

**129 WHITEKNIGHTS ROAD, READING,
BERKSHIRE**

**DUSK EMERGENCE AND
DAWN RE-ENTRY BAT SURVEYS**

A Report to: Hives Architects LLP

Report No: RT-MME-153229 RevB

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REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 “Biodiversity, Code of practice for planning and development”.

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The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management’s Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client’s brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 12 months from the date of survey. If works have not commenced by this date, an updated site visit should be carried out by a suitably qualified ecologist to assess any changes in the habitats present on site, and to inform a review of the conclusions and recommendations made. For this site, an updated survey has been carried out, the findings of which are summarised in Report MME-156393. A Precautionary Mitigation Strategy outlined in Report MME-156393 must be followed.

NON-TECHNICAL SUMMARY

In July 2020 Oakbridge Bespoke Homes Ltd commissioned Middlemarch Environmental Ltd to undertake dusk emergence and dawn re-entry bat surveys at 129 Whiteknights Road, Reading. These surveys are required to inform a planning application associated with partial demolitions and extensions to the existing residential building.

Dusk emergence and dawn re-entry surveys were undertaken between 10th August 2020 and 8th September 2020. The dusk emergence and dawn re-entry bat survey data within this report was valid for a period of 12 months from the survey date. Following consultation with the Local Planning Authority, it was agreed that an updated Preliminary Bat Roost Assessment could be undertaken to extend the validity of the bat survey data, provided the results of the survey were the same as the previous assessment. In accordance with this, an updated Preliminary Bat Roost Assessment (Report RT-MME-156393) was undertaken in November 2021, which confirmed the findings of the previous assessment.

During the dusk emergence surveys a total of four species of bat were recorded: noctule, common pipistrelle, soprano pipistrelle and serotine. No bats were observed emerging from any features associated with the site during either of the nocturnal emergence surveys. Frequent commuting and foraging activity from soprano pipistrelles was recorded across the site during both dusk emergence surveys. Foraging activity was mostly recorded within the rear garden to the main building. Common pipistrelles were also detected during both surveys but less frequently. Noctules were recorded commuting over the site as well as a single serotine which was recorded commuting over the rear garden of the site during the second nocturnal emergence survey.

During the dawn re-entry bat survey, a total of three species of bat were recorded during the survey period: noctule, soprano pipistrelle and serotine. No bats were observed re-entering any features associated with the site. There was almost constant foraging activity from a single soprano pipistrelle recorded throughout most of the dawn re-entry survey. Noctules were observed making high passes and commuting over the site and a few passes from serotines were detected but no visual contact was made. It is likely that these were detections were picked up by the surveyors from bats passing offsite.

No bats were recorded emerging or re-entering from any features associated with the site.

Following the results of the dusk emergence and dawn re-entry surveys, the following recommendations have been made (Full recommendations are within Chapter 6):

R1 Main Building

The main building at 129 Whiteknights Road, Reading has been subject to a full suite of activity surveys in line with Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), and no bat roosts were identified. A Precautionary Mitigation Strategy outlined in Report MME-156393 must be followed.

R2 Lighting

In accordance with best practice guidance relating to lighting and biodiversity (Miles et al, 2018; Gunnell et al, 2012), any new lighting should be carefully designed to minimise potential disturbance and fragmentation impacts on sensitive receptors, such as bat species.

R3 Habitat Enhancement

In line with the National Planning Policy Framework, the development should aim to enhance the site for bats. Bat boxes should be installed to provide roosting habitat for species such as pipistrelle.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

In July 2020 Oakbridge Bespoke Homes Ltd commissioned Middlemarch Environmental Ltd to undertake dusk emergence and dawn re-entry bat surveys at 129 Whiteknights Road, Reading. These surveys are required to inform a planning application associated with partial demolitions and extensions to the existing residential building.

Middlemarch Environmental Ltd has previously carried out a Preliminary Ecological Appraisal and a Preliminary Roost Assessment of this site, results of which are detailed within Middlemarch Reports RT-MME-152004-01 RevA and RT-MME-152004-02 RevA.

The Preliminary Roost Assessment revealed a number of potential high value roosting features within the main building at 129 Whiteknights Road, such as, lifted/missing roof tiles and gaps underneath the ridge tiles. These features were present on all elevations of the building that will be demolished and due to their height and location could not be fully inspected during the assessment. As such the building was classed as having high potential to support roosting bats. As the presence of bats within the building could not be ruled out, in the absence of appropriate mitigation, potential impacts could include (if bats are present) destruction of a roost, direct harm, injury and disturbance.

Therefore, dusk emergence and dawn re-entry bat surveys were recommended. This report details the results of the surveys undertaken between 10th August 2020 and 8th September 2020.

