corrugated metal and plastic roof. The building is connected on its eastern elevation to B8.	External: Potential bat access opportunities include limited gaps under bargeboards on the northern and southern elevations and gaps under the roof on the western and eastern elevations. Internal: No loft space present. No evidence of bats recorded.	Low

Building	Description	Findings	Bat roost potential
B10 (Photo 9)	Two storey building with brick and flint walls and a pitched, slate tiled roof. Connected to the eastern elevation is a single storey 'L' shaped storage building with brick and flint walls and a pitched valley slate tiled roof. Connected to the southern elevation is a single storey brick building with sections of sloped and flat corrugated metal roofs. The building is connected on its western elevation to B7.	External: Potential bat access opportunities include slipped/missing tiles, and gaps at the apex of the roof, under the eaves and around a pipe on the southern elevation. Internal: The roof is unlined and a false ceiling is present in sections. No evidence of bats recorded.	Moderate
B11 (Photo 10)	Single storey workshop with brick walls clad with corrugated fibreglass on the south-eastern elevation and hanging tiles on the north-eastern elevation. The building is connected on its south-western elevation to B12.	External: Potential bat access opportunities include gaps under hanging tiles and the soffit on the north-eastern elevation. Internal: Internally the roof features a false ceiling, with no loft space present. No evidence of bats recorded.	Moderate
B12 (Photo 11 and 12)	Single storey lean-to with wooden feather boarding walls and a flat corrugated plastic roof. The building is connected on its north-eastern elevation to B11 and on its western elevation to B13.	External: No suitable features for roosting bats recorded. Internal: No loft space present. The building is well-lit and subject to temperature fluctuations. No evidence of bats recorded.	Negligible
B13 (Photo 12)	Single storey animal shed with brick walls and a pitched gable corrugated asbestos roof. Connected to the eastern elevation is a two storey brick building with a pitched corrugated asbestos roof. The building is connected on its eastern elevation to B12.	External: Potential bat access opportunities include gaps in brickwork and above a window, under asbestos roof and under a wooden board. Internal: No loft space present. The roof is lined with wooden boards. No evidence of bats recorded.	Moderate

3.2 Phase 1 tree survey

3.2.1 Although evidence of bats was not identified from any of the surveyed trees during the Phase 1 tree inspections, features suitable for use by roosting bats were identified in 12 trees within the site. *Table 5* details the findings of the Phase 1 tree survey and the locations of the trees are illustrated in *Appendix A*.

Table 5: Results of Phase 1 tree survey

Tree ref	Species	Description of features	Bat roost potential
T1	Oak	Entire stem is decaying resulting in a gap in the bark and a cavity on the northern aspect at 6m.	Moderate
T2	Oak	Two knot holes present on the western aspect at 6m and 8m. Split in a large branch on western aspect at 3m.	High
T3	Oak	Woodpecker hole on north-eastern aspect at 4m. Three knot holes on western aspect.	Moderate
T4	Oak	Split in small limb on western aspect at 6m.	Low
T5	Oak	Three large stem cavities on eastern and western aspects at over 10m. Deadwood in crown.	High (Subsequent to the Phase 1 tree survey, works were undertaken to the tree due to the presence of swarming bees; two of the stem cavities at the top of the tree were removed. The potential of the tree to support roosting bats was subsequently revised following a later visit to moderate)
T6	Oak	Cavity in branch on southern aspect at 6m. Two large holes in stem on northern aspect at 4m and 6m. Two large holes in branch on northern aspect at over 10m. Deadwood in crown.	High
T7	Oak	Knot hole cavity on southern aspect at 4m.	Moderate
T8	Oak	The tree is of sufficient size and age to contain roosting features not visible from the ground.	Low
T9	Oak	Cavity in trunk on northern aspect at 2m. Cavity in trunk on southern aspect at 6m.	Moderate
T10	Oak	Split in branch on eastern aspect at 6m.	Moderate
T11	Oak	Cavity in trunk on eastern aspect at 4m. The tree is of sufficient size and age to contain additional roosting features not visible from the ground.	Moderate

Tree ref	Species	Description of features	Bat roost potential
T12	Oak	Possible knot hole cavity on eastern aspect at 4m. A hole at the base of tree on western aspect. Deadwood in crown.	Moderate

3.2.2 All other trees within the site were assessed as having ‘negligible’ potential to support roosting bats during the Phase 1 bat scoping survey and have therefore not been mapped in *Appendix A*.

3.3 Phase 2 bat roost surveys

3.3.1 The results of the Phase 1 bat scoping surveys were used to determine the requirement for Phase 2 bat roost survey work of buildings and trees where these had the potential to be affected by emerging development proposals. The Phase 2 bat roost surveys took the form of emergence/re-entry surveys of buildings and trees.

3.3.2 In accordance with the current best practice guidelines and the emerging development proposals, ‘high’ potential trees (T2) were subject to three emergence/re-entry surveys, ‘moderate’ potential buildings and trees (B1, B2, B3, B5, B7, B10, B11, B13 and T1, T5, T7 and T10) were subject to two emergence/re-entry surveys, and ‘low’ potential buildings (B6 and B9) were subject to one emergence/re-entry survey. Where emerging survey findings from B3, B5, B7, B10 and B13 indicated that a bat roost may be present, additional surveys were carried out. Details of the dates and times of Phase 2 emergence/re-entry surveys, along with weather conditions and sunset/sunrise times, are provided in *Table 1* above.

3.3.3 Although T3, T6, T9, T11 and T12 were identified as having either high or moderate potential to support roosting bats the emerging development proposals indicated these will be retained and therefore no further surveys of these trees were conducted³.

3.3.4 Two trees within the site were assessed as having ‘low’ potential to support roosting bats (T4 and T8), during the Phase 1 bat scoping survey. In line with current best practise guidelines (BCT, 2016), further surveys of these trees are not required in support of a planning application. However, in the event that retention of a tree identified as having BCT ‘low’ potential to support roosting bats is not possible, the appropriate approach to works is given in *Section 5* below.

3.3.5 All other buildings and trees within the site with the potential to be affected by the development proposals were identified as having ‘negligible’ potential to support roosting

³ Subsequent to completing the 2017 Phase 2 emergence/re-entry surveys, the emerging development proposals were altered, also resulting in the retention of T5 which was subject to Phase 2 roost surveys.

bats and therefore no further survey of these buildings and trees was required in line with current guidance (BCT, 2016).

