

**FORMER GAMECOCK PUB,
BOOTH STREET WEST, MANCHESTER**

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

A Report to: Curlew Alternatives Eighth Property LP

Report No: RT-MME-153624-03

Date: June 2021



Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ

Tel: 01676 525880 Fax: 01676 521400

E-mail: admin@middlemarch-environmental.com Web: www.middlemarch-environmental.com

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”.

Report Version	Date	Completed by:	Checked by:	Approved by:
Final	16/06/2021	Charlotte Richardson MSc (Ecological Consultant)	Ellie Rickman MSc, MCIEEM (Principal Ecological Consultant)	Tom Docker CEcol MCIEEM (Managing Director)

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.

NON-TECHNICAL SUMMARY

In April 2021, Curlew Alternatives Eighth Property LP commissioned Middlemarch Environmental Ltd to undertake dusk emergence and dawn re-entry bat surveys at the Former Gamecock Pub, Booth Street West, Manchester. These surveys are required to inform a planning application associated with the demolition of the existing building and structure and the redevelopment of the site for Purpose Built Student Accommodation (PBSA) uses (Sui Generis use class) comprising 261 bedroom units with ancillary amenity space, a ground floor 'community hub' (proposed for Use Classes F2(b), E(b), E(3), E(f)) associated landscape works and infrastructure.

Dusk emergence and dawn re-entry surveys were undertaken between 13th May 2021 and 16th June 2021. During the first dusk emergence survey one single common pipistrelle bat call was recorded, but no visual contact was made. During the second dusk emergence survey, common pipistrelle was once again, the only species recorded onsite, with occasional passes observed to the west of the building. No bats were seen to emerge from the building during either of the dusk emergence surveys. During the dawn re-entry survey, a small number of common pipistrelle bat passes were recorded to the east and west of the building, and also over the central portion of the building from the north. On five occasions, common pipistrelle calls were detected, but no visual contact was made. In addition to common pipistrelles, a single soprano pipistrelle bat call was detected during the dawn survey, but no visual contact was made with this bat. No bats were seen to re-enter the building during the dawn re-entry survey.

Following the results of the dusk emergence and dawn re-entry surveys, the following recommendations have been made:

R1 The Former Gamecock Pub

The Former Gamecock Pub 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 survey data obtained for the site is valid for 12 months from the survey date.

R2 Lighting

In accordance with best practice guidance relating to lighting and biodiversity, any new lighting should be carefully designed to minimise potential disturbance and fragmentation impacts on sensitive receptors, such as bat species. An example of good practice includes avoiding the installation of new lighting in proximity to key ecological features, such as adjacent tree lines.

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 and the planting of species which attract night flying insects is also encouraged.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

In April 2021, Curlew Alternatives Eighth Property LP commissioned Middlemarch Environmental Ltd to undertake dusk emergence and dawn re-entry bat surveys at the Former Gamecock Pub, Booth Street West, Manchester. These surveys are required to inform a planning application associated with the demolition of the existing building and structure and the redevelopment of the site for Purpose Built Student Accommodation (PBSA) uses (Sui Generis use class) comprising 261 bedroom units with ancillary amenity space, a ground floor 'community hub' (proposed for Use Classes F2(b), E(b), E(3), E(f)) associated landscape works and infrastructure.

Middlemarch Environmental Ltd has previously carried out a Preliminary Ecological Appraisal and Preliminary Bat Roost Assessment for Curlew Alternatives Eighth Property LP at this site. The findings of these surveys are detailed in Reports RT-MME-153624-01 and -02, respectively.

During the Preliminary Bat Roost Assessment (Report: RT-MME-153624-02), the former Gamecock Pub was found to have several potential ingress points and roosting opportunities for bats. These features included gaps within mortar, gaps under roof tiles, gaps behind uPVC/wooden cladding, lifted cladding joints and gaps beneath overhanging tiles. These features were considered to have high potential for use by roosting bats, providing potential access points into internal building structures and/or crevice roosting locations. No evidence of bats was found during the assessment; however, the majority of the potential roosting features could not be fully assessed at the time of the survey and a large proportion of the building could not be surveyed internally. Therefore, dusk emergence and dawn re-entry bat surveys were recommended. This report details the results of the surveys undertaken between 13th May 2021 and 16th June 2021.

All UK bat species are legally 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 survey area comprised a parcel of land measuring approximately 0.1 hectares, located to the south of Manchester City Centre. The site was centred at National Grid Reference SJ 8414 9669 and, at the time of the survey, was occupied by the former Gamecock Pub and associated hardstanding car park and storage area. Small areas of grassland, bare ground, scrub and tall ruderal vegetation were present around the site, whilst scattered trees were identified along the western boundary. Boundary features, comprising walls and fencing, were also noted onsite.