The dusk emergence and dawn re-entry bat survey data within this report was valid for a period of 12 months from the survey date. Following consultation with the Local Planning Authority, it was agreed that an updated Preliminary Bat Roost Assessment could be undertaken to extend the validity of the bat survey data provided the results of the survey were the same as the previous assessment. In accordance with this, an updated Preliminary Bat Roost Assessment (Report RT-MME-156393) was undertaken in November 2021, which confirmed the findings of the previous assessment. A Precautionary Mitigation Strategy outlined in Report MME-156393 must be followed.

All UK bat species are European protected species and they are capable of being material considerations in the planning process. A summary of the legislation protecting bats is included within Appendix 1. This section also provides some brief information on the ecology of British bat species.

1.2 SITE DESCRIPTION AND CONTEXT

The site under consideration is a rectangular pocket of land located at 129 Whiteknights Road, Reading, Berkshire. It is centred on OS Grid Reference SU 74264 71924. The site contains a large detached residential property, a front garden with driveway and a larger rear garden to the north-east. The site covers an area of approximately 0.148 ha.

The site is bordered to the west and east by residential buildings, to the south by Whiteknights Road and to the north further residential gardens.

The majority of the site is covered by a two-storey residential building with single storey attached garage, amenity grassland with pockets of scattered trees and introduced shrubs. There were areas of hardstanding tarmac to the south of the site in a form of vehicular access to the garage and pedestrian access to the house. The rear garden is fenced off with a wooden 6 ft fence.

The wider landscape is comprised of further residential buildings with large gardens to the north, west and east and patches of woodlands to the south.

1.3 DOCUMENTATION PROVIDED

The conclusions and recommendations made in this report are based on information provided by the client regarding the scope of the project. Documentation made available by the client is listed in Table 1.1.

Document Name / Drawing Number	Author
Existing and Demolition Plans / 2822 004P11	Hives Architects
Proposed Plans / 2822 005P16	Hives Architects
Existing and Proposed Elevations / 2822 003P13	Hives Architects
Existing and Proposed Street Elevations / 2807 004P11	Hives Architects
Proposed Block Plan / 2822 007P8	Hives Architects
Existing and Proposed 3D Views / 2822 006P9	Hives Architects
Front Garden Concept Plan / 865 01	Bradford-Smith

Table 1.1: Documentation Provided by Client

2. METHODOLOGY

2.1 DESK STUDY

As part of the Preliminary Ecological Appraisal (Report RT-MME-152004-01) an ecological desk study (which included a search for records of bats) was undertaken within a 1 km radius of the site. The consultee for the desk study was Thames Valley Environmental Records Centre.

Middlemarch Environmental Ltd then assimilated and reviewed the desk study data provided by this organisation. Relevant bat data are discussed in Chapter 3. In compliance with the terms and conditions relating to its commercial use, the full desk study data are not provided within this report.

The desk study included a search for statutory nature conservation sites designated for bats within a 10 km radius of the site.

2.2 FIELD SURVEYS

2.2.1 Overview of Dusk Emergence and Dawn Re-entry Surveys

The main building was classed as having high potential to support roosting bats during the daytime survey. In line with Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), three bat surveys were carried out consisting of two dusk emergence bat surveys and one dawn re-entry bat survey. The aim of these surveys was to detect whether bats are roosting within the buildings, and to enable a profile of site utilisation by bats to be compiled.

2.2.2 Dusk Emergence Bat Surveys

In line with the specifications detailed in Bat Surveys: Good Practice Guidelines (Collins, 2016), the dusk surveys commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. The dusk emergence surveys were conducted using electronic bat detectors (Echo Meter Touch 2 and Bat Box Duet with associated recording devices) to facilitate the detection of bats and to aid in the determination of species of bat using the site. Subsequent computer analysis of recordings allowed all species of bat using the site to be identified.

2.2.3 Dawn Re-Entry Bat Survey

Bats swarm at their roost site 10-90 minutes prior to entering the roost at dawn (Mitchell-Jones & McLeish, 2004). Surveying for dawn swarming by bats is an efficient way of detecting bat roosts. In line with the specifications detailed by Bat Surveys: Good Practice Guidelines (Collins, 2016) the dawn survey commenced 120 minutes prior to sunrise and continued until 15 minutes after sunrise. To facilitate the detection of bats and to aid in the determination of species of bat using the site, the dawn survey was conducted using electronic bat detectors (Echo Meter Touch 2 and Bat Box Duet with associated recording devices). Computer analysis of bat detector information collected was utilised to identify all species recorded on the site.

3. DESK STUDY

3.1 STATUTORY NATURE CONSERVATION SITES

The site is not located within 10 km of any statutory nature conservation sites designated for the presence of bats.

