



Dapper's Lane, Angmering

Bat Activity Survey



Persimmon Homes

December 2018

WYG, Wharf House, Guildford, GU1 4RP

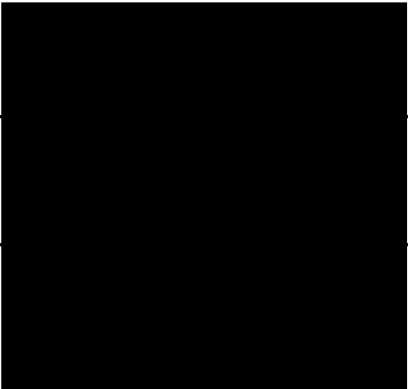
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Contents

Executive Summary	1
Glossary	2
1.0 Introduction	3
1.1 Background	3
1.2 Site Location	3
1.3 Development Proposals	3
1.4 Previous Ecology Reports	3
1.5 Purpose of the Report	3
2.0 Methodology	5
2.1 Field Surveys	5
2.2 Desk Study	5
2.3 Bat Activity - Walked Transects	5
2.4 Bat Activity - Static Detectors	6
2.5 Value of the On Site Bat Populations in a Wider Ecological Context	6
2.6 Limitations	8
3.0 Results	10
3.1 Desk Study	10
3.2 Walked Transect Survey Results	10
3.3 Static Detector Survey Results	12
3.4 Value of Habitats	13
3.5 Results Summary	14
4.0 Planning Policy & Legislation	15
4.1 Revised National Planning Policy Framework	15
4.2 Biodiversity 2020: A strategy for England's wildlife & ecosystem services	15
4.3 Local Biodiversity Action Plan	15
4.4 Local Plan	16
4.5 Relevant Legislation	17
5.0 Discussion	18
5.1 Potential Impacts	18
5.2 Mitigation	19
5.3 Enhancement Measures	20
6.0 Summary	21
7.0 References	22



FIGURES

Figure 1 – Site Location Plan

Figure 2 – Phase 1 Habitat Map

Figure 3a – Transect Route and Static Location – August and September Survey

Figure 3b – Transect Route and Static Location – October Survey

Figure 4a – August Bat Flight Lines and Recording Points

Figure 4b – September Bat Flight Lines and Recording Points

Figure 4c – October Bat Flight Lines and Recording Points

APPENDICES

Appendix A – Report Conditions

Appendix B – Suggested Enhancements



Executive Summary

Contents	Summary
Site Location	The site is located west of Dapper's Lane, north of Angmering in West Sussex, Ordnance Survey grid reference TQ 07189 05174. The majority of the site comprises semi-improved grassland which is heavily grazed by horses, with hedgerow and woodland boundaries.
Development Proposals	The development proposals are not yet finalised however they include the creation of a new residential development (up to 100 dwellings) with associated access, landscaping and open amenity space.
Previous Ecology Reports	WYG undertook an Update Ecology Walkover survey in July 2018. Due to a change in the proposals requiring partial removal of a hedgerow, the survey recommended bat activity surveys based on: • The presence of low quality foraging and commuting habitat on-site and higher quality habitat in the surrounding landscape (woodland); and • The proposals will result in loss of grassland habitat and severance of hedgerows.
Scope of this Survey(s)	WYG was commissioned to undertake three bat activity surveys and three sets of static monitoring surveys (in line with the BCT guidelines for a site of low suitability for foraging and commuting bats). The activity surveys followed a pre-set route with stopping points designed to sample all habitats on site, while the static monitoring surveys sampled the activity of one location over a minimum five night period. The surveys were undertaken in August, September and October 2018 by WYG Ecologists Marc Anderton (Natural England Class 1 Survey Licence number: 2016-27290-CLS-CLS), Harriet Baber and Adam Sela.
Results	The surveys recorded at least eight species of bat using the site. These included common, Nathusius' and soprano pipistrelle, noctule, serotine, brown long-eared bat, a myotis species and barbastelle. The species-poor hedgerow and woodland bounding the site to the north and west were the most frequently used by foraging and commuting bats. The boundary features of the site (hedgerows and woodland) are assessed as having regional value for commuting and foraging bats due to the presence of barbastelle bats. The semi-improved grassland is of less value to bats as it holds little foraging opportunity or linear features for bats to use for commuting.
Recommendations	The following mitigation and enhancements have been suggested within the site: • As much hedgerow to be retained as possible. Like for like replacement hedgerow planting for any hedgerow which is lost. Existing hedgerow and woodland to be protected by at least a 5m buffer of UK native species planting; • A sensitive lighting scheme to reduce light spill to the adjacent hedgerows and woodland; • Construction activity in proximity to the hedgerow and woodland be timed during daylight hours; • Creation of a wild flower meadow with insect boxes; and, • Inclusion of bat boxes on retained trees and within the new houses.



Glossary

BCT	Bat Conservation Trust
CIEEM	Chartered Institute of Ecology & Environmental Management
EPS	European Protected Species
Habitat Regulations	Conservation of Habitats and Species Regulations 2017
LED	Light Emitting Diode
MCIEEM	Member of Chartered Institute of Ecology & Environmental Management
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NPPF	National Planning Policy Framework
EA	Ecological Appraisal
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site(s) of Special Scientific Interest
SxBRC	Sussex Biodiversity Records Centre
UV	Ultra Violet



1.0 Introduction

1.1 Background

WYG was commissioned in August 2018 to complete bat activity surveys to inform the proposed development at Dapper's Lane, Angmering (hereafter referred to as 'the site').

This report has been prepared by WYG Assistant Ecologist Harriet Baber GradCIEEM. This report is suitable to support a planning application for the site.

1.2 Site Location

The site is located west of Dapper's Lane, north of Angmering in West Sussex, Ordnance Survey grid reference TQ 07189 05174 (see Figure 1).

The majority of the site comprises semi-improved grassland which is heavily grazed by horses, with hedgerow and woodland boundaries. Along the western boundary runs a public footpath beyond which lies St. Margaret's C of E Primary School and arable fields, while housing and further horse grazing fields surround all other sides of the site. Beyond this, to the north lies Poling Furze fields woodland.

1.3 Development Proposals

The development proposals include residential redevelopment of up to 100 new dwellings with associated landscaping, access and public amenity space. The main access route will come from Dapper's Lane along the eastern boundary and sever the existing hedgerow to create access and associated visibility splay. In addition, pedestrian access to the existing footpath along the boundary of the site will be created from the site and this will require some removal of the existing hedgerow. The proposals for the site are not yet finalised.

1.4 Previous Ecology Reports

The bat activity surveys were recommended following an Update Ecology Walkover Survey (WYG, 2018^a) completed in July 2018, which identified the existing habitat within the site as having a **low value** for foraging and commuting bats on site (see Figure 2 for Phase 1 Habitat Plan).

1.5 Purpose of the Report

The aims of the survey work and the subsequent report presented here are to:

- Undertake bat activity surveys to gain an understanding of bat species assemblage and activity levels on site;
- Outline the legislative protection given to bats, and relevant planning policy;
- Assess the potential ecological constraints to the proposed development at the site relating to bat species and recommendations for further survey, avoidance, mitigation and enhancement where appropriate.