The site was immediately bordered by Boundary Lane to the west, Booth Street West to the north and a small access road to the south. Beyond these roads, multi-storey commercial and residential buildings with associated greenspace were present to all sides. The wider landscape was dominated by a mixture of residential, commercial and industrial units. The River Medlock was located 710 m north of the survey area.

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
Gamecock, Booth Street West, Manchester – GA Plan - Proposed - Ground Floor (Level 00) – Drawing: 10224-Z0-A-B5D8-G200-PL-00-001 Rev 01	Simpsonhaugh
Booth Street West – Manchester (Document Ref: 10224- SHP-RP-CP10 Revision 01)	Simpsonhaugh

Table 1.1: Documentation Provided by Client

2. METHODOLOGY

2.1 DESK STUDY

As part of the Preliminary Ecological Appraisal undertaken in February 2021 (Report RT-MME-153624-01) 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 Greater Manchester Record 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 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 February 2021 by Greater Manchester Record 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
Common pipistrelle <i>Pipistrellus pipistrellus</i>	15	2018	340 m west *	-	ECH 4, WCA 5, WCA 6, Local
Pipistrelle <i>Pipistrellus sp.</i>	5	2018	440 m east *	#	ECH 4, WCA 5, WCA 6, Local
Key: # : Dependent on species. * : Grid reference provided was six figures and as such, the record may be located within 100 m of the study site. 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. Local: Priority Species on the Greater Manchester Biodiversity Action Plan.					

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

4. SURVEY RESULTS

The dusk emergence and dawn re-entry surveys were undertaken between 13th May 2021 and 16th June 2021 by the following members of staff:

- Charlotte Richardson MSc (Ecological Consultant and Class 17 Natural England Licence Holder);
- Anna Evans MSc (Ecological Consultant);
- Geoff Nickolds (Ecological Consultant);
- Shona Sutherland BSc (Ecological Project Officer); and,
- Sam Spickett (Ecological Project Officer).

4.1 FIRST DUSK EMERGENCE SURVEY

The first dusk emergence survey was undertaken on 14th May 2021 and the weather conditions recorded at the time of the survey are detailed in Table 4.1.

Parameter	Conditions	
	Start	Finish
Temperature (°C)	14	12
Cloud Cover (%)	30	10
Precipitation	Nil	Nil
Wind Speed (Beaufort)	F2	F1

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 21:00 hrs (BBC Weather Centre Data for Manchester). One bat species, common pipistrelle *Pipistrellus pipistrellus*, was recorded during the survey.

Common pipistrelle

One common pipistrelle bat was recorded during the field survey at 21:18 hrs (18 minutes after sunset), by the surveyor positioned to the north of the building. This bat did not emerge from the building surveyed but was passing nearby.

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 DAWN RE-ENTRY SURVEY

The dawn re-entry bat survey was undertaken on 2nd June 2021 and the weather conditions recorded at the time of the survey are detailed in Table 4.2.

Parameter	Conditions	
	Start	Finish
Temperature (°C)	14	13
Cloud Cover (%)	30	30
Precipitation	Dry	Dry
Wind Speed (Beaufort)	F2	F1-2

Table 4.2: 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 04:46 hrs (BBC Weather Centre Data for Manchester). Two species of bat, common pipistrelle and soprano pipistrelle, were recorded during the survey. Survey results are plotted on Drawing C153624-03-01 in Chapter 7.

Common pipistrelle

The first common pipistrelle was recorded at 03:18 hrs (88 minutes before sunrise). This bat was faintly detected, but no visual contact was made. Several further faint common pipistrelle calls were detected at 03:24 hrs, 03:31 hrs, 03:42 hrs and 03:58 hrs, but again, no visual contact was made with these bats. At 03:31 hrs, a common pipistrelle commuted adjacent to the western elevation of the building from north to south, whilst at the same time a common pipistrelle was seen to the north of the building before passing over it to the south-west. At 03:58 hrs, a common pipistrelle was seen to pass over the building from north to south, before leaving the site to the south. Finally, at 04:13 hrs, a common pipistrelle commuted over the building from north to south and exited the site in the direction of the off site trees to the east. During this survey, no common pipistrelle bats were seen to return to roost in the building.

Soprano pipistrelle

The first and only common pipistrelle bat recorded was detected at 03:25 hrs (81 minutes before sunrise). This bat was strongly detected by the surveyor positioned to the west of the building, but as no visual contact was made, it was anticipated that it had passed along the tree line to the west. During this survey, no soprano pipistrelle bats were seen to return to roost in the building.