3.2 SPECIES RECORDS

The data search was carried out in March 2020 by Thames Valley Environmental Records Centre. Records of bat species within a 1 km radius of the survey area provided by the consultee are summarised in Table 3.1. It should be noted that the absence of records should not be taken as confirmation that a species is absent from the search area.

Species	No. of Records	Most Recent Record	Proximity of Nearest Record to Study Area	Species of Principal Importance?	Legislation
Brown long-eared bat <i>Plecotus auritus</i>	3	2018	100 m north-west	✓	ECH 4, WCA 5, WCA 6
Noctule <i>Nyctalus noctula</i>	24	2017	160 m north-west	✓	ECH 4, WCA 5, WCA 6
Pipistrelle <i>Pipistrellus</i> sp.	12	2016	160 m north-west	#	ECH 4, WCA 5, WCA 6
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	29	2017	180 m north-west	✓	ECH 4, WCA 5, WCA 6
Unidentified bat <i>Chiroptera</i> sp.	8	2017	200 m north-west	#	#
Common pipistrelle <i>Pipistrellus pipistrellus</i>	29	2018	230 m north-west	-	ECH 4, WCA 5, WCA 6
Unidentified myotis <i>Myotis</i> sp.	2	2016	240 m north-west	-	ECH 4, WCA 5, WCA 6
Daubenton's bat <i>Myotis daubentonii</i>	2	2015	360 m west	-	ECH 4, WCA 5, WCA 6
Long-eared bat <i>Plecotus</i> sp.	3	2015	410 m south-east	#	ECH 4, WCA 5, WCA 6
Natterer's bat <i>Myotis nattereri</i>	1	2016	930 m north	-	ECH 4, WCA 5, WCA 6
Serotine bat <i>Eptesicus serotinus</i>	3	2016	930 m north	-	ECH 4, WCA 5, WCA 6
Unidentified bat <i>Vespertilionidae</i> sp.	1	2014	Potentially within a 1 km radius*	#	#
Key: #: Dependent on species. ECH 4: Annex IV of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest in need of strict protection. WCA 5: Schedule 5 of Wildlife and Countryside Act 1981 (as amended). Protected animals (other than birds). WCA 6: Schedule 6 of Wildlife and Countryside Act 1981 (as amended). Animals which may not be killed or taken by certain methods. Species of Principal Importance: Species of Principal Importance for Nature Conservation in England.					

Table 3.1: Bat Species Records Within 1 km of Survey Area

4. SURVEY RESULTS

4.1 FIRST DUSK EMERGENCE SURVEY

The first dusk emergence survey was undertaken on 10th August 2020 by Sophie Moy (Senior Ecological Consultant, Class Licence number: 2018-33168-CLS-CLS), Harry Stone (Ecological Project Officer) and Sarah Jackson (Ecological Project Officer). The weather conditions recorded at the time of the survey are detailed in Table 4.1.

Parameter	Conditions	
	Start	Finish
Temperature (°C)	28	25
Cloud Cover (%)	10	10
Precipitation	Nil	Nil
Wind Speed (Beaufort)	F0	F0

Table 4.1: Weather Conditions During First Dusk Emergence Survey

The dusk emergence survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 20:35 hrs (BBC Weather Centre Data for Reading). Three species of bat, noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* were recorded during the survey. Survey results are plotted on Drawing C153229-01 in Chapter 7.

Soprano pipistrelle

The first soprano pipistrelle was detected at 21:04 (29 minutes after sunset). This bat was observed entering into the rear garden from the south-east, the bat then foraged over the rear garden briefly before flying in a south-west direction over the main residential building on site.

At 21:06 a soprano pipistrelle was detected commuting along the south-eastern boundary in a north-eastern direction. This bat did not emerge from any features associated with the site. At 21:07 a soprano pipistrelle was observed briefly foraging within the rear garden to the site. From 21:15 until 21:38 a soprano pipistrelle was observed constantly foraging within the rear garden to the site. At 21:43 another soprano pipistrelle was observed briefly foraging within the rear garden. At 21:47 a soprano pipistrelle was detected but no visual contact was made.

Noctule

The first noctule was detected at 21:12 (37 minutes after sunset), this bat was observed passing high over the site in a westerly direction. This bat was not observed emerging from any features associated with the site. This bat did not stay to forage over the site. At 21:16 a noctule was observed passing high over the site in a north-western direction. At 21:27, 21:29, 21:51 and 21:56 a noctule was detected but no visual contact was made with the bat. It is likely that these were detections were picked up by the surveyors from bats passing offsite.

Common pipistrelle

The first common pipistrelle was detected at 21:05 (30 minutes after sunset). Two common pipistrelles were observed commuting over the site from the south-east to the north-west. These bats did not emerge from any features associated with the site.