3.3.6 *Table 6* provides a summary of the results of the Phase 2 bat roost surveys of buildings and trees. Key findings of the Phase 1 survey are also summarised where relevant. Locations of identified emergence/re-entry points described in the table are shown on the 'Bat Roost Survey Summary Plan' in *Appendix A* and photographs of the buildings are provided in *Appendix C*.

Table 6: Results of Phase 2 bat roost surveys

Building/Tree	Type/Date	Results	Updated Roost Status
B1	Dusk 09.08.2017	No emergences/re-entries	'Moderate' bat roost potential
	Dawn 25.08.2017	No emergences/re-entries	
B2	Dawn 11.08.2017	No emergences/re-entries	'Moderate' bat roost potential
	Dusk 24.08.2017	No emergences/re-entries	
B3	Dusk 27.07.2017	Probable emergence of 1 x Common Pipistrelle from under a barge board on the northern elevation.	Probable roost Probable transitional/occasional roost supporting one Common Pipistrelle
	Dawn 10.08.2017	No emergences/re-entries	
	Dusk 26.09.2017	No emergences/re-entries	
B5	Dawn 28.07.2017	Re-entry of 1 x Common Pipistrelle into apex of porch roof on the southern elevation.	Confirmed roost Transitional/occasional roost supporting one Common Pipistrelle and one silent bat (also likely to be Common Pipistrelle in view of the emergence time, observations from other surveys and observations of bat).
	Dusk 24.08.2017	Emergence of 1 x silent bat from apex of porch roof on the southern elevation.	
	Dusk 26.09.2017	No emergences/re-entries	
B6	Dusk 10.08.2017	No emergences/re-entries	'Low' bat roost potential
B7	Dusk 10.08.2017	No emergences/re-entries	Confirmed roost Transitional/occasional roost supporting one Common Pipistrelle and one silent bat (also likely to be Common Pipistrelle in view of the emergence time, observations from other surveys and observations of bat).
	Dusk 24.08.2017	Emergence of 1 x Common Pipistrelle from open doorway on the eastern elevation. Probable emergence of 1 x silent bat from southern area of building.	
	Dusk 19.09.2017	No emergences/re-entries	

B9	Dawn 11.08.2017	No emergences/re-entries	'Low' bat roost potential
B10	Dusk 09.08.2017	No emergences/re-entries	Confirmed roost Transitional/occasional roost supporting up to four silent bats (likely to be Long-eared bats ⁴ in view of the emergence/re-entry times, observations of bats and quiet calls associated with this species group).
	Dawn 25.08.2017	Re-entry of 1 x silent bat under roof tiles on southern elevation. Re-entry of 3 x silent bats into hole in roof on northern elevation.	
	Dusk 26.09.2017	Emergence of 1 x silent bat from hole in roof on northern elevation	
B11	Dawn 28.07.2017	No emergences/re-entries	'Moderate' bat roost potential
	Dawn 25.08.2017	No emergences/re-entries	
B13	Dawn 10.08.2017	No emergences/re-entries	Confirmed roost Transitional/occasional roost supporting one Common Pipistrelle and one silent bat (also likely to be Common Pipistrelle in view of the emergence time, observations from other surveys and observations of bat).
	Dusk 19.09.2017	Emergence of 1 x silent bat from under ridge tile at the apex of the roof on the eastern elevation.	
	Dusk 26.09.2017	Emergence of 1 x Common Pipistrelle from under ridge tile at the apex of the roof on the eastern elevation.	
T1	Dusk 23.08.2018	No emergences/re-entries	'Moderate' bat roost potential
	Dusk 20.09.2018	No emergences/re-entries	
T2	Dusk 23.08.2018	No emergences/re-entries	'High' bat roost potential
	Dusk 30.08.2018	No emergences/re-entries	
	Dusk 20.09.2018	No emergences/re-entries	
T5 *	Dawn 11.08.2017	No emergences/re-entries	'Moderate' bat roost potential
	Dawn 25.08.2017	No emergences/re-entries	
T7	Dawn 24.08.2018	No emergences/re-entries	'Moderate' bat roost potential
	Dusk 20.09.2018	No emergences/re-entries	
T10	Dawn 24.08.2018	No emergences/re-entries	'Moderate' bat roost potential
	Dusk 20.09.2018	No emergences/re-entries	

* T5 was revised from having high to moderate bat roost potential due to works undertaken to the tree due to the presence of swarming bees and was accordingly subject to only two emergence/re-entry surveys.

⁴ Most likely Brown Long-eared bats however the emerging bats were silent, confirmation of call analysis is not reliable in any event, and no droppings were available for DNA analysis.

3.3.7 During the Phase 2 bat roost surveys, confirmed bat roosts were recorded in B5, B7, B10 and B13. A summary of bat roosting activity recorded during the Phase 1 and Phase 2 surveys and the likely status of the roosts present is given below:

- B5:
 - On the first survey visit, one Common Pipistrelle was recorded re-entering the apex of the porch roof on the southern elevation.
 - On the second survey visit, one silent bat (thought to be Common Pipistrelle) was recorded emerging from the apex of the porch roof on the southern elevation.
 - It is therefore considered that B5 supports an active transitional/occasional roost supporting one Common Pipistrelle bat.
- B7:
 - On the second survey visit, a Common Pipistrelle emerged from an open doorway on the eastern elevation. In addition, a probable emergence was recorded of a silent bat (likely Common Pipistrelle) from the southern area of the building.
 - B7 is therefore considered to support an active transitional/occasional bat roost for one Common Pipistrelle and one silent bat (likely Common Pipistrelle).
- B10:
 - On the second survey visit, four silent bats re-entered a hole in the roof on the northern elevation and a tile on the southern elevation. In view of: i) the size and behaviour of the bats, and ii) the quiet nature of Long-eared bat calls; these are expected to be Long-eared bats.
 - On the third survey visit, one silent bat (likely Long-eared bat) emerged from a hole in the roof on the northern elevation.
 - It is therefore considered that B10 supports an active transitional/occasional bat roost supporting up to four Long-eared bats.
- B13:
 - On the second survey visit, one silent bat (likely a Common Pipistrelle) emerged from under a ridge tile at the apex of the roof on the eastern elevation.
 - On the third survey visit, one Common Pipistrelle emerged from under a ridge tile at the apex of the roof on the eastern elevation.
 - It is therefore considered that B13 supports an active transitional/occasional bat roost for one Common Pipistrelle.