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 SECOND DUSK EMERGENCE SURVEY

The second dusk emergence survey was undertaken on 16th July 2021 and the weather conditions recorded at the time of the survey are detailed in Table 4.3.

Parameter	Conditions	
	Start	Finish
Temperature (°C)	18	17
Cloud Cover (%)	100	100
Precipitation	Dry	Dry
Wind Speed (Beaufort)	F0-1	F2-3

Table 4.3: 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 21:40 hrs (BBC Weather Centre Data for Manchester). One bat species, common pipistrelle, was recorded during the survey. Survey results are plotted on Drawing C153624-03-01 in Chapter 7.

Common pipistrelle

The first common pipistrelle was detected at 22:03 hrs (23 minutes after sunset), but no visual contact was made with this bat. At 22:19 hrs, a common pipistrelle bat was seen to pass in front of the western elevation of the building, before looping round and exiting the site to the south. The same happened again at 22:44 hrs, but two bats were seen on that occasion. During this survey, no common pipistrelle bats were seen to emerge from the building.

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

It is understood that the works will involve the demolition of the existing building and structure and the redevelopment of the site for Purpose Built Student Accommodation (PBSA) uses (Sui Generis use class) comprising 261 bedroom units with ancillary amenity space, a ground floor 'community hub' (proposed for Use Classes F2(b), E(b), E(3), E(f)) associated landscape works and infrastructure.

5.1.2 Summary of Dusk Emergence and Dawn Re-entry Surveys

Dusk Emergence Surveys

A small amount of bat activity was recorded on site during the field surveys, the majority of which was of common pipistrelle bats. During the first dusk emergence survey one single common pipistrelle bat call was recorded, but no visual contact was made. During the second dusk emergence survey, common pipistrelle was once again, the only species recorded onsite, but occasional passes were observed to the west of the building. No bats were seen to emerge from the building during either of the dusk emergence surveys.

Dawn Re-entry Survey

During the dawn re-entry survey, a small number of common pipistrelle bat passes were recorded to the east and west of the building, and also over the central portion of the building from the north. On five occasions, common pipistrelle calls were detected, but no visual contact was made. In addition to common pipistrelles, a single soprano pipistrelle bat call was detected during the dawn survey, but no visual contact was made with this bat. No bats were seen to re-enter the building during the dawn re-entry survey.

5.2 CONCLUSIONS

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

It is understood that as part of the proposals, the trees along the western boundary of the site will be removed to facilitate the works. However, as new tree planting is proposed to the south of the site and as scattered trees will still be present to the west, beyond Boundary Lane, post-works, no long-term impacts to foraging/commuting bats are predicted. Therefore, providing that the lighting and biodiversity enhancement measures outlined in Chapter 6 are taken into consideration, no adverse impacts to foraging and commuting bats is anticipated.

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 The Former Gamecock Pub

The Former Gamecock Pub 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 survey data obtained for the site is valid for 12 months from the survey date. If development works to the surveyed building have not commenced within this timeframe it will be essential to update the survey effort to establish if bats have colonised the buildings in the interim. Updated Preliminary Bat Roost Assessments can be undertaken at any time of year. Updated surveys requiring nocturnal or dawn assessment will need to adhere to the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) with the surveys undertaken between April and September inclusive. In the unlikely event that a bat is found during site works all works in that area must immediately cease and a suitably qualified ecologist should be contacted.

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 adjacent tree lines.
- 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.