At 21:30 a common pipistrelle was observed commuting along the south-eastern boundary in a north-eastern direction. This bat did not emerge from any features associated with the site. At 21:35 a common pipistrelle was intermittently foraging along the treeline offsite, south-west of Whiteknights Road. At 21:46 a faint echolocation from a common pipistrelle was detected but no visual contact was made with the bat.

No other species of bat were detected or observed during this survey. Analysis of the sound recordings did not identify any further species of bat.

4.2 SECOND DUSK EMERGENCE SURVEY

The second dusk emergence survey was undertaken on 24th August 2020 by Sophie Moy (Senior Ecological Consultant, Class Licence number: 2018-33168-CLS-CLS), Will Rees (Ecological Consultant) and Harry Stone (Ecological Project Officer). The weather conditions recorded at the time of the survey are detailed in Table 4.2.

Parameter	Conditions	
	Start	Finish
Temperature (°C)	19	17
Cloud Cover (%)	50	60
Precipitation	Nil	Nil
Wind Speed (Beaufort)	F1	F0-1

Table 4.2: Weather Conditions During Second Dusk Emergence Survey

The dusk emergence survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 20:06 hrs (BBC Weather Centre Data for Reading). Four species of bat; noctule, common pipistrelle, soprano pipistrelle and serotine *Eptesicus serotinus* were recorded during the survey. Survey results are plotted on Drawing C153229-02 in Chapter 7.

Noctule

The first bats recorded onsite during the second nocturnal emergence survey were two noctules commuting over the site at 20:18 (12 minutes after sunset). These two noctules commuted from offsite to the south-east making a high pass over the site in a north-west direction. A second noctule was detected at 20:21 but no visual contact was made with this bat.

At 20:47 a noctule was observed commuting high over the front garden of the site from the south-east heading in a north-west direction. Further noctules were detected at 20:29, 20:45, 20:51, 21:09 and 21:11 but no visual contact was made with these bats. It is likely that these were detections were picked up by the surveyors from bats passing offsite.

Soprano pipistrelle

At 20:25 (19 minutes after sunset) a soprano pipistrelle was detected briefly foraging along the south-eastern boundary of the site for a couple of minutes before heading offsite at 20:27. This bat did not emerge from any features associated with the site. At 20:26 a foraging soprano pipistrelle was detected within the rear garden. This bat remained on site foraging within the rear garden until 20:33.

At 20:28 a soprano pipistrelle was observed commuting along the north-western boundary of the site in a north-eastern direction. This bat did not emerge from any features associated with the site.

At 20:33 two soprano pipistrelles were observed foraging within the rear garden over the amenity grassland and introduced shrubs and alongside the scattered trees. From 20:34 until 20:58 a single soprano pipistrelle was observed foraging within the rear garden. At 20:45 two soprano pipistrelles were observed commuting over the front garden of the main building from the north-west to the south-east. At 20:59 and between 21:05 – 21:07 a soprano pipistrelle was detected foraging within the rear garden briefly.

Common pipistrelle

At 20:37 (31 minutes after sunset) a common pipistrelle was detected by the surveyor located to the north-west of the site. No visual contact was made with this bat. This bat did not emerge from any features associated with the site.

Serotine

At 20:46 (40 minutes after sunset) a serotine was observed commuting over the rear garden of the site travelling from the north-west to the south-east and headed offsite over the adjacent residential gardens.

No other species of bat were detected or observed during this survey. Analysis of the sound recordings did not detect any further species of bat.

4.3 DAWN RE-ENTRY SURVEY

The dawn re-entry bat survey was undertaken on 8th September 2020 by Sophie Moy (Senior Ecological Consultant, Class Licence number: 2018-33168-CLS-CLS), Marco Bartolini (Ecological Project Officer) and Rod Batistela (Ecological Project Officer). The weather conditions recorded at the time of the survey are detailed in Table 4.3.

Parameter	Conditions	
	Start	Finish
Temperature (°C)	16	16
Cloud Cover (%)	100	100
Precipitation	Nil	Nil
Wind Speed (Beaufort)	F0	F0

Table 4.3: Weather Conditions During Dawn Re-entry Survey

The dawn re-entry survey commenced 120 minutes prior to sunrise and continued until 15 minutes after sunrise. Sunrise was at 06:28 hrs (BBC Weather Centre Data for Reading). Three species of bat; noctule, soprano pipistrelle and serotine were recorded during the survey. Survey results are plotted on Drawing C153229-03 in Chapter 7.

Serotine

The first bat recorded during the dawn re-entry survey was a serotine at 04:44 (104 minutes prior to sunrise). This bat was detected by the surveyor located to the east of the site, it was a faint call and no visual contact was made with the bat. This bat was not observed re-entering any features associated with the site. A further three passes from serotine were detected at 05:11, 05:33 and 05:42. These were all faint calls and no visual contact was made with the bat. It is likely that these were detections were picked up by the surveyors from bats passing offsite.