3.3.8 During the Phase 2 bat roost surveys, a probable bat roost was also recorded in B3. In summary this comprised:

- B3:
 - On the first survey visit, a probable emergence of a Common Pipistrelle was recorded from under a barge board on the northern elevation.
 - It is therefore considered that B3 is likely to support an active transitional/occasional bat roost for one Common Pipistrelle.

3.4 Phase 2 activity transect surveys

3.4.1 Details of the dates and times of bat activity transect surveys, along with weather conditions and sunset/sunrise times, are provided in *Table 1*. The areas covered during each survey visit included all areas of the site.

3.4.2 A visual summary of bat foraging and commuting activity recorded during the surveys has been provided in *Appendix B*. In total, at least five species were recorded during the transect surveys: Common Pipistrelle, Soprano Pipistrelle, Noctule, Serotine and *Myotis* sp. bats. A summary of each species recorded, their activity and an estimation of numbers using the site during any one survey is provided in *Table 7* below.

Table 7: Summary of bat activity during transect surveys

Species	Activity summary	Approx. number recorded*
Common Pipistrelle	Common Pipistrelle was the most frequently recorded species during the activity surveys. The majority of Common Pipistrelle activity was associated with the woodland located to the north of the site and a group of mature trees in the central and eastern part of the site. Common Pipistrelles were also recorded on a less frequent basis using hedgerows and scattered trees in the remainder of the site. It is estimated that up to 3 Common Pipistrelle bats could have been using the site at any one time for foraging and commuting.	3
Noctule	Noctule was recorded on only three occasions during the transect survey, foraging along hedgerows in the centre of the site and around mature trees in the east of the site. It is likely that the site was used by up to 1 Noctule at any one time during the survey as part of a much larger foraging range for a single /low number of this species.	1
Serotine	Serotine was recorded on only one occasion during the transect survey, in association with the woodland located to the north of the site. It is likely that the site was used by up to 1 Serotine at any one time during the survey as part of a much larger foraging range for a single/low number of this species.	1
Soprano Pipistrelle	Soprano Pipistrelle was recorded on one occasion during the transect survey, in association with woodland located to the north of the site. It is likely that the site was used by up to 1 Soprano Pipistrelle at any one time during the survey as part of a much larger foraging range for a single/low number of this species.	1

<i>Myotis</i> sp.	<i>Myotis</i> species of bat were recorded on only one occasion, foraging around mature trees in the centre of the site. It is likely that the site was used by up to 1 <i>Myotis</i> species of bat at any one time during the survey and it is likely that the site comprises part of a much larger foraging range for a low number of individuals of this species genus.	1
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**This is an approximation of the number of bats of any one species estimated to have been using the site during any one visit.*

3.4.3 The majority of activity recorded within and adjacent to the site during the transect surveys related to Common Pipistrelle bats, with up to 3 Common Pipistrelle bats considered to be using the site at any one time. The majority of Common Pipistrelle activity was recorded along the woodland located beyond the northern site boundary and a group of mature trees in the central and eastern part of the site. Common Pipistrelles were also recorded less frequently using hedgerows and mature trees in the remainder of the site.

3.4.4 Noctule, Serotine, Soprano Pipistrelle and *Myotis* sp. bats were all recorded on an occasional or individual basis. Activity relating to these species consisted of brief passes by single bats foraging or commuting along hedgerows and woodland margins bordering the site and foraging around mature trees within the central and eastern areas of the site.

3.5 Phase 2 automated activity surveys

3.5.1 The dates during which the automated detector was deployed, along with sunset/sunrise times and temperatures are provided in *Table 2*. The locations in which the automated bat detector was placed during each deployment are shown on the plan in *Appendix B*.

3.5.2 The automated detector was placed in three separate locations to give an indication of the species using different areas of the site and relative levels of activity throughout the night⁵. A summary of bat activity recorded during the automated surveys in each location is provided below in *Table 8*. In total, six species or species groups were recorded during the automated surveys; Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Noctule, Long-eared bat and *Myotis*.

⁵ The static detector 'B' deployed between 27th July – 10th August 2017 failed to record; data is subsequently only available for two of the three locations the automated detector was deployed.

Table 8: Summary of bat activity recorded by the automated detector

Location	Activity summary
A	The automated detector at Location A recorded bat activity associated with mature trees in the south-eastern corner of the site. A total of 98 bat passes were recorded over 5 nights; an average of 20 bat recordings per night. Common Pipistrelle was the most frequently recorded species at Location A (79.6% of the bat recordings), with occasional foraging activity recorded during every night. Occasional passes by Long-eared bat and Noctule were also recorded (13.3% and 7.1% of passes respectively).
C	The automated detector at Location C recorded bat activity associated with the on-site managed hedgerow and off-site woodland in the north of the site. A total of 557 bat passes were recorded over 7 nights; an average of 80 bat recordings per night. Common Pipistrelle was the most frequently recorded species at Location C (78.6% of the bat recordings), with occasional foraging activity recorded during every night. Soprano Pipistrelle was the second most frequently recorded species at Location C (16.0% of the bat recordings), with occasional foraging activity recorded during most nights. Occasional passes by <i>Myotis</i> sp., Noctule, Long-eared bat and Nathusius' Pipistrelle were also recorded (2.9%, 1.3%, 1.1% and 0.2% of passes respectively).

3.5.3 In summary, both of the static detectors recorded Common Pipistrelle, Noctule and Long-eared bats. *Myotis*, Soprano Pipistrelle and Nathusius' Pipistrelle were only recorded at Location C.