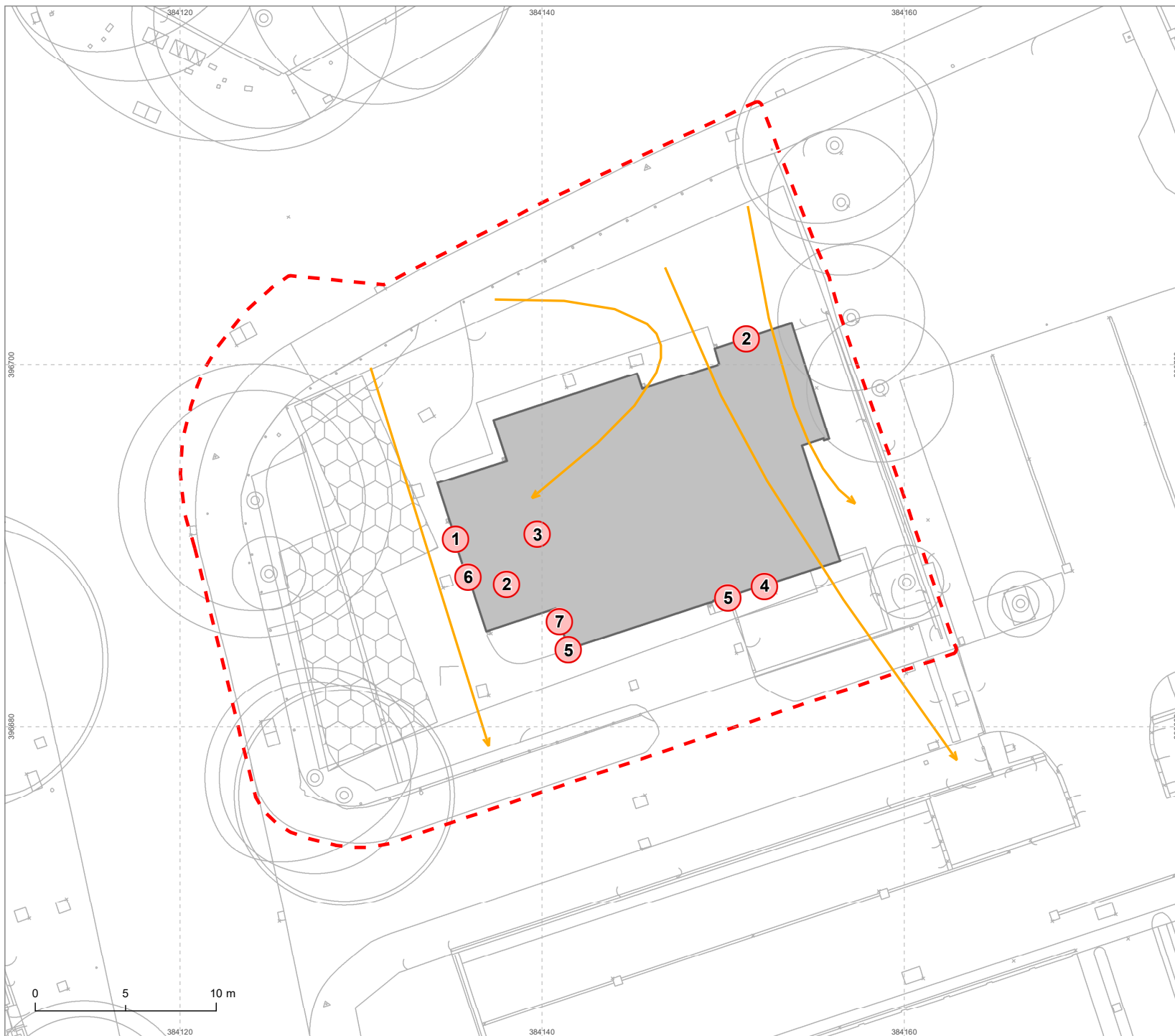
R3 Habitat Enhancement

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 C153624-03-01 – Dawn Re-entry Survey

Drawing C153624-03-02 – Second Dusk Emergence Survey



C153624-03-01

Legend

- Site boundary
- Building surveyed
- Common Pipistrelle Activity
- # Potential roosting features:
 - 1 Gaps in mortar
 - 2 Gaps under roof tiles
 - 3 Gaps behind uPVC/wooden wall cladding
 - 4 Gaps around chimney cladding
 - 5 Lifted cladding joints
 - 6 Broken boarding around pub entrance sign
 - 7 Gaps beneath overhanging tiles

