Girls Day School Trust

Northwood College London

Bat Survey Report

2484985

DECEMBER 2023

RSK biocensus
EXPERTS IN ECOLOGY

RSK GENERAL NOTES

Project No.: 2484985

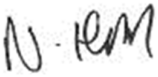
Title: Northwood College London – Bat Survey Report

Client: Girls Day School Trust (GDST)

Date: December 2023

Office: Hemel Hempstead

Status: Rev 00

Author and Project Manager	Joe Pepper	**Technical reviewer**	Daniel Fellman
Signature		Signature	
Date:	12 December 2023	Date:	15 December 2023
Quality reviewer	Nick Henson		
			
Signature			
Date:	15 December 2023		

Switchboard: +44 (0)330 223 1074 Company contact: Enquiries@biocensus.co.uk

EXECUTIVE SUMMARY

This report presents the results of a series of bat surveys completed at Northwood College for Girls (Grid Ref TQ089912), in relation to a proposed floodlight installation at two multi-use games areas (MUGAs).

The survey results presented in this report include a number of field surveys completed in 2023 to inform the Proposed Development, specifically:

- static detector monitoring surveys to identify species, levels of activity, and any key foraging and commuting areas within the Site; and
- emergence surveys on a confirmed roost (*Figure 2*).

Following a Preliminary Ecological Appraisal (PEA) and Preliminary Roost Assessment (PRA) in October 2022, it was recommended that static detectors were deployed in two locations, for three deployments over the course of the active bat season (between May and October).

Following the analysis of data from the first deployment, the survey effort was increased due to the higher level of bat activity than originally expected. Additionally, a surveyor was shown a confirmed roost outside of the red line boundary, but that was considered to be potentially linked to commuting features surrounding the MUGAs.

Droppings were collected from below the entrance to this roost, and the analysis of these found that they originated from Common Pipistrelle. This roost was subject to three emergence surveys. On the third survey, one bat emerged but did not echolocate, so could not be identified to species level.

At least eight species of bat were recorded during the static detector surveys comprising; Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Serotine, Noctule, Leisler's bat, *Myotis* species, and Brown long-eared bat.

Pipistrelles dominated the recordings overall across both static detector locations, with Common Pipistrelle activity being represented most in the data (83.83%). This was followed by soprano pipistrelle (12.93%), and unidentified Pipistrelles (1.32%). The remaining species each contributed less than 1% of the total registrations across both static detectors.

The majority of bat registrations across both MUGAs were by light tolerant species, with just 0.49% of total registrations being associated with light-averse species (i.e. *Myotis spp.* and Brown Long-eared bats).

These light-averse bats were recorded infrequently on site and were primarily found to be commuting through. This activity was also recorded later at night than when the lights would likely be in use. Despite light being shown on the proposed lighting plan to spill onto the areas surrounding MUGA 1, this is not expected to have a significant adverse effect on bats using this area of the site.

Additional measures are nonetheless recommended to reduce the light spill onto a high-potential roost feature present in the tree-line behind MUGA 2 from 1.0 lux to 0.3 lux.

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1.0 INTRODUCTION

1.1 Purpose of this report

1.1.1 This report presents the results of a series of bat surveys, carried out in relation to the proposed installation of flood lighting on two multi-use games areas (MUGAs) at Northwood College for Girls (OS Grid Reference: TQ088913) (*Figure 1*).

1.1.2 This consisted of five static bat recorder deployments, three emergence surveys on a confirmed bat roost, and the DNA analysis of a bat droppings collected from this roost.

1.1.3 The purpose of this report is to inform GDST of the potential for the bats present onsite to be, both directly and indirectly, impacted by the proposed increase in lighting at night.

1.2 Landscape context

1.2.1 The 0.43 ha site is located in central Northwood, north of Ruislip. The site is dominated by hardstanding, in the form of multi-use games areas (MUGAs) and associated footpaths.

1.2.2 The site is immediately bordered by school buildings, with a large playing field to the north-east of the site. The surrounding landscape is largely suburban, with housing and gardens. The Northwood Golf Course club lies to the south-west, between the site and Ruislip Woods.

1.3 Development proposal

1.3.1 The development proposals are for the installation of floodlights throughout the site, to illuminate the two MUGAs for use in the dark.