Soprano pipistrelle

The first soprano pipistrelle was recorded at 05:05 (83 minutes prior to sunrise). This bat was detected foraging by the surveyor located to the south-west of the site. No visual contact was made with the bat. This bat was not observed re-entering any features associated with the site.

At 05:43 a soprano pipistrelle was observed commuting in a north-west direction over the rear garden to the main building. At 05:44 a soprano pipistrelle was observed foraging from the rear garden along the northern boundary of the site over the garage into the front garden and then returning to the rear garden. From 05:44 until 06:10 constant foraging by a soprano pipistrelle over the rear garden to the main building was observed. This bat then flew offsite to the north-east into the adjacent residential gardens.

Noctule

The first noctule was recorded at 05:54 (34 minutes prior to sunrise). No visual contact was made with the bat. This bat was not observed re-entering any features associated with the site. At 06:16 a noctule was observed making a high pass over the site from the north-west heading in a south-eastern direction. At 06:18 two noctules were observed making a high pass from the south-east over the site to the north-west.

No other species of bat were detected or observed during this survey. Analysis of the sound recordings did not detect any further species of bat.

5. DISCUSSION AND CONCLUSIONS

5.1 DISCUSSION

5.1.1 Summary of Proposals

This assessment is required to inform a planning application associated with partial demolitions and extensions to the existing residential building. The flat roof garage and hipped roof kitchen extension are to be demolished to facilitate the construction of a large ground floor extension. Extension works on the first floor of the building will extend northeastwards and involve extensive works to the existing hipped roof.

5.1.2 Summary of Dusk Emergence and Dawn Re-entry Surveys

Dusk Emergence Surveys

The first nocturnal emergence survey was completed on 10th August 2020. A total of three species of bat were recorded during the survey period: noctule, common pipistrelle and soprano pipistrelle. No bats were observed emerging from any features associated with the site.

Frequent activity of soprano pipistrelles was observed on site throughout the first survey. The majority of the activity recorded was by foraging soprano pipistrelles within the rear garden to the site. Foraging activity by common pipistrelles was recorded off site to the south of Whiteknights Road. Noctules were recorded commuting over the site.

The second nocturnal emergence survey was undertaken on the 24th August 2020. A total of four species of bat were recorded during the survey: noctule, common pipistrelle, soprano pipistrelle and serotine. No bats were observed emerging from any features associated with the site.

Noctules were recorded commuting over the site as well as a single serotine which was recorded commuting over the rear garden of the site. Frequent foraging and commuting activity from soprano pipistrelles was observed on site throughout the survey. The majority of the activity recorded was by foraging soprano pipistrelles within the rear garden to the site. A single echolocation from a common pipistrelle was recorded by the surveyor to the north-west of the site.

Dawn Re-entry Survey

The dawn re-entry survey was conducted on the 8th September 2020. A total of three species of bat were recorded during the survey period: noctule, soprano pipistrelle and serotine. No bats were observed re-entering any features associated with the site.

The majority of the activity recorded on site was from foraging and commuting soprano pipistrelles. There was almost constant foraging activity from a single soprano pipistrelle throughout most of the dawn re-entry survey. Noctules were observed making high passes and commuting over the site and a few passes from serotines were detected but no visual contact was made. It is likely that these were detections were picked up by the surveyors from bats passing offsite.

5.2 CONCLUSIONS

Given that no bats emerged from or re-entered the main building at 129 Whiteknights Road and the relatively small amount of bat activity recorded on site during the surveys, it is concluded that there are no bat roosts present in the buildings on site. Therefore, the proposed works are not expected to impact roosting bats, and as such the proposed works may proceed as scheduled.

Common pipistrelle, noctule, serotine and soprano pipistrelle were recorded foraging and /or commuting on site, however no bats were recorded emerging or re-entering from any features associated with the site.

The rear garden to the main building at 129 Whiteknights Road was used by foraging and commuting bats with varying levels of frequency during all three surveys. The majority of the activity on site recorded was by foraging soprano pipistrelles within the rear garden to the site. As such any proposed lighting within the rear garden will need to be designed to ensure foraging and commuting bats are not adversely impacted. A recommendation relating to enhancements and lighting has been made in Chapter 6.

6. RECOMMENDATIONS

All recommendations provided in this section are based on Middlemarch Environmental Ltd's current understanding of the site proposals, correct at the time the report was compiled. Should the proposals alter, the conclusions and recommendations made in the report should be reviewed to ensure that they remain appropriate.