Note that scientific names are provided at the first mention of each species and common names (where appropriate) are then used throughout the rest of the report for ease of reading.



2.0 Methodology

2.1 Field Surveys

All survey methods were carried out in-line with standard practice guidance produced by the Bat Conservation Trust (Collins, 2016), with the exception of the survey timings which did not sample all three seasons. Please see Section 2.4 for further information.

2.2 Desk Study

2.2.1 Local Ecological Records Centre

Information was requested from the Sussex Biodiversity Records Centre (SxBRC) for any records of bats within 2km of the boundary of the site, or any protected sites designated for bats within 2km. Local records were obtained in 2014.

2.2.2 Online Resources

The MAGIC website (managed by DEFRA) was consulted for records of any granted EPS licenses for bats within 2km of the site and any designated sites within 2km supporting bats. The search was conducted in November 2018.

2.3 Bat Activity - Walked Transects

The site was appraised for its suitability to support foraging and commuting bats during the Ecological Appraisal in July (WYG, 2018^a) and was considered to have **low** quality habitat for foraging and commuting bats. With reference to best practice guidelines (Collins, 2016), three transect surveys were carried out.

The walked transect surveys began at sunset and continued until 2 hours after sunset or began 2 hours before dawn and finished at dawn. Table 1 summarises the survey times and weather conditions of the walked activity surveys undertaken.

Table 1: Date, timings and weather conditions for walked transects

Date of Survey	Start	Sunset/ Sunrise	Finish	Temp (°C)		Precipitation	Wind (Beaufort Scale)	Cloud (%)
				Max	Min			
21/08/18	20:11	20:11	22:11	19	17	None	2	0
25/09/18	04:52	06:52	06:52	5	5	None	0	0
17/10/18	18:06	18:06	20:06	15	14	None	1	100

The transect route (Figure 3a and 3b) was designed to sample representative habitats within the site including the species-poor hedgerow and scrub. The surveyors walked at a steady pace and paused at 'stopping points'. For the third survey, the transect route was updated to include one grassland field to the north to reflect a change in the red line boundary for the site.



A series of 'stopping points' (see Figure 3a and 3b) were located at pre-defined positions along the transect route. These comprised five minute stops during which any bat foraging and/or commuting activity was recorded. The nature of the bat activity was recorded along with the direction in which the bat was travelling (if the bat was observed). The surveyors also recorded any activity heard or seen during the walking sections between stops.

Any bats recorded were identified to species (where possible) and recorded on a field map. Many of the calls were heard without being seen due to the position of the bat and the lack of light. The calls were recorded on Elekon Batlogger M detectors and all calls were then analysed where necessary using 'Bat Explorer' version 2.0 software to allow identification to species or genus level (Russ, 2012).

2.4 Bat Activity - Static Detectors

One Anabat Express bat detector location was used to sample bat activity, distribution and species across the site (see Figure 3a and 3b). The static detector was placed at the location before dusk and was retrieved during the daytime after at least five nights of consecutive recording. The location for the static survey was identified within the species-poor hedgerow along the western boundary (TQ 07001 05107) in line with recommendations for a site of low value for foraging and commuting bats (Collins 2016). The area selected as it was representative of the habitats most likely to be utilised by foraging and commuting bats. Prior to deploying the static detector, a five day weather forecast was consulted to check that it would sample during suitable weather conditions. Although more than five days were collected on some occasions, only the first five days were analysed to prevent bias. Table 2 presents the static detector survey timing and weather details.

Table 2: Summary of static bat detector survey locations

Month & Year	Date Static Deployed	Date Static Retrieved	Average Weather
August 2018	21/08/18	31/08/18	18°C and dry
September 2018	19/09/18	24/09/18	18°C and dry
October 2018	17/10/18	23/10/18	12°C and dry

2.5 Value of the On Site Bat Populations in a Wider Ecological Context

The assessment of the value of the bat population on site is based on the article in the Institute of Ecology and Environmental Management (IEEM) In Practice magazine – Valuing Bats in Ecological Impact Assessment, No. 70, December 2010 (Wray *et al.*, 2010). Where bats (species and number) are found using certain habitats (to roost, commute or forage) their population is assigned a relative ecological value. The value to the species is partly based upon how well used a habitat is and also upon how rare the bat species is. In the case of commuting routes or foraging areas, the number of roosts nearby is also a factor. Once the value of the bat population has been calculated, robust mitigation for any impact on the bats can be determined.

British bat species have been subdivided into groups, dependant on how common they are: common, rarer and rarest. These have been further subdivided based upon the location surveyed. Table 3 presents the rarity categorisation of bats in England. The tables in the following sections have been adapted from Valuing Bats in Ecological Impact Assessment (Wray *et al.*, 2010).

**Table 3: Categorising bats by distribution and rarity in England**

Rarity	Country
	England
Rarest	Greater horseshoe <i>Rhinolophus ferrumequinum</i> Bechstein's <i>Myotis bechsteinii</i> Alcathoe <i>Myotis alcathoe</i> Greater mouse-eared <i>Myotis myotis</i> Barbastelle <i>Barbastellus barbastella</i> Grey long-eared <i>Plecotus austriacus</i>
Rarer	Lesser horseshoe <i>Rhinolophus hipposideros</i> Whiskered <i>Myotis mystacinus</i> Brandt's <i>Myotis brandti</i> Daubenton's <i>Myotis daubentonii</i> Natterer's <i>Myotis nattereri</i> Leisler's <i>Nyctalus leisleri</i> Noctule <i>Nyctalus noctula</i> Nathusius' pipistrelle <i>Pipistrellus nathusii</i> Serotine <i>Eptesicus serotinus</i>
Common	Common pipistrelle <i>Pipistrellus pipistrellus</i> Soprano pipistrelle <i>Pipistrellus pygmaeus</i> Brown long-eared <i>Plecotus auritus</i>

To calculate the score for either commuting routes or foraging areas, the numerical values from each column below are added together. These are detailed in Tables 4 and 5.

Table 4: Valuing commuting routes

Species	Number of bats	Roosts/potential roosts nearby	Type and complexity of linear features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts or close to a SSSI (5)	Well grown and well connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table 5: Valuing foraging areas

Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)



Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
-	-	Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts or close to a SSSI (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

Finally, for commuting routes and foraging areas, the ecological value of the site is based upon the following scoring system (Table 6).

Table 6: Scoring system for valuing commuting and foraging bats

Geographic frame of reference	Score
International	>50
National	41-50
Regional	31-40
County	21-30
District, local or parish	11-20
Not important	1-10

2.6 Limitations

The Anabat static monitoring device provides no indication as to the number of bats present on a site as recorded bat calls could be from one bat making repeated passes or multiple bats making fewer passes. The Anabat recorded for more than five nights on some occasions, to prevent a skew in the data, only the first five consecutive nights was analysed from each survey.

Due to the proposed timings for the planning application submission, it was not possible to survey all three seasons (Spring, Summer and Autumn). Two out of the three seasons were surveyed (summer and autumn). This limitation, and potential skew in the data, has been taken into account when interpreting the results and is not considered to significantly impact the robustness of the conclusions of this report, especially considering that the majority of the development will impact low quality habitat.