3.5.4 The highest number of bat passes and diversity of bat species were recorded at Location C. Common Pipistrelle was the most frequently recorded species across the site relating to 78.8% of all bat passes recorded, with all locations being used by foraging bats of this species on at least an occasional basis on each night. Soprano Pipistrelle was the second most recorded species relating to 13.6% of all bat passes recorded, however all recordings relate to Location C with this location being used by foraging bats of this species on at least an occasional basis on most nights. Long-eared bat followed by *Myotis* sp. and Noctule bats were the next most recorded bat species (2.9%, 2.4% and 2.1% of all bat recordings, respectively), with similar patterns of activity to the Common Pipistrelle and Soprano Pipistrelle bats, however at much lower numbers. Nathusius' Pipistrelle was only recorded on one occasion at Location C.

4 EVALUATION

4.1 Bat roosting habitat

Buildings

4.1.1 Bat roosts were confirmed within B5, B7, B10 and B13. In addition, a probable roost was recorded within B3. In summary:

- B3 supports a probable active transitional/occasional bat roost for one Common Pipistrelle bat.
- B5 supports an active transitional/occasional bat roost for one Common Pipistrelle bat.
- B7 supports an active transitional/occasional bat roost for one Common Pipistrelle and one silent bat (likely Common Pipistrelle).
- B10 supports an active transitional/occasional bat roost supporting up to four Long-eared bats.
- B13 supports an active transitional/occasional bat roost for one Common Pipistrelle bat.

4.1.2 No bat roosting activity was recorded during the Phase 2 emergence/re-entry surveys of T1, T2, T5, T7 and T10 and therefore no bat roosts are expected to have been present within these trees at the time of survey.

4.1.3 Only low numbers of bats were recorded using any one roost and the survey results indicate that the roosts are used on a transitory or occasional basis. It is therefore likely that the roosts recorded are low-status non-breeding roosts used by male and/or non-breeding female bats, and in combination the roosts are considered unlikely to be of no more than moderate local interest. Notwithstanding the low status of the bat roosts recorded, the proposed demolition of B3, B5, B7, B10 and B13 conflicts with the nature conservation legislation afforded to bats (set out in *Section 1.3*). Works to the above buildings with potential to affect roosting bats should therefore be carried out under a full European Protected Species Mitigation (EPSM) licence⁶. The licence application would need to be supported by a detailed method statement setting out measures for how individual bats would be protected during construction works and opportunities for roosting bats would be maintained thereby ensuring the continued favourable conservation status of the local bat population. Suitable measures by which this can be achieved are provided in *Section 5* below.

4.2 Foraging and commuting activity

4.2.1 At least seven species of bat were recorded using the site for foraging and commuting, with varying levels of activity observed throughout the surveys. The plan in *Appendix B* provides an overview of bat activity recorded during the surveys.

4.2.2 The majority of activity recorded related to Common Pipistrelle bats, with up to 3 Common Pipistrelle bats considered to be using the site at any one time. The majority of Common Pipistrelle activity was recorded from the woodland located beyond the northern site

⁶ The 'Low Impact Licence' approach only covers small numbers of roost sites which is not the case in this instance.

boundary and a group of mature trees in the central and eastern part of the site. Common Pipistrelles were also recorded less frequently using hedgerows and mature tree habitats in the remainder of the site.

4.2.3 Noctule, Serotine, Soprano Pipistrelle and *Myotis* sp. bat were all recorded on an occasional or individual basis during the suite of surveys. In addition, Long-eared bats and Nathusius' Pipistrelle were only recorded on an occasional basis during the automated detector surveys. Activity relating to Noctule, Serotine, Soprano Pipistrelle, *Myotis* sp., Long-eared bats and Nathusius' Pipistrelle consisted of brief passes by individual bats foraging or commuting along hedgerows and woodland margins bordering the site and foraging around mature trees within the central and eastern areas of the site, suggesting the site forms only a small part of a much wider foraging territory for individuals of these species.

4.2.4 Despite the number of species recorded and the number of bats expected to have been present within the site at any one time, overall the level of bat activity recorded was generally considered to be low, relative to the size of the site, and similar foraging and commuting opportunities are relatively widespread in the wider area. As a whole the site is therefore considered to be of no more than low local interest for foraging bats. This interest largely relates to habitats associated with the off-site woodland located adjacent to the northern site boundary and to a lesser extent the hedgerows bordering the site and mature trees within the central and eastern areas of the site, with the amenity grassland, hardstanding and buildings dominating the site being of no more than site interest for foraging bats.

4.2.5 Notwithstanding the above, development proposals should seek to maintain and, where possible, enhance foraging and commuting opportunities for all species of bats using the site in accordance with nature conservation legislation, planning policy and the 2006 NERC Act. Recommendations to maintain and enhance the value of the site for bats are provided in *Section 5* below.

5 RECOMMENDATIONS

5.1 This section identifies measures to be implemented during development of the site in order to avoid, mitigate and compensate potential impacts on bats, and to maintain the favourable conservation status of the local bat population. In addition, recommendations for enhancement of the site for roosting and foraging bats are included in accordance with 2018 National Planning Policy Framework (NPPF) and the 2006 NERC Act.

5.2 Roosting Bats

5.2.1 The low numbers of Common Pipistrelle and Long-eared bats recorded roosting at the site (and, the low fidelity shown by individual bats to any single roost site) indicate that the recorded roosts are small low-status non-breeding roosts used by male and non-breeding female bats.

5.2.2 The proposed redevelopment of the site will result in the loss of the probable and confirmed roost sites identified in B3, B5, B7, B10 and B13. A European Protected Species (EPS) licence would therefore need to be obtained from Natural England prior to the commencement of any works affecting these roosts. The licence would need to be accompanied by a detailed method statement describing how the favourable conservation status of bats at the site will be maintained, including information on how loss of roost sites will be compensated and timing of works to minimise impacts on bats. Mitigation would centre on:

- Creation of appropriately designed and sited new roosting opportunities for bats, proportionate to those being lost; and
- Implementation of works affecting roost sites at a time of year when bats are least susceptible to disturbance/likely to be present, employing sensitive working practices.

Measures by which this can be achieved are given below. These should be implemented unless otherwise agreed with the local planning authority and/or Natural England.

Replacement of roost sites

5.2.3 A strategy for mitigating the loss of the existing roost sites resulting from the proposed development works is described below. This should be reviewed at an appropriate stage in light of detailed design and/or the findings of updated surveys if appropriate.