R1 Main Building

The main building at 129 Whiteknights Road, Reading has been subject to a full suite of activity surveys in line with Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), and no bat roosts were identified. The main building at 129 Whiteknights Road, Reading has been subject to a full suite of activity surveys in line with Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), and no bat roosts were identified. A Precautionary Mitigation Strategy outlined in Report MME-156393 must be followed.

R2 Lighting

In accordance with best practice guidance relating to lighting and biodiversity (Miles et al, 2018; Gunnell et al, 2012), any new lighting should be carefully designed to minimise potential disturbance and fragmentation impacts on sensitive receptors, such as bat species. Examples of good practice include:

- Avoiding the installation of new lighting in proximity to key ecological features, such as scattered trees, grassland and introduced shrubs.
- Using modern LED fittings rather than metal halide or sodium fittings, as modern LEDs emit negligible UV radiation.
- The use of directional lighting to reduce light spill, e.g. by installing bespoke fittings or using hoods or shields. For example, downlighting can be used to illuminate features such as footpaths whilst reducing the horizontal and vertical spill of light.
- Where the use of bollard lighting is proposed, columns should be designed to reduce horizontal light spill.
- Implementing controls to ensure lighting is only active when needed, e.g. the use of timers or motion sensors.
- Use of floor surface materials with low reflective quality. This will ensure that bats using the site and surrounding area are not affected by reflected illumination.
- For internal lights, recessed light fittings cause significantly less glare than pendant type fittings. The use of low-glare glass may also be appropriate where internal lighting has the potential to influence sensitive ecological receptors.

R3 Habitat Enhancement

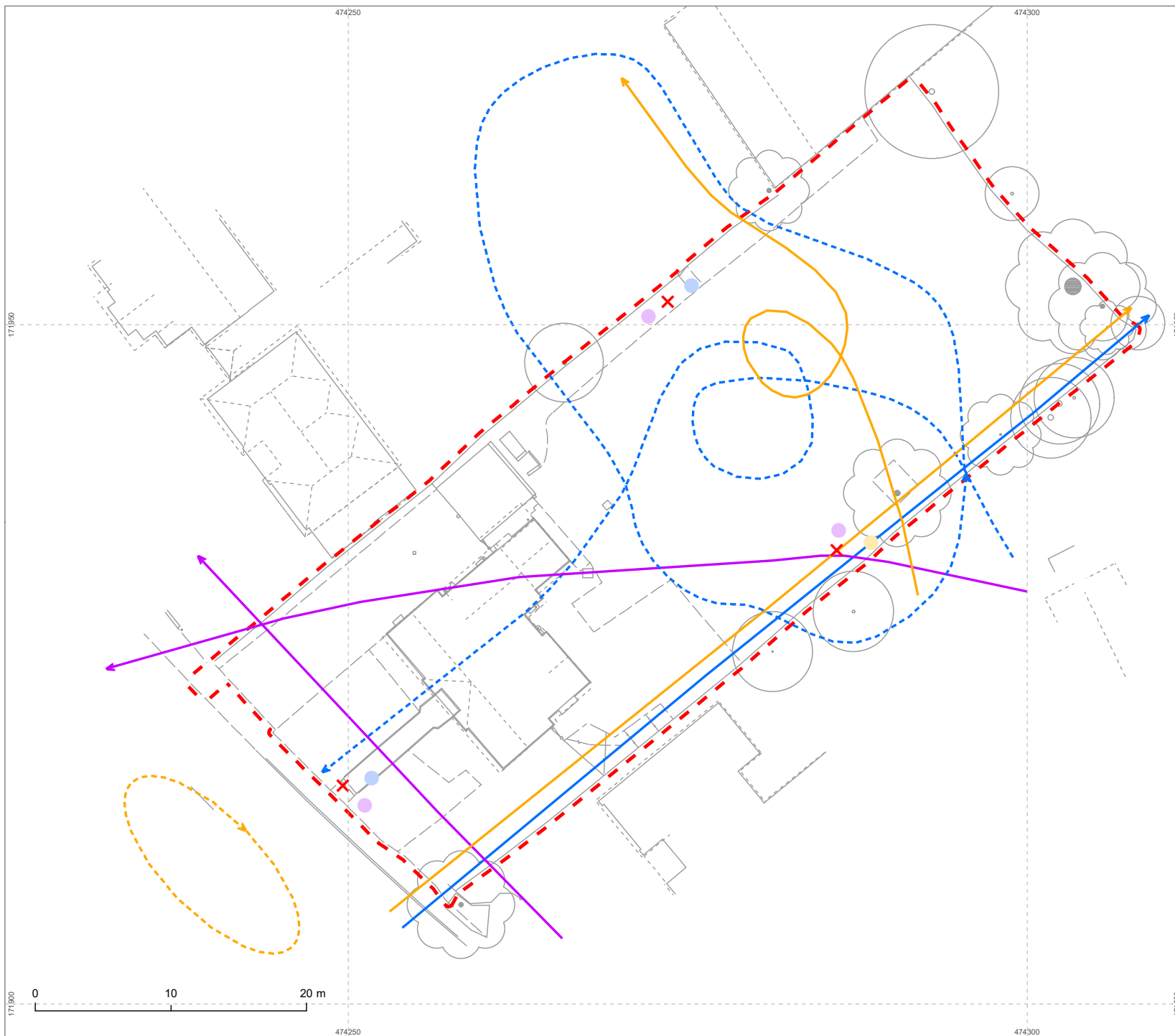
In line with the National Planning Policy Framework, the development should aim to enhance the site for bats. Bat boxes should be installed to provide roosting habitat for species such as pipistrelle. In general, bats seek warm places and for this reason boxes should be located where they will receive full/partial sun, although installing boxes in a variety of orientations will provide a range of climatic conditions. Position boxes at least 4 m above ground to prevent disturbance from people and/or predators. The planting of species which attract night flying insects is encouraged as this will be of value to foraging bats, for example: evening primrose *Oenothera biennis*, goldenrod *Solidago virgaurea*, honeysuckle *Lonicera periclymenum* and fleabane *Pulicaria dysenterica*.