The dusk bat activity walked transect surveys were completed in optimum weather conditions, however during the dawn survey (September 2018) the temperatures unexpectedly fell to 5°C, which is considered to be less suitable for bats as they tend to avoid hunting at low temperatures. Although, very low levels of bat activity were still recorded this is considered a limitation to the assessment as this survey is unlikely to reflect true activity on site at this time. Due to the transect being undertaken in late September, it was not possible to repeat the September survey transect, therefore this limitation is taken into consideration in the conclusions.

Due to a change in the site red line boundary, the first two surveys did not cover the northern section of the site. As the distance between the walked transect and the northern boundary is less than 80m, it is thought likely that most bats will still have been recorded, although quieter calling bats may have been missed. This has been taken into account when interpreting the data.

The surveys were completed with the assistance of bat detectors. All survey techniques are subject to bias, and bat detector surveys may under-record species with weak echolocation calls, such as brown long-eared bats. However, these biases were considered when interpreting the results. (It is also of note that Batloggers are very effective at picking up quiet calls from brown long-eared bats). Some bat calls are variable and extremely similar between species. Where identification to species level was not possible (for example in the *Myotis* genus), bats were identified to genus level (e.g. *Myotis* sp.).

The details of this report are considered to remain valid for a period of 18 months (until May 2020), subject to no significant changes in the development proposals. Beyond this period, if works have not yet been undertaken, it is recommended that a review of the ecological conditions is undertaken.



3.0 Results

3.1 Desk Study

SxBRC provided records for up to ten species of bat including unidentified bats (Chiroptera) nine records of unidentified pipistrelle bat, common pipistrelle, soprano pipistrelle, an unidentified long-eared bat and brown long-eared bat, a serotine bat, and Natterer's Bat. The closest record is for an unidentified pipistrelle roost approximately 0.3 km south of the proposed development site; this record is for a maximum count of 148 bats.

No EPSL for bats were found within 2km of site.

3.2 Walked Transect Survey Results

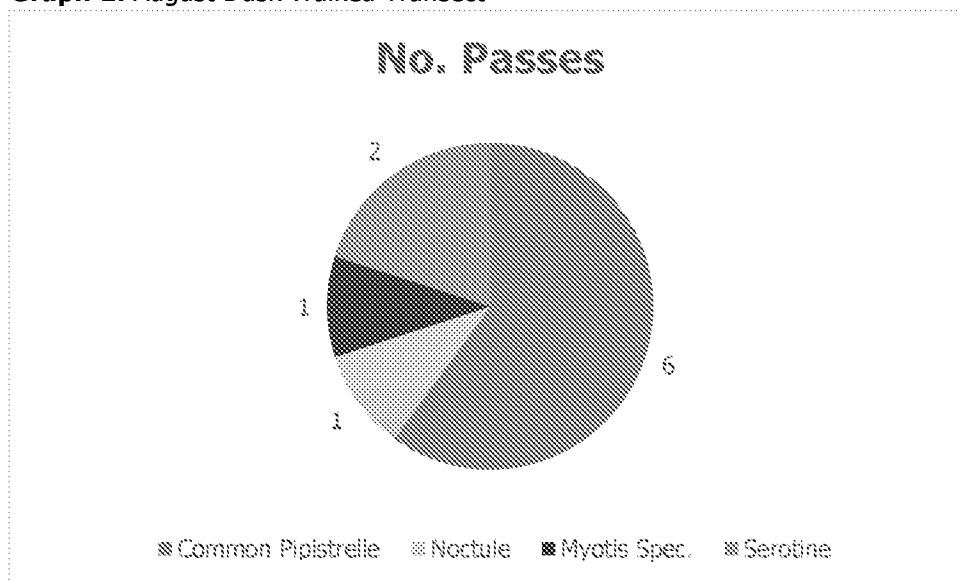
The foraging and commuting lines and by bats and recording locations are displayed in Figure 4a to 4c. Overall, most activity across the three surveys was concentrated around the margins of the fields, where the hedgerows and woodland are located.

3.2.1 Dusk - 21st August 2018

At least four species of bat – common pipistrelle, noctule, serotine and a myotis *Myotis* species were recorded during the survey (see Figure 4a and Graph 1), with common pipistrelle being the most frequently recorded species. Common pipistrelles were recorded sporadically throughout the survey from 21:03 (52 minutes after sunset) through to 21:49, other species included two serotines, one noctule and one myotis. Activity was recorded between 20:44 (33 minutes after sunset) and 21:57, with no bats observed during the survey (they were all heard on the bat detector) this is likely due to bat activity beginning after dark, making harder for surveyors to see bats. All activity during the survey was recorded along the hedgerows, with the exception of the noctule recording which was recorded in the centre of the northern parcel, although as noctules commute high overhead this is not unexpected.



Graph 1: August Dusk Walked Transect

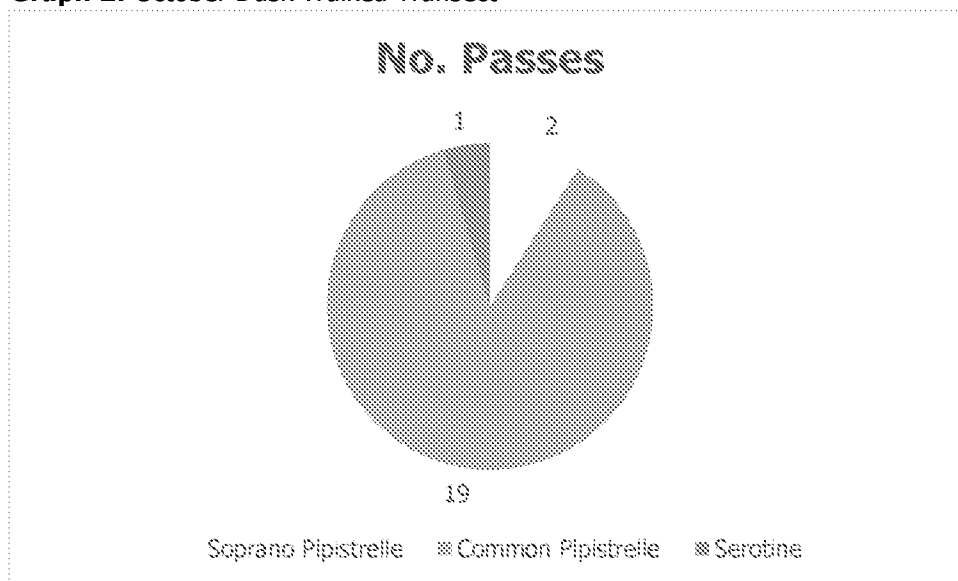


3.2.2 Dawn - 25th September 2018

One species of bat, barbastelle, was recorded during the survey when the surveyor was in the middle of the grassland in east of the site (see Figure 4b). This was recorded at 05:18 (1.5 hours before sunrise) and was heard only. Due to the bat logger GPS system, although the bat was recorded while surveyors were within the grassland field, there is potential that the bat was commuting along one of the boundaries. No graph has been produced for this survey as only one species of bat was recorded during this survey.