Short-term roost replacement and enhancement: tree-mounted bat boxes

5.2.4 Current proposals indicate that the proposed demolition of B3, B5, B7, B10 and B13 will result in the loss of these roosts. Where it is not possible to retain confirmed/probable bat roosts during development works, suitable replacement roosting opportunities should be provided during the construction phase prior to new roosting opportunities being created within the new buildings. The bats recorded roosting at the site are species which have been recorded roosting in both trees and/or bat boxes (University of Bristol, 2005; Schofield and Mitchell-Jones, 2004), with records of bat boxes having been used for successful breeding of Common Pipistrelle and Brown Long-eared bats.

5.2.5 To provide replacement opportunities for bats associated with the identified roost sites prior to construction commencing, 10 bat boxes should be installed on suitable retained trees within the site in the vicinity of the existing roosts. These should be located within

areas away from the proposed construction works. The precise position should be determined through consultation with an appropriately qualified and experienced bat ecologist, but will need to integrate the location of suitable retained trees and habitat connections with avoidance of areas with highest potential future lightspill. Suitable locations exist across the site along woodland edges and on mature trees. Specifically, initial replacement roost mitigation should consist of the following bat boxes or similar as advised by a suitably qualified ecologist:

- 3 Schwegler 1FF boxes⁷;
- 3 Schwegler 2F boxes⁸;
- 3 Schwegler 1FS boxes⁹; and
- 1 Schwegler 1FW hibernation box.

5.2.6 To provide the opportunity for bats to find and utilise new roost sites prior to development, bat boxes should be put in place at an appropriate stage in advance of demolition works commencing.

Long-term roost replacement and enhancement: Crevices and roof voids

5.2.7 The bat boxes described above should be retained on completion of development in order to mitigate for the loss of bat roosting opportunities during the site demolition works. Measures to ensure the long-term availability of roost sites within the proposed development are described below.

5.2.8 Of the bats recorded roosting in the buildings at the site, Common Pipistrelle are considered to be primarily crevice or hole-dwelling bats and Long-eared bats are primarily void dwelling bats (Mitchell-Jones, 2004). To provide replacement roost sites and maintain opportunities for these bats within the completed development, and deliver enhancements to the long-term roosting potential of the site, a number of features suitable for crevice and void dwelling bats should be incorporated into the new buildings.

5.2.9 In order to maintain opportunities for crevice dwelling bat species, a number of features should be incorporated into the new buildings. A list of potential features proportionate to the roosts to be lost to the proposed works is described below:

- A minimum of four dedicated features such as Schwegler 1FR Bat Tubes or 'Habibat' type boxes should be incorporated into south to west-facing elevations of the new buildings;

⁷ In a study conducted by the Vincent Wildlife Trust (Colin Morris, pers. comm.), Schwegler 1FF bat boxes were identified as the box design that attracts the most species of bat, as well as being the most favoured by rare species such as Bechstein's Bat.

⁸ In the same study, Schwegler 2F bat boxes were identified as the box design most likely to contain bats.

⁹ In a study conducted to determine whether Brown Long-eared bats exhibit preferences between five different Schwegler bat boxes, 1FS was preferred during July-October (Dodds and Bilston, 2003).

- A selection of other opportunities for crevice dwelling bats (a minimum of eight) should be provided in a variety of locations on the new buildings. These could include a selection of:
 - 20mm mortar gaps between roof and ridge tiles with localised underfelt providing access at ridge level;
 - Purpose made bat access tiles integrated into the external roof covering;
 - Gaps allowing access into cavity walls; and/or
 - 20mm x 300mm soffit gaps providing access to soffit boxes (using soffit bat boxes if desired) or the internal roof space where appropriate.

5.2.10 A roof void suitable for void dwelling bats should also be incorporated into the design for the new buildings. This will ideally have an apex height in excess of 2.8m and a length and width of 5m or more as detailed in the Bat Mitigation Guidelines (Mitchell-Jones, 2004). Long-eared bats are however known to use smaller roost sites and where this is not possible, the advice of a suitably qualified ecologist should be sought. Four access points should be provided in to the roof void, oriented away from areas of significant lightspill. Access points could include a selection of:

- Modified ridge tiles (e.g. 20mm mortar gaps left between the roof and ridge tile) integrated into the external roof covering with a gap of a minimum of 18mm high and 60mm wide to allow access into the roof void below;
- Bat access tiles integrated into the external roof covering with a minimum gap of 18mm high and 60mm wide, with localised gaps in the roofing felt below to allow access into the roof void below; and
- Bat bricks to provide access into the roof void through the gable end (e.g. Schwegler 2FR bat tube or standard bat brick).

5.2.11 In order to maximise opportunities for bats within the bat loft, the space should be designed and implemented according to the specifications listed below:

- Lightspill onto all the bat loft access points from any external lighting should be avoided;
- Boards fixed to the roofing battens for bats to squeeze behind and pieces of carpet hung in the roof space for bats to hang on to (while maintaining a relatively uncluttered loft cavity); and
- The area should be classified as a 'bat loft' and should not be available as an attic space for the storage of household goods.

5.2.12 Where any features such as crevices and voids for roosting bats are provided in association with roofs of the new buildings, bitumastic (traditional) roofing felt should be used to avoid entanglement of bats.

- 5.2.13 All replacement roost sites should be located away from areas most affected by construction and operational phase noise and lighting. The precise position of replacement roost sites should be determined through consultation with an appropriately qualified and experienced ecologist at the detailed design stage, but would in any case need to integrate the location of suitable retained trees and habitat connections with avoidance of areas subject to significant levels of light spill.

Enhancement of roosting opportunities

- 5.2.14 The proposed redevelopment works would provide opportunity to enhance the value of the site for roosting bats in the long-term in accordance with the 2018 NPPF and the 2006 NERC Act through the provision of additional opportunities for roosting bats to those described above. The detailed design and location of such features would be determined at an appropriate stage prior to construction, but in addition to the mitigation measures described above, consideration should be given to inclusion of additional roosting opportunities including:

- Erection of additional bat boxes on mature trees across the site; and/or
- Creation of additional bat roosting opportunities on new buildings e.g. through the use of bat bricks within the external walls of buildings, accessible roof voids etc. (suitable opportunities are described in *Section 5.2.9 and 5.2.10* above).