Project
The Gamecock Pub, Booth Street, Manchester

Drawing
Dawn Re-Entry Survey Results - 02.06.2021

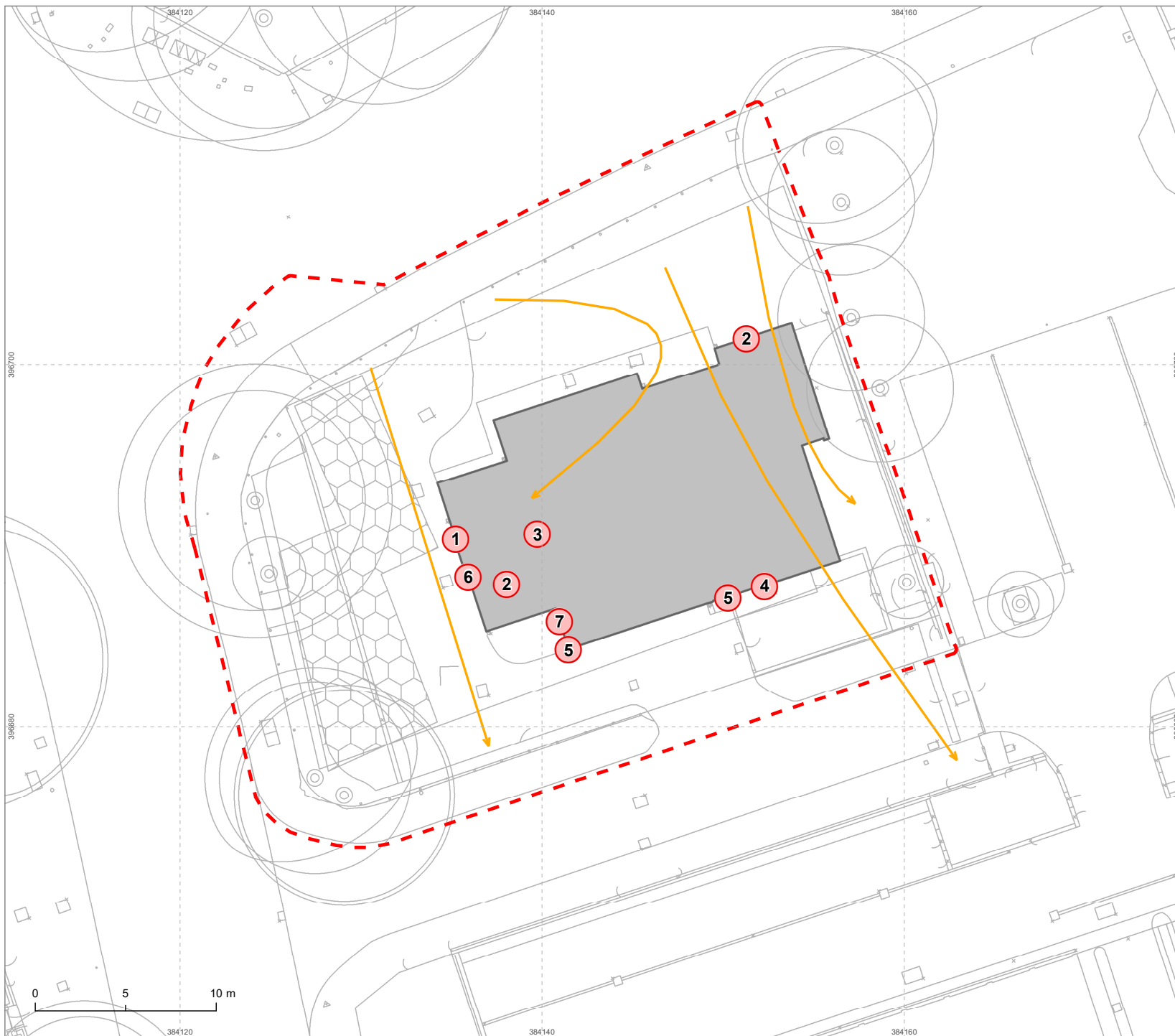
Client
Curlew Alternatives Eighth Property LP

Drawing Number C153624-03-01	Revision 00
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Approved By CR	Drawn By JR

MIDDLEMARCH
ENVIRONMENTAL

Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

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C153624-03-01

Legend

- Site boundary
- Building surveyed
- Common Pipistrelle Activity
- # Potential roosting features:
 - 1 Gaps in mortar
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 - 4 Gaps around chimney cladding
 - 5 Lifted cladding joints
 - 6 Broken boarding around pub entrance sign
 - 7 Gaps beneath overhanging tiles

Project
The Gamecock Pub, Booth Street, Manchester

Drawing
Dawn Re-Entry Survey Results - 02.06.2021

Client
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Drawing Number C153624-03-01	Revision 00
Scale @ A4 1:300	Date June 2021
Approved By CR	Drawn By JR

MIDDLEMARCH
ENVIRONMENTAL

Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

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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 legal protection under the Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017) and the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 (Habitats Regulations 2019). 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.

Changes have been made to parts of the Habitats Regulations 2017 so that they operate effectively from 1st January 2021. The changes are made by the Habitats Regulations 2019, which transfer functions from the European Commission to the appropriate authorities in England and Wales.

All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

The obligations of a competent authority in the 2017 Regulations for the protection of species do not change. A competent authority is a public body, statutory undertaker, minister or department of government, or anyone holding public office.

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

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*. Species of Principal Importance for Nature Conservation in England are material considerations in the planning process. The list of species is derived from Section 41 list of the Natural Environmental and Rural Communities (NERC) Act 2006.

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.