3.2.3 Dusk - 17th October 2018

Three species of bat – serotine, common pipistrelle and soprano pipistrelle were recorded during the survey (see Figure 4c and Graph 2). Low activity levels of both soprano and serotine were recorded foraging between 18:42 and 19:08 (36 minutes to 65 minutes after sunset), with continuous low levels of common pipistrelle activity from 18:32 till 19:36 (26 minutes to 90 minutes after sunset). The activity was concentrated along the field margins across the site with a large number of common pipistrelle recorded near the woodland on the northern site boundary.

**Graph 2: October Dusk Walked Transect**

3.3 Static Detector Survey Results

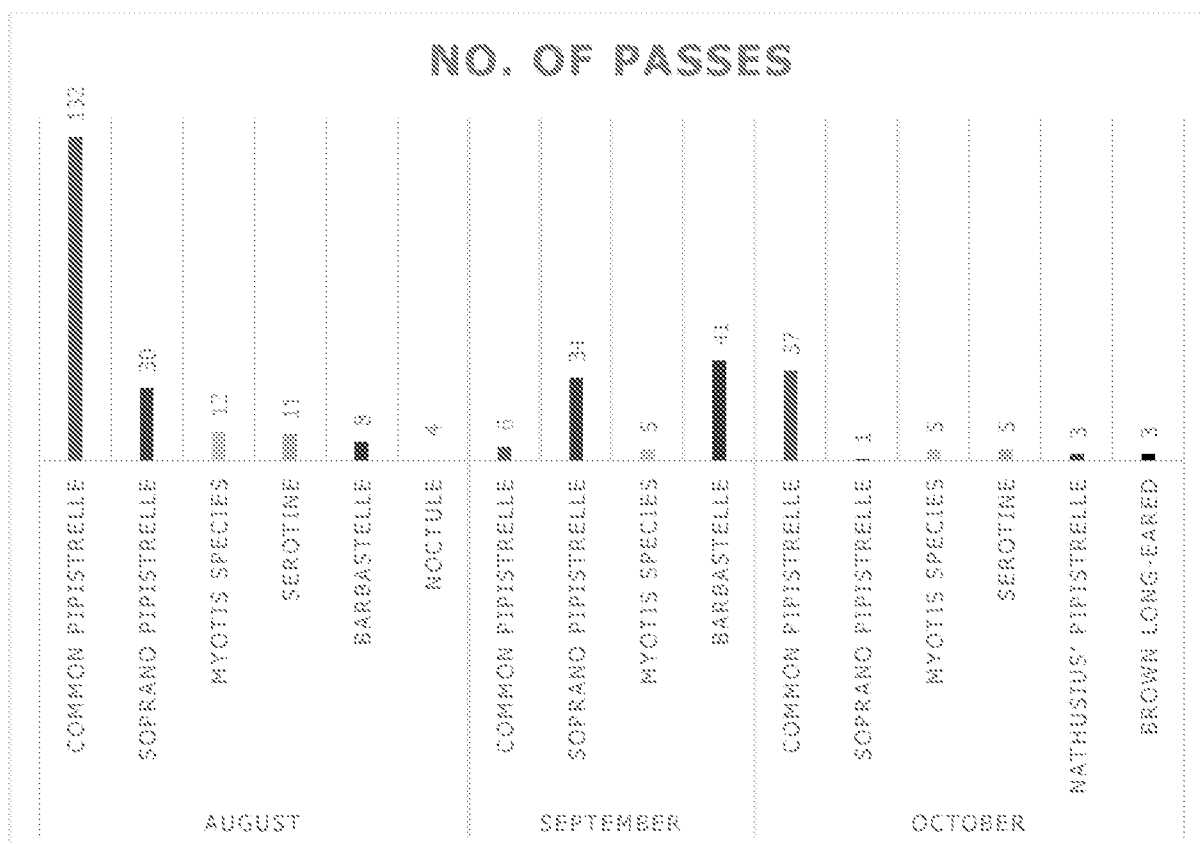
At least eight species of bat were recorded during the static detector automated surveys: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, serotine, noctule, brown long-eared, barbastelle and Myotis species. Common pipistrelles were most frequently recorded in August and October, although in September barbastelle was most frequently recorded. Soprano pipistrelle, myotis species and serotine were recorded less frequently and noctule, Nathusius' pipistrelle and brown long-eared were only recorded rarely.

Tables 7 and Graph 3 below summarise the results of the automated activity surveys.

Table 7: Automated activity survey results

Month	Species	No. of Passes
August	Common Pipistrelle	132
	Soprano Pipistrelle	30
	Myotis species	12
	Serotine	11
	Barbastelle	8
	Noctule	4
September	Common Pipistrelle	6
	Soprano Pipistrelle	34
	Myotis species	5
	Barbastelle	41
October	Common Pipistrelle	37
	Soprano Pipistrelle	1
	Myotis species	5
	Serotine	5
	Nathusius' Pipistrelle	3
	Brown Long-eared	3

Graph 3: Static Results – All Months



3.4 Value of Habitats

Value of Commuting and Foraging Habitat for bats

Based on data collection and following the CIEEM (2010) guidance (Wray *et al.*, 2010), the boundary habitats, such as the hedgerow and woodland, on site are of **Regional** importance for commuting and foraging bats. When making this evaluation the wider landscape has been taken into account.

- Commuting = Rarest (20) barbastelle + individual bats (5) + moderate number/ not known (4) + isolated well grown hedgerows, and moderate field sizes (3) = 32, regional importance (between 31-40 points)
- Foraging = Rarest (20) barbastelle + individual bats (5) + moderate number/ not known (4) + Suburban areas or intensive arable land (2) = 31, regional importance (between 31-40 points)

While the site has been given **Regional** value due to the presence of barbastelle, it should be noted that this method of valuation only gives a general context for the whole site and does not take into account which features within the site are of particular importance. In this instance, it is the hedgerows and woodland along the site boundary which have the highest value. During the surveys, no bats were recorded along the eastern boundary, which is poorly connected to the rest of site. In addition, the well grazed grassland habitat in the centre of site is much less suitable for bats than the



hedgerow and woodland along the northern and western boundaries, and therefore has a lower value to bats.

3.5 Results Summary

At least eight bat species including common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, serotine, noctule, brown long-eared, barbastelle and *Myotis* bat species were all recorded on site during both the static and walked transect bat activity surveys.

The walked transect survey results indicated that the most regularly used habitats by foraging and commuting bats are the boundary hedgerow and woodland habitats which bound the site along the northern and western boundaries. Only low levels of activity were recorded within the central areas of the site with very little activity over the areas of semi-improved grassland. This suggests that these areas are not used extensively by foraging or commuting bats.

Over the survey period, September appears to be the most important month for barbastelle movement, as shown by the peak counts during the surveys. This may be due to movement of juvenile bats or males moving for mating purposes.

The site holds features of **Regional** importance for foraging and commuting bats. This value rating has been determined mainly due to the presence of barbastelle bats on site. The important features (and features of most value) are the boundary hedgerows and woodland, specifically along the northern and western boundaries. The semi-improved grassland in the centre of the site holds much less value as there is little foraging opportunities and no linear features for commuting bats.