- 5.2.15 By providing a variety of roosting opportunities in different locations and orientations within the new buildings, a range of roost spaces with varied microclimates will be provided that will offer long-term roosting opportunities for bats throughout the year.

Approach and timing of works

- 5.2.16 Works affecting confirmed or possible roost sites should ideally be carried out at a time of year when bats are least likely to be present. Long-eared bats may use the same roost site throughout the year and little is known about the hibernation habitats of Pipistrelles. In view of the difficulties in ruling out use of the buildings by small numbers of hibernating bats, works to buildings during the winter hibernation months (November-March) should be avoided, since any bats present during this period may be in torpor and would be particularly sensitive to disturbance. Although the findings of the surveys suggest that only non-breeding bat roosts are present at the site, given that a degree of uncertainty always exists in relation to the exact status of a summer roost, best practice is to also avoid the peak breeding period (June to August) when young bats, unable to fly, may be present.
- 5.2.17 Accordingly, to minimise any adverse impacts, any works affecting B3, B5, B7, B10 and B13 should be conducted during suitable climatic conditions within either the spring (April-May) or autumn (September-October).

- 5.2.18 In the event that works affecting probable or known roost sites are required outside of the timeframe described above then works potentially affecting roosting bats should either: (i) be preceded by an updated survey to confirm the continued absence of a breeding roost (for works between June and August); or (ii) be carried out during periods of mild weather when bats are active with minimum night time temperatures exceeding 7°C for five consecutive nights (for demolition works between November and February).
- 5.2.19 As identified above, bat boxes on nearby mature trees and/or creation of alternative roost sites should be provided in advance of any works commencing.
- 5.2.20 All works involving the removal of features with the potential to conceal roosting bats should be overseen by a licensed bat worker under an Ecological Watching Brief. Potential features may include: roof coverings; roof and ridge tiles; roof timbers; barge boards and weather-boarding. Suitable features should be inspected prior to works commencing and a cautious approach should be employed, particularly in the vicinity of the known and possible roost sites identified, with key features removed by hand where appropriate.
- 5.2.21 Should a bat be encountered during these works, it should be moved by the licensed bat worker to one of the pre-installed bat boxes described in *Section 5.2.5*.
- Trees*
- 5.2.22 No bat roosting activity was recorded during the Phase 2 emergence/re-entry surveys of T1, T2, T5, T7 and T10 and therefore no bat roosts are expected to have been present within these trees at the time of survey.
- 5.2.23 Tree roosting bats can move roosts frequently and individual features may be used sporadically, with little or no sign of occupation outside of these times. All trees containing features suitable for use by roosting bats should therefore be retained wherever possible in order to maximise the current and future value of the site for bats. Where significant loss of future roosting opportunities arises, this should be offset through alternative roost provision elsewhere within the site.
- 5.2.24 Where retention of trees identified as providing opportunities for roosting bats is not possible within the proposed development, due to the transitory nature with which bats may use roost sites in trees it is recommended that felling works are carried out in accordance with the following procedure, including where the 2017/2018 Phase 2 surveys have not identified a roost as being present:

1. Trees suitable for climbing inspections should first be climbed by a licensed bat worker to inspect potential roost sites for bats. In the event that a bat (or evidence of bats) is encountered, and the tree cannot be retained, then felling/works to this tree should be delayed until an EPS licence has been sought and obtained from Natural England prior to soft felling in accordance with the methodology described under point 4 below. In the event that no bats (or evidence of bats) are encountered during an exhaustive search then any features should be 'soft stopped' to prevent occupation prior to felling.
2. Trees with 'high' potential, for which an exhaustive climbed inspection is not possible or practicable should be subject to three emergence/re-entry surveys following BCT best practice guidelines to confirm the absence of roosting bats prior to any works affecting the tree commencing.
3. Trees with 'moderate' potential, for which an exhaustive climbed inspection is not possible or practicable should be subject to two emergence/re-entry surveys following BCT best practice guidelines to confirm the absence of roosting bats prior to any works affecting the tree commencing.
4. 'Low' potential trees that are unsuitable for climbing inspections and/or have not been subject to an emergence survey immediately in advance of works should be 'soft felled' under the supervision of a suitably qualified ecologist. Soft felling involves progressive removal of the tree, using ropes to gently lower sections of tree potentially supporting roosting bats to the ground for inspection by a suitably qualified ecologist. Where appropriate, features should be left on the ground overnight before clearing to allow any bats present to escape.

5.2.25 In the event that a roosting bat is discovered during any of the above works, trimming/felling works must cease and Natural England contacted to agree an appropriate course of action. A licence may need to be applied for, and approved, before works can continue.

5.2.26 All trees requiring felling or pruning during future management of the site should first be inspected for any potential bat roosts present. Should works be proposed to any trees with the potential to support bat roosts, these should first be subject to survey to determine the presence/likely absence of roosting bats in line with the procedure outlined in *Section 5.2.24* above.

Protection of roosting opportunities

5.2.27 The integrity of retained roosting opportunities and replacement roost sites should be secured in the long-term through the maintenance of connections to commuting and foraging habitat and sensitive use of lighting throughout the construction and operational phases (see *Section 5.3* below).

5.2.28 In addition, trees not supporting roosting bats at the time of survey have potential to support bats in the future and therefore these trees should be retained and their ability to support roosting bats maintained where possible. If significant loss of future roosting opportunities arises, this should be offset through alternative roost provision elsewhere within the site.

5.2.29 Bats may occupy roost sites on a seasonal or temporary basis and old roost sites may be abandoned and new roosts occupied within relatively short periods of time. In view of this, where appropriate, Phase 2 bat roost surveys of buildings and trees to be affected by the proposed development should be updated in advance of development commencing. The guidance of a suitably qualified ecologist should be sought to determine if and when surveys should be updated with regard to the development programme. This would ensure that up-to-date information is available to inform the extent of any mitigation and licensing requirements relating to bats.

5.3 Foraging and commuting habitat

5.3.1 The site is considered as a whole to be of no more than low local importance for foraging bats. It is expected to provide only a small area of foraging habitat for low numbers of bats, with the vast majority of activity relating to Common Pipistrelle which is a relatively common and widespread species in the UK. The site is also used by at least another six species on an occasional basis.