7. DRAWINGS

Drawing C153229-01 – First Dusk Emergence Survey

Drawing C153229-02 – Second Dawn Re-entry Survey

Drawing C153229-03 – Dawn Re-entry Survey



C153229-01

Legend

- Site boundary
- X Surveyor location
- Common pipistrelle heard not seen
- Noctule heard not seen
- Soprano pipistrelle heard not seen
- Common pipistrelle commuting
- Common pipistrelle foraging
- Noctule commuting
- Soprano pipistrelle commuting
- Soprano pipistrelle foraging



Project		129 Whiteknights Road, Reading	
Drawing		First Nocturnal Emergence Survey (10/08/2020)	
Client		Oakbridge Bespoke Homes	
Drawing Number	C153229-01	Revision	00
Scale @ A4	1:400	Date	August 2020
Approved By	SM	Drawn By	GT
			
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ T:01676 525880 F:01676 521400 E:admin@middlemarch-environmental.com			
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C153229-02

Legend

- Site boundary
- X Surveyor location
- Common pipistrelle heard not seen
- Noctule heard not seen
- Soprano pipistrelle heard not seen
- Noctule commuting
- Serotine commuting
- Soprano pipistrelle commuting
- - - → Soprano pipistrelle foraging

Project
129 Whiteknights Road, Reading

Drawing
Second Nocturnal Emergence Survey (24/08/2020)