4.0 Planning Policy & Legislation

4.1 Revised National Planning Policy Framework

The revised NPPF was issued on 24th July 2018 and currently supplements government Circular 06/2005, *Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System*.

Circular 06/2005 states that the presence of protected species is a material consideration in the planning process. Paragraph 107 of the NPPF also states that '*Planning policies and decisions should contribute to and enhance the natural environment by:*

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)*
- b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland*
- c) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*
- d) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

4.2 Biodiversity 2020: A strategy for England's wildlife & ecosystem services

Biodiversity 2020 replaces the previous UK Biodiversity Action Plan and sets national targets to be achieved. The intent of Biodiversity 2020, however, is much broader than the protection and enhancement of less common species, and is meant to embrace the wider countryside as a whole.

The priority species and habitats considered under Biodiversity 2020 are the SPI & HPI detailed under NERC Act.

4.3 Local Biodiversity Action Plan

Local Biodiversity Action Plans (LBAPs) identify habitat and species conservation priorities at a local level (typically County by County) and are usually drawn up by a consortium of local Government organisations and conservation charities. Although they are no-longer managed at a national level many are still reviewed and updated at a local level.

The Sussex LBAP is the relevant document for this site, it is in line with UK Biodiversity Action Plan, and it contains the following species within the Species Action Plans:

**Table 8: LBAP SAPs**

Species Action Plans	
Bechstein's Bat <i>Myotis bechsteinii</i>	Barbastelle Bat
Brown Long-eared Bat	Greater Horseshoe Bat <i>Rhinolophus ferrumequinum</i>
Soprano Pipistrelle	Noctule Bat

It should be noted that the existence of a SAP or HAP does not always infer an elevated level importance for those features. These plans may be designed to encourage an increase in these habitats/species, rather than to protect a county-scarce feature (for example).

4.4 Local Plan

The Arun Local Plan 2011-2031 was adopted in July 2018 and replaces the 2003 Arun Local Plan. The wish of the council is to *"plan for climate change and work in harmony with the environment to conserve natural resources and increase biodiversity"*. The policies of relevance to the site and bats are:

Policy ENV SP1 – Natural Environment

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

Policy ENV DM3 – Biodiversity Opportunity Areas

Development shall:

- ✧ *Retain and sympathetically incorporate locally valued and important habitats, including wildlife corridors and stepping stones*
- ✧ *Be designed in order to minimise disturbance to habitats*

Development proposals that do not reasonably address opportunities for enhancing these through their design, layout and landscaping or access/management shall not be permitted. Where a development scheme would result in habitat loss, mitigation measures will be proposed as part of the proposed scheme and such measures agreed with the Local Planning Authority prior to the determination of any planning application...

Policy ENV DM5 – Development and Biodiversity

Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. The shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on



existing habitats (whether designed or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement.

Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licenced person.

All developments shall have regard to Natural England's standing advice for protected species.

4.5 Relevant Legislation

All British bat species are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and under Schedule 2 of the Conservation of Habitats and Species Regulations 2018 as European protected species. Furthermore, the Countryside and Rights of Way Act 2000 (Schedule 12, Paragraph 5) has amended Section 9 of the 1981 Act.

This makes it an offence to:

- » Deliberately capture, injure or kill any bat;
- » Deliberately disturb bats, in particular where it is likely to:
 - Impair their ability to breed or reproduce, or to rear or nurture their young;
 - Impair their ability to hibernate or migrate; or
 - Affect significantly the local distribution or abundance of bats.
- » Intentionally or recklessly damage, destroy or obstruct the access to the place of shelter or protection; and
- » Damage or destroy a bats breeding site or resting place.

The effects of development proposals should be considered when assessing the impact of the maintenance of favorable conservation status of local bat populations, especially those mentioned under Section 41 of the NERC Act. The presence of these species is a material consideration in determining a planning application and it is therefore appropriate for the LPA to ensure that these species are not adversely affected by development.

Unmitigated removal of linear corridors such as sections of hedgerows and increases in habitat disturbance (through lighting, noise and vibration impacts) during construction and operational phases of a proposed development could indirectly impact bats that use the site to forage and commute.



5.0 Discussion

The development proposals are not yet finalised. Impacts and mitigation and enhancement recommendations should be reviewed once the proposals have been finalised.

5.1 Potential Impacts

The development proposals include residential redevelopment of up to 100 new dwellings with associated landscaping, access and public amenity space. The main access route will come from Dapper's Lane along the eastern boundary and sever the existing hedgerow to create access and associated visibility splay. In addition, pedestrian access to the existing footpath along the boundary of the site will be created from the site and this will require some removal of the existing hedgerow. The most regularly used commuting and foraging corridors were along the species-poor hedgerow and the edge of the woodland along the northern and western boundaries.

The areas which will be affected most by the proposals are the eastern boundary and semi-improved grassland. Neither of these areas received much bat activity, with no activity recorded along the eastern boundary. The eastern boundary is also poorly connected to the most used commuting routes, meaning it is unlikely to be utilised by bats.

The commuting and foraging habitats have been assessed as having **Regional** importance for bats, particularly due to the presence of barbastelle on site, with highest levels of commuting noted in September. The habitats which specifically hold this level of importance are the boundary habitats, such as the hedgerows and woodland on the northern and western boundaries. The impacts on these boundary habitats by the proposals will be relatively minimal, so these commuting and foraging corridors will still be accessible for bats upon completion of the development.

The woodland along the northern boundary will be retained and the majority of the hedgerow habitats will be retained. However, a small amount of both the western hedgerow and eastern hedgerow will be removed to facilitate the new access road and pedestrian link to the existing public footpath. The majority of grassland habitat will be lost to residential development however public amenity space is proposed in the northern boundary of the site therefore some grassland habitat will be present within the site.

5.1.1 Foraging Habitat Loss

The hedgerows and woodland provide the most suitable features for foraging and commuting bats, holding **Regional** importance, with the semi-improved grassland providing the least suitability, this is supported by the results from the survey.

Barbastelles hunt along border structures (Gunnell, et al 2012) and therefore the loss of grassland and open habitat is less likely to impact barbastelle.

5.1.2 Hedgerow Severance

The eastern hedgerow will be severed by a gap of roughly 20m to facilitate an access road and visibility splay while the western hedgerow will also be severed to allow for a pedestrian link on to the public footpath. Bats tend to avoid gaps of up to 10m, therefore, there will be an impact on foraging and commuting bats along these hedgerows.



5.1.3 External Light Spill

External lighting can act as a barrier and disrupt flight paths and restrict access to otherwise suitable habitat. Sensitive lighting is required to reduce potential impacts on bats, particularly along the boundary hedgerow habitats and woodland.

Avoidance and mitigation recommendations to offset the potential development impacts are provided in the following section.

5.2 Mitigation

5.2.1 Hedgerow Severance: Hop Over

On areas where the hedgerow is to be severed to allow for access, creation of hop overs between trees is recommended, gaps should be no more than 10m. This can be done using the existing canopy to create a continuation of the hedgerow. In addition, planting more trees / shrubs within the area where the hedgerow is to be severed will also help to create a continuous corridor for commuting and foraging bats.