5.3.2 A number of the bat species identified at the site (Soprano Pipistrelle, Noctule and likely Brown Long-eared bat) are listed as Species of Principal Importance under Section 41 of the 2006 NERC Act and therefore the effects of development on foraging and commuting habitat are a material consideration in the planning process.

5.3.3 The emerging development proposals indicate that it will be possible to retain the majority of hedgerows and tree lines bordering the site and mature trees within the centre of the site. The development of the site may however result in the loss of limited areas of foraging habitat within the site where buildings and hardstanding takes the place of areas currently dominated by managed grassland, hedgerow and mature tree habitats. Although the amenity grassland areas are currently of limited value for foraging bats and it is expected that the proposed gardens and areas of open space within the site will provide new opportunities for foraging bats as these mature, consideration should be given to the use of pollen and nectar rich species within the formal planting schemes, enhancement of woodland edge and hedgerow habitats, new shrub and tree planting and inclusion of areas of rough and meadow grassland within areas of open space in order to maximise opportunities for foraging and commuting bats following development.

- 5.3.4 The site is currently subject to limited external lighting in association with security lighting on the on-site and off-site residential dwellings. The integrity of retained and new foraging and commuting habitat, both within the site and its surrounds, should be conserved through the sensitive use of lighting throughout the construction and operational phases of the proposed development. In accordance with the Bat Conservation Trust and Institute of Lighting Practitioners guidance (BCT and ILP, 2018) this could be achieved through employment of a selection of the following measures in the vicinity of retained/newly created areas of suitable foraging habitat and in the vicinity of trees and buildings providing opportunities for roosting bats:
- Use only the minimum amount of light required for safety and amenity, and minimise upward reflected light.
 - Avoid use of bare bulbs or upward-pointing lights. The spread of light should be kept near to or below the horizontal.
 - Use narrow spectrum bulbs (between 4000 and 2700k) and/or low UV emitting bulb types.
 - Avoid light-spill into adjacent areas through luminaire design or with accessories, such as hoods, cowls, louvers and shields to direct the light.
 - Minimise the height of lighting columns.
 - For pedestrian lighting, use low level lighting that is as directional as possible and below 3 lux at ground level.
 - Where necessary, use embedded road lights to illuminate roadways and light only high-risk stretches of roads such as crossings and merges.
 - Limit the times that lights are on to provide some dark periods for wildlife and/or use automatic dimmers to reduce lighting outside times of peak use.
- 5.3.5 It is recommended that all detailed external lighting proposals are reviewed at appropriate design stages by a suitably qualified ecologist. This could be secured via a condition of planning consent.
- 5.3.6 Furthermore, in addition to the above measures to maintain opportunities for foraging and commuting bats within and adjacent to the developed areas of the site, the proposed areas of informal public open space will provide opportunities to enhance these areas of the site for bats through the creation and enhancement of meadow grassland, scrub, hedgerow and woodland edge habitats and the creation of new wetland features. In order to maximise future opportunities for foraging and commuting bats within these areas of open space, it is recommended that the following measures are included in the landscape strategy:

- Enhancement of woodland edge habitats through creation of ecotones (a gradation from woodland to scrub to rough grassland habitats), to provide improved foraging opportunities;
- Linear features such as hedgerows and treelines should be retained wherever possible and enhanced through infilling of gaps or provision of complementary scrub and tree planting. Where loss is unavoidable, for example at road or footpath access points, loss should be minimised and compensatory habitat provided at an appropriate location elsewhere;
- Landscape proposals within areas of open space across the site should seek to include high quality habitat for foraging bats. This might include shrub planting, creation of areas of rough and meadow grassland, woodland and marginal vegetation and/or use of native species-rich hedgerows and treelines along boundaries;
- Creation of new wetland habitats including reedbeds, ponds and drains either as stand-alone features or as part of the surface water drainage strategy. These habitats are capable of supporting large numbers of invertebrates, providing a significant foraging resource for bats;
- Maintenance of standing deadwood and decaying trees/branches where safe to do so in order to maintain and encourage future natural opportunities for roosting bats; and
- Securing the long-term integrity of high-quality habitats through inclusion within a long-term management strategy.

5.3.7 The emerging development proposals shown on the *Sketch Layout* (Thrive Architects 2017) show how the above measures can be achieved within the proposed development, and include the retention of the majority of mature trees and creation of a new area of meadow grassland and wetland habitat in the north-east of the site, together with the maintenance of a network of green corridors running across and around the site. In combination with opportunities for foraging bats provided by the gardens of the proposed development, subject to appropriate planting proposals and the sensitive use of lighting, it is considered unlikely that the proposed development would have any significant adverse effect on foraging bats at a local level.

6 CONCLUSION

Roosting bats

6.1 The bat survey work carried out at the site identified a number of roost sites associated with individual/small numbers of roosting bats within buildings which would be affected by the proposed development. These are considered to be low status non-breeding roosts for Common Pipistrelle and Long-eared bats within buildings B3, B5, B7, B10 and B13.

6.2 Although the roosts to be affected by the proposed development works are considered in combination to be of no more than moderate local value, the proposed works must give due regard to the legal protection afforded to all bats, which protects both individual bats and the conservation status of populations.

6.3 Measures to ensure the protection of individual bats during construction works and maintenance of opportunities for roosting bats in the long-term, including provision of a range of new bat roosting opportunities and suitable timing of activities, is described in *Section 5* of this report. The measures described should form the basis of a detailed Method Statement which would accompany an application to Natural England for a licence to permit development works affecting bats.

Foraging and commuting bats

6.4 The site is currently dominated by amenity grassland, hardstanding and buildings of limited value for foraging bats. Although more suitable foraging habitat is provided by the scattered mature trees within the site and the off-site woodland to the north, the site is considered to be of no more than low local interest for foraging bats. Measures are also described for the maintenance and enhancement of current opportunities provided by the site for foraging and commuting bats. These include sensitive lighting design and planting and habitat creation works. It is likely that the measures described could maintain and possibly enhance the value of the site in the long-term for this group.

Summary and conclusion

6.5 Subject to the implementation of the recommendations given in *Section 5*, it is considered that the favourable conservation status of local bat populations would be maintained and, through long-term provision of higher quality roosting and foraging habitat at the site, potentially enhanced. This would ensure compliance with the nature conservation objectives of the EC Habitats Directive, the 2006 NERC Act and the guidance underpinning the 2018 National Planning Policy Framework.