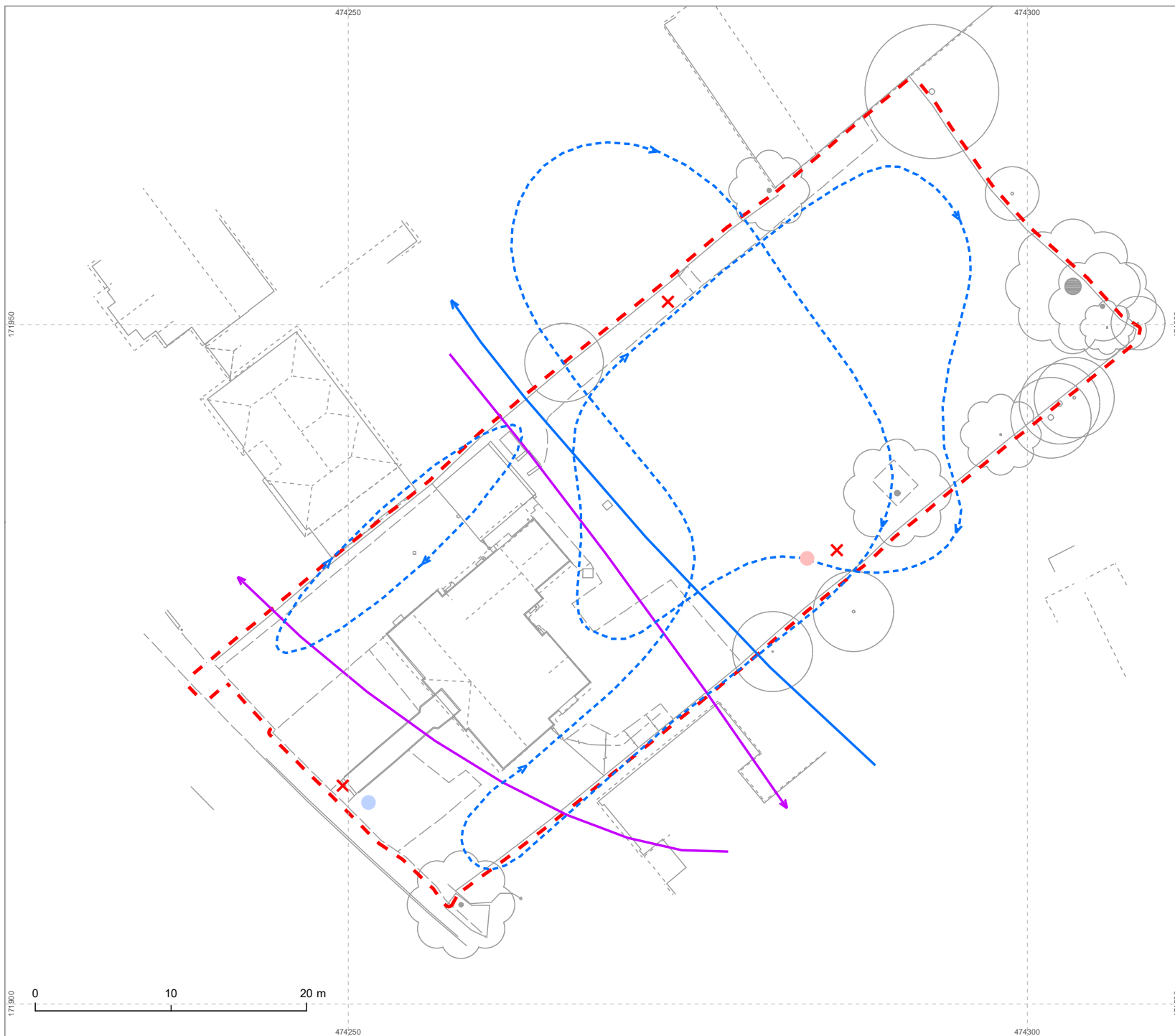
Client
Oakbridge Bespoke Homes

Drawing Number	Revision
C153229-02	00
Scale @ A4	Date
1:400	September 2020
Approved By	Drawn By
SM	CD

MIDDLEMARCH ENVIRONMENTAL

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C153229-03

Legend

- Site boundary
- X Surveyor location
- Serotine heard not seen
- Soprano pipistrelle heard not seen
- Noctule commuting
- Soprano pipistrelle commuting
- - - → Soprano pipistrelle foraging



Project		129 Whiteknights Road, Reading	
Drawing		Dawn Re-entry Survey (08/09/2020)	
Client		Oakbridge Bespoke Homes	
Drawing Number	C153229-03	Revision	00
Scale @ A4	1:400	Date	September 2020
Approved By	SM	Drawn By	RP
			
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The Conservation of Habitats and Species Regulations 2017.

APPENDIX 1

LEGISLATION

Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that bats, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats; or
- damage or destroy a bat roost (breeding site or resting place).

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead bats, part of a bat or anything derived from bats, which has been unlawfully taken from the wild.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, or *obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CROW) Act 2000.

As bats re-use the same roosts (breeding site or resting place) after periods of vacancy, legal opinion is that roosts are protected whether or not bats are present.

The following bat species are Species of Principal Importance for Nature Conservation in England: barbastelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*.

The reader should refer to the original legislation for the definitive interpretation.

ECOLOGY

At present, 18 species of bats are known to live within the United Kingdom, of which 17 species are confirmed as breeding. All UK bat species are classed as insectivorous, feeding on a variety of invertebrates including midges, mosquitoes, lacewings, moths, beetles and small spiders.

Bats will roost within a variety of different roosting locations, included houses, farm buildings, churches, bridges, walls, trees, culverts, caves and tunnels. At different times of the year the bats roosting requirements alter and they can have different roosting locations for maternity roosts, mating roosts and hibernation roosts. Certain bat species will also change roosts throughout the bat activity season with the bat colony using the site to roost for a few days, abandoning the roost and then returning a few days or weeks later. This change can be for a variety of reasons including climatic conditions and prey availability. Bats are known live for several years and if the climatic conditions are unfavourable at a particular roost, they may abandon it for a number of years, before returning when conditions change. Due to the matriarchal nature of bat colonies, the locations of these roosts can be passed down through the generations.

Bats usually start to come out of hibernation in March and early April (weather dependent), when they start to forage and replenish the body weight lost during the hibernation period. The female bats then start to congregate together in maternity roosts prior to giving birth and a single baby is born in June or July. The female then works hard to feed her young so that they can become independent and of a sufficient weight to survive the winter before the weather gets too cold and invertebrate activity reduces. Males generally live solitary lives, or in small groups with other males, although in some species the males can be found living with the females all year. The mating season begins in the autumn. During the winter bats hibernate in safe locations which provide relatively constant conditions, although they may venture outside to forage on warmer winter nights.