5.2.2 Compensation of Habitat Loss

The current hedgerow should be enhanced through planting of native species to thicken the hedgerow by creating a buffer of at least 5m. It should be noted that at least a 5m buffer will be required for dormice (which are present within the site) along the hedgerow and woodland in the north and west of site (WYG, 2018^b), this will also be suitable for foraging and commuting bats. Within the site plans an amenity grassland space will be placed, this will act as an area in which invertebrates can breed, providing food for the bats.

5.2.3 Sensitive Lighting

Any new lighting should be carefully designed to minimise disturbance to foraging and commuting bats in the nearby areas, particularly along the western and northern hedgerow and woodland (Emery, 2008; BCT, 2009; ILP, 2018). A sensitive lighting strategy is recommended for the site (some considerations are outlined below).

- External lighting should be avoided along the hedgerows and new lighting should only be installed where it is absolutely necessary.
- Consideration of newly available lighting technology to minimise impacts on bats, i.e. use of traditional low pressure sodium lamps (as opposed to high pressure sodium, mercury, and white SON), as these have been shown to have the least impact on bats (as well as invertebrates) as they emit no UV light (which attracts invertebrates). LED lighting also emits little UV light and these lamps can be programmed to switch off, or dim at certain times (however white LED have been shown to disturb slow flying bat species).
- Minimising light spill by directional lighting to prevent upward light spill, such as using hoods or cowls to direct light below the horizontal plane (ideally at an angle less than 70 degrees).
- Reducing the height of lighting columns as light at low levels reduces impacts these lights should be designed to be as low to the ground as possible (specifically not above 8m).
- Consideration as to whether lights can be switched off at night or put on motion sensors (particularly during the months of April to October, inclusive when bats are active) to provide dark periods.



Lighting design software and professional lighting designers should be instructed to produce a lux contour plan (which predicts where light spill will occur within the site and changes in light lux level). These predictions can then be used to adapt the design to achieve the most sensitive scheme. Particular care should be taken to reduce lighting on areas where the hedgerow has been removed to prevent discouraging bats further.

5.2.4 Construction timings

It is advised that **no external** night time working is undertaken between the months of April to October, inclusive (during the bat active season). Furthermore, if security lighting is necessary, lights triggered by motion sensors should be used and their coverage should be kept to a minimum.

5.3 Enhancement Measures

In line with national planning policy and the Arun Local Plan the site should be enhanced for bats, the following is recommended.

5.3.1 Artificial roost provision

Additional measures to enhance the site for bats should include the provision of artificial bat roosts, which can be attached to suitable trees that are being retained or built into the new houses. A total of five artificial roost units / boxes should be used (see Appendix B), these should be varied to encourage a range of species and placed facing different aspects to create a range of temperatures.

5.3.2 Wild Flower Meadow

Along with the new hedgerow planting, areas should be set aside as wild flower meadows with insect boxes placed within them. This will provide habitat for foraging bats food sources, such as moths, creating an increased foraging area for bats in the area. This can be created within the open green space currently proposed within the northern section of site.



6.0 Summary

Survey results have indicated that the areas regularly used by foraging and commuting bats are the species-poor hedgerow and woodland located along the northern and western boundaries.

These boundary habitats have been assessed as having **Regional** importance due to the presence of barbastelle bats, while the semi-improved grassland in the site centre and eastern boundary habitats are less frequently used and have less value to bats.

The development proposals are not yet finalised. As such, impacts and mitigation and enhancement recommendations should be reviewed once the proposals have been finalised.

The following mitigation is recommended:

- ✦ The species-poor hedgerow will be mostly retained and enhanced with native species planting. It is recommended that a buffer of at least 5m is created; and
- ✦ A lighting strategy will be devised, with the aim of no net-increase of light on retained species-poor hedgerows / woodland.

The following enhancements have been suggested:

- ✦ 5 artificial roosts provided such as bat boxes on retained trees and within proposed buildings; and
- ✦ A wild flower meadow with insect boxes could be created in the amenity area proposed for the northern part of the site.

The details of this report will remain valid for a period of **18 month** from the date of the last survey, after which the validity of this assessment should be reviewed to determine whether further updates are necessary. Note that the recommendations within this report should be reviewed (and reassessed if necessary) should there be any changes to the red line boundary or development proposals which this report was based on.



7.0 References

- ✧ Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*, (3rd ed), The Bat Conservation Trust: London.
- ✧ Gunnell, K., Grant, G. and Williams, C. (2012) Landscape and urban design for bats and biodiversity. Bat Conservation Trust
- ✧ Institute of Lighting Professionals (ILP) (2018). Bats and artificial lighting in the UK: Bats and the Built Environment series. Guidance Note 08/18
- ✧ Ministry of Housing, Communities & Local Government (2018) National Planning Policy Framework.
- ✧ ODPM, (2005), *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System*, [online] Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf, Accessed September 2018.
- ✧ Russ (2012) British Bat Calls; A guide to species identification. Pelagic Publishing.
- ✧ Wray. S, Wells. D, Long. E & Mitchell-Jones. T. (2010). Valuing Bats in Ecological Impact Assessment. Valuing Bats in ECIA.
- ✧ WYG, (2018^a), *Dapper's Lane, Angmering, West Sussex: Update Ecology Walkover Survey*.
- ✧ WYG, (2018^b), *Dapper's Lane, Angmering, West Sussex: Dormouse Survey Report*.
- ✧ Arun District Council (2014) Arun Local Plan 2011-2031



FIGURES

Figure 1 – Site Location Plan

Figure 2 – Phase 1 Habitat Map

**Figure 3a – Transect Route and Static Location –
August and September Survey**

**Figure 3b – Transect Route and Static Location –
October Survey**

**Figure 4a – August Bat Flight Lines and
Recording Points**

**Figure 4b – September Bat Flight Lines and
Recording Points**

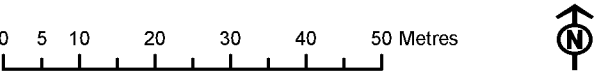
**Figure 4c – October Bat Flight Lines and
Recording Points**



Rev	Date	Notes
A	11/07/18	Initial map production

Legend

-
- Site Boundary
- Dense Scrub
- Dense Scrub / Tall Ruderal Mosaic
- Semi-Improved Neutral Grassland
- Dry Ditch
- Fence
- Species Poor Hedgerow with Trees
- Tree



Phase 1 Habitat Map

Dapper's Lane, Angerming Persimmon Homes

Scale at A3: 1:1,000	Project No: A085519-4	Drawing No: Figure 2	Revision: A
Drawn by: Harriet Baber	Drawn date: 23/07/2018	Approved by: Vivienne Greenough	

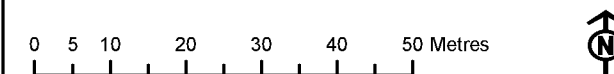
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Rev	Date	Notes
A	11/10/18	Initial map production

Legend

-  Site Boundary
 Transect Route
 Static Location
 Stopping Point
 Start and Finish