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HDA Document Control and Quality Assurance Record

Project Title: Padnell Grange
Project Reference: 2080.6
Document Title: Bat Survey Report
Commissioning Party: Bellway Homes

Issue	Description	Date of Issue	Signed
1	Bat Survey Report	October 2018	AM

	Personnel	Position
Author	Clare Bird MCIEEM	Senior Ecologist
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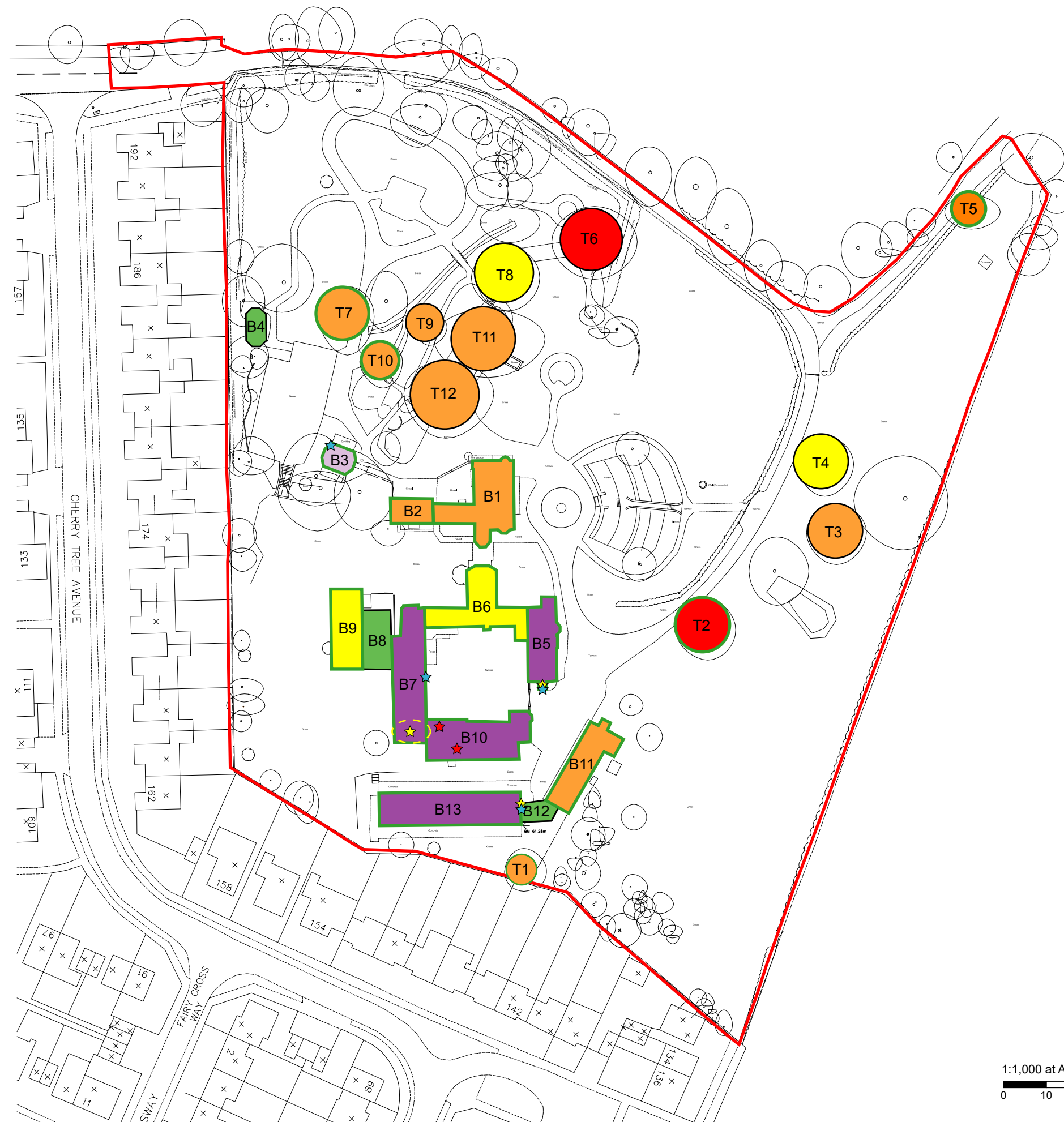
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APPENDIX A

Bat Roost Survey Summary Plan



1:1,000 at A3 - metres:
0 10 20 30 40 50

KEY

- Site boundary
- Tree/building subject to emergence/re-entry survey

BUILDINGS

- Confirmed bat roost
- Probable bat roost
- Moderate bat roosting potential
- Low bat roosting potential
- Negligible bat roosting potential

TREES *

- High bat roosting potential
- Moderate bat roosting potential
- Low bat roosting potential

EMERGENCE / RE-ENTRY SURVEY RESULTS

- Common Pipistrelle
- Unidentified bat - probably Common Pipistrelle
- Unidentified bat - probably Long-eared bat

Roosting categories relate to roost potential in accordance with the BCT 2016 guidelines.

All other trees within the site are regarded as having 'Negligible' potential to support roosting bats.

CLIENT:
Bellway Homes

PROJECT:
Padnell Grange

TITLE:
Bat Roost Survey Summary Plan

SCALE AT A3:
1:1,000

DATE:
October 2018

2080.6 / 05

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Landscape Architecture
Masterplanning
Ecology



SAPPENDIX B

Bat Activity Survey Summary Plan

APPENDIX C

Photographs



Photo 1. Eastern elevation of B1.



Photo 2. Northern elevation of B1 and B2.



Photo 3. North-eastern elevation of B3.



Photo 4. Eastern and southern elevations of B4.



Photo 5. Eastern elevation of B5.



Photo 6. Northern and eastern elevations of B6.



Photo 7. Eastern elevation of B7 and southern elevation of B6.



Photo 8. Southern elevations of B8 and B9.



Photo 9. Northern elevation of B10.



Photo 10. North-western elevation of B11.



Photo 11. Northern elevation of B12.



Photo 12. Eastern and northern elevations of B13 and northern elevation of B12.