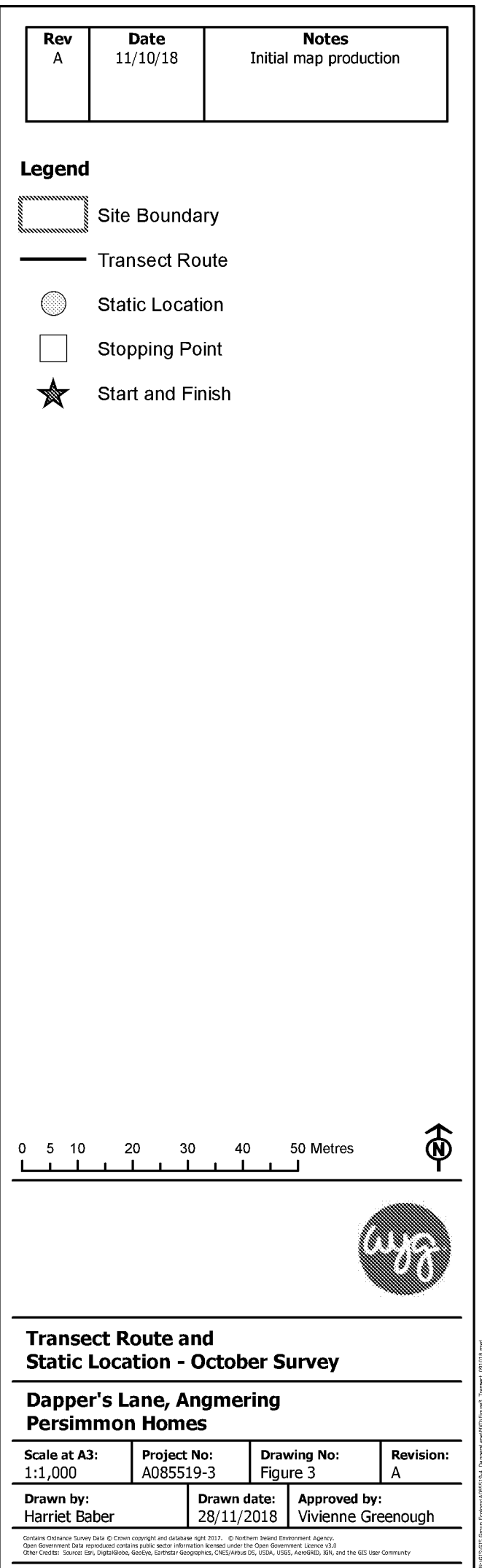


Transect Route and Static Location - August and September Survey

Dapper's Lane, Angmering Persimmon Homes

Scale at A3: 1:1,000	Project No: A085519-3	Drawing No: Figure 3a	Revision: A
Drawn by: Harriet Baber	Drawn date: 28/11/2018	Approved by: Vivienne Greenough	

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Rev	Date	Notes
A	22/10/18	Initial map production

Legend



Site Boundary



- Transect Route

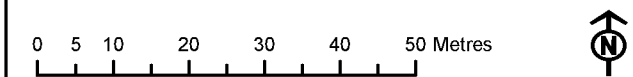
Recorded Bat Points

-  Serotine
-  Myotis Spec.
-  Noctule
-  Common Pipistrelle

- Myotis Spec.

- Noctule

- Common Pipistrelle



August Bat Flight Lines and Recording Points

Dapper's Lane, Angmering Persimmon Homes

Scale at A3: 1:1,000	Project No: A085519-4	Drawing No: Figure 4a	Revision: A
Drawn by: Harriet Baber	Drawn date: 28/11/2018	Approved by: Vivienne Greenough	

Project No:	A085519-4
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Drawing No:
Figure 4a

Revision:
A

Drawn by:
Harriet Baber

Drawn date:
28/11/2018

Approved by:
Vivienne Greenough

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Legend

Recorded Bat Points

● Barbastelle

—— Transect Route



Dapper's Lane, Angmering Persimmon Homes

Drawn by: Harriet Baber	Drawn date: 28/11/2018	Approved by: Vivienne Greenough
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Rev	Date	Notes
A	22/10/18	Initial map production

Legend

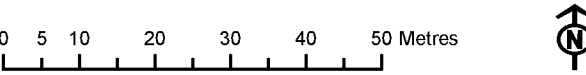
- Site Boundary
- Transect Route

Indicative Flight Lines

- Common Pipistrelle
- Serotine

Recorded Bat Points

- Serotine
- Myotis Spec.
- Noctule
- Common Pipistrelle



October Bat Flight Lines and Recording Points

Dapper's Lane, Angmering Persimmon Homes

Scale at A3: 1:1,000	Project No: A085519-4	Drawing No: Figure 4c	Revision: A
Drawn by: Harriet Baber	Drawn date: 28/11/2018	Approved by: Vivienne Greenough	

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W:\2018\10\2018-10-20\Angmering Persimmon Homes\Angmering Persimmon Homes - October 2018\Angmering Persimmon Homes - October 2018 - Figure 4c.mxd



Appendix A – Report Conditions



REPORT CONDITIONS

This Report has been prepared using reasonable skill and care for the sole benefit of Persimmon Homes ("the Client") for the proposed uses stated in the report by [WYG Environment Planning Transport Limited] ("WYG"). WYG exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

No liability is accepted or warranty given for; unconfirmed data, third party documents and information supplied to WYG or for the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report. WYG does not purport to provide specialist legal, tax or accounting advice.

The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

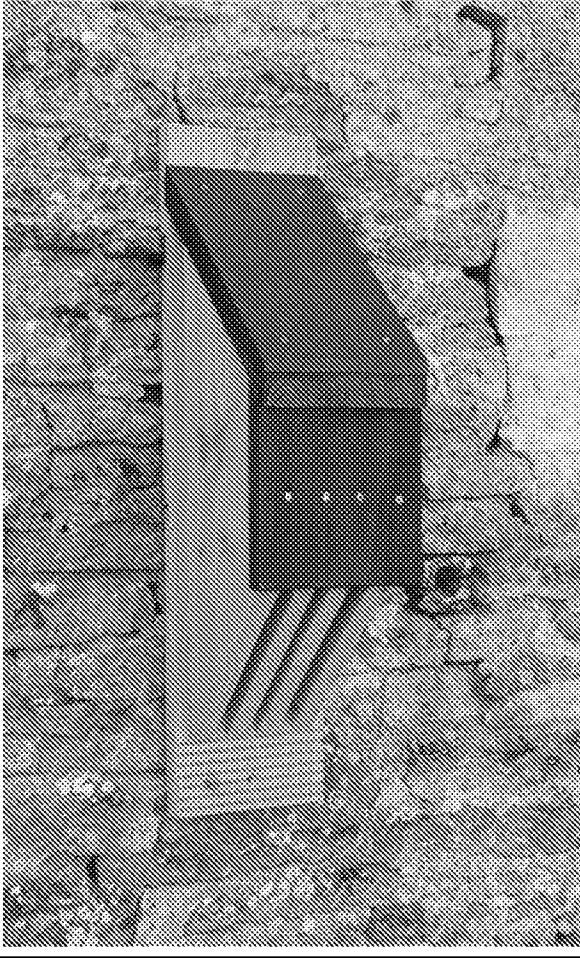
The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

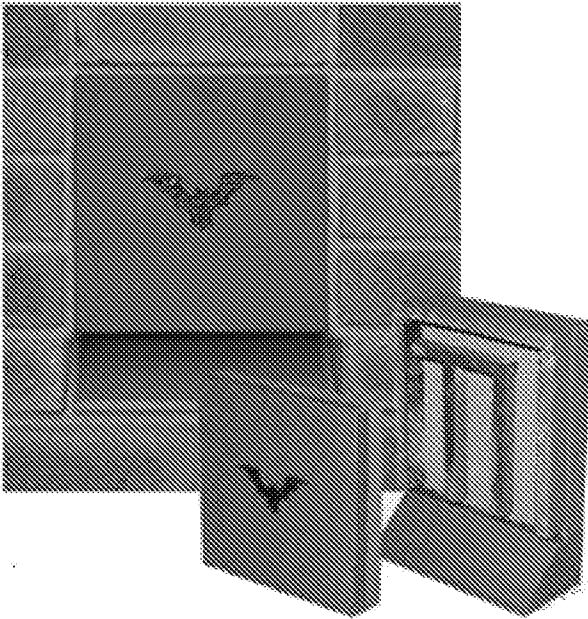
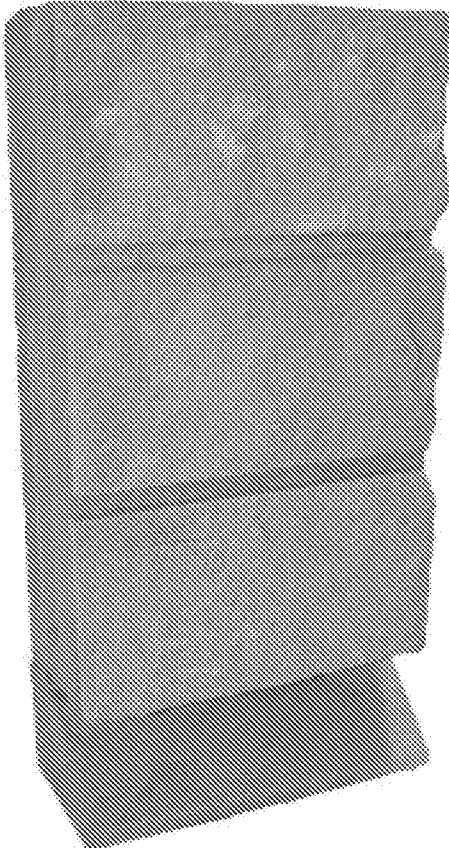
The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYG accept no liability for issues with performance arising from such factors.

November 2018



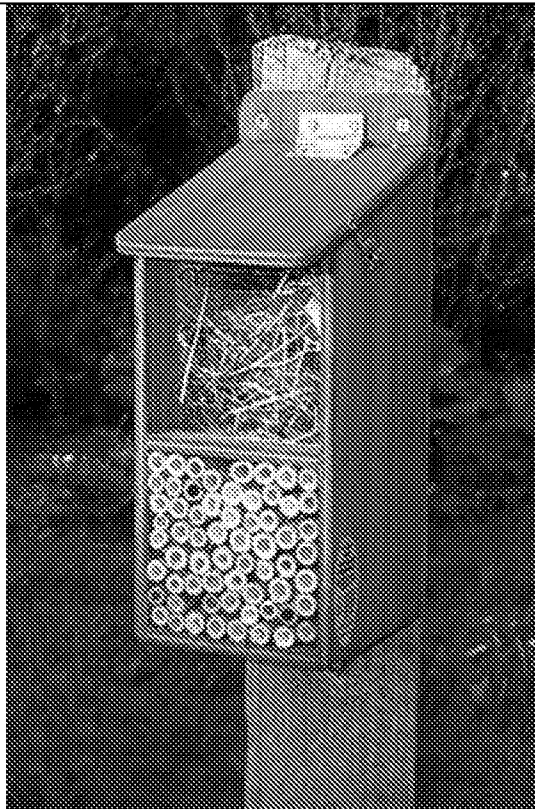
Appendix B – Suggested Enhancements

Enhancement	Example
Bat Boxes	Low Profile WoodStone Bat Box (available at: www.nhbs.com/) 
	Vincent Pro Bat Box (available at: www.nhbs.com/) 

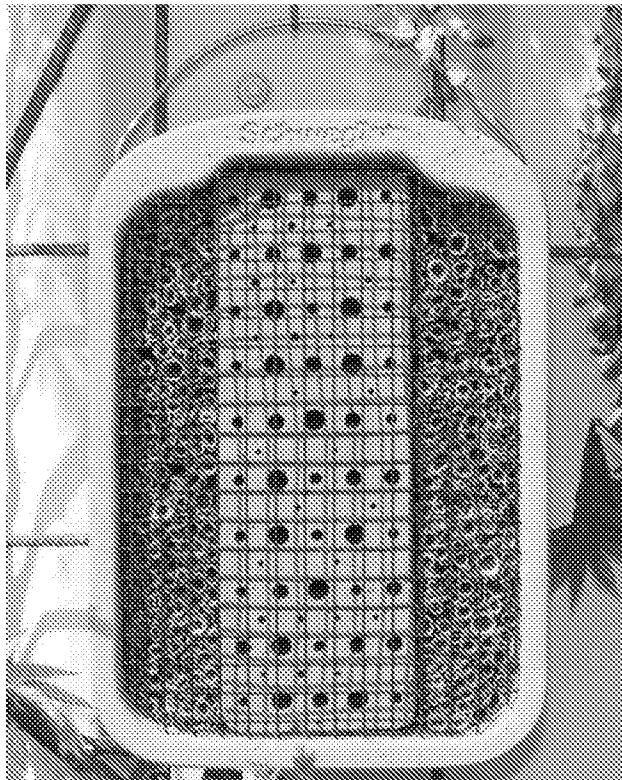
	Ibstock Enclosed Bat Box 'C' (available at: www.nhbs.com/)  Habibat Bat Box – Custom Stone Facing (available at: www.nhbs.com/) 
Meadow Creation	N12 Acid Soils Meadow Mixture (available at www.naturescape.co.uk)



	 EM1 – Basic /general Purpose Meadow Mixture (available at www.naturescape.co.uk) 
Insect Boxes	Bug Mansion (available at: www.nhbs.com/)



Schwegler Clay and Reed Insect Nest (available at: www.nhbs.com/)

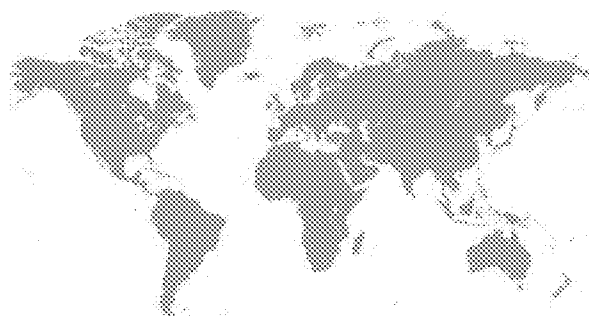




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