1.3.2 At each MUGA, the lighting installation will consist of six LED floodlight projectors mounted on eight metre high collapsible columns. With asymmetric optical control directing the beam downwards from a horizontal mounting position to the playing surface below (dpa lighting consultants, 2022).

1.3.3 It is our understanding that these floodlights will be in use when required according to the following schedule:

- Monday to Friday: 09:00 – 21:00;
- Saturdays: 09:00 – 18:00;
- Sundays: 10:00 – 16:00;
- No use on Bank Holidays.

1.4 Background information

1.4.1 RSK Biocensus were instructed to complete a Preliminary Ecological Appraisal (PEA) at Northwood College for Girls, which was carried out in October 2022 (RSK Biocensus, 2022).

1.4.2 *Figure 1* shows the red line boundary associated with the proposed works, as provided for the original surveys.

1.4.3 A background data search (BDS) carried out as part of the PEA returned records of the following bat species within 2 km of the site:

- Serotine (*Eptesicus serotinus*)
- Daubenton's bat (*Myotis daubentonii*)
- Natterer's bat (*Myotis natterii*)
- Leisler's bat (*Nyctalus leisleri*)
- Common Pipistrelle (*Pipistrellus pipistrellus*)
- Soprano Pipistrelle (*Pipistrellus pygmaeus*)
- Nathusius's Pipistrelle (*Pipistrellus nathusii*)
- Brown Long-eared bat (*Plecotus auritus*)
- Unidentified myotis species (*Myotis* sp.)

1.4.4 The survey also found that the buildings surrounding MUGA 1 had high roosting potential for bats, and a tree behind MUGA 2 had high potential for roosting bats.

1.4.5 The initial survey effort, based on the results of the PEA and Preliminary Roost Assessment (PRA) survey, was agreed to comprise three static detector deployments throughout the active bat season (between May and October). Following the results of the first deployment, this was increased to a rate of one week of deployment per month. A surveyor was also shown a confirmed bat roost in a building excluded from the original redline boundary, but that was deemed likely to be linked to the habitats surrounding the MUGAs. Three emergence surveys were therefore also recommended for this building to assess bat activity levels throughout the year, and the potential for its use as a maternity roost.

1.5 Validity of data

1.5.1 According to guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2019), survey data are generally considered valid for a period of 12 to 18 months from the date of the first survey. Between 18 months and 3 years, a professional ecologist will need to undertake a site visit and may also need to update desk study information and review the validity of the survey reports.

2.0 METHODS

2.1 Activity surveys

2.1.1 The initially proposed deployment schedule for static bat detectors was one week of deployment at each MUGA, in May, July, and September 2023. Following the analysis of data from the first deployment, which shows higher than expected bat activity levels, the survey frequency was increased to a rate of one week of deployment per month between May and October.

2.1.2 Equipment used consisted of two Wildlife Acoustics SM4 bat detectors, with one at each MUGA, recording from 30 minutes before sunset until 30 minutes after sunrise. For locations of deployments, please see *Figure 2*. SM4s record audio data, which can then be analysed using bat analysis software such as Kaleidoscope and BatExplorer. The data was joint-analysed by experienced bat ecologists Erika Broom and Daniel Fellman, using a combination of these software.

2.1.3 Following identification of each sound file, these data were extracted and tabulated based on species and the time at which they were recorded. Noise files identified manually were then filtered out of the data for further analysis. In situations where a sound file had calls by more than one bat, these were attributed to each species present in the recording.

2.2 Emergence surveys

2.2.1 Surveyors were positioned in the most suitable locations for viewing the structure. The roost entrance point is shown in *Figure 2*. Due to the size and location of the access point, it was possible for surveyors to be positioned directly adjacent to the roost feature.

2.2.2 The dusk emergence surveys started 15 minutes before sunset and continued for 90 minutes after. Electronic equipment capable of detecting and recording the ultrasonic echolocation calls of bats in flight was used to record bat activity (Elekon Batlogger M2). Species were identified from the characteristics of their calls (including peak frequency, minimum and maximum frequency, call duration, and inter-pulse interval). In addition, infra-red cameras were used to monitor the bat access point on each survey.

2.2.3 The surveys were carried out in weather suitable for bats to be active, that being no strong wind and a sunset air temperature of 10°C or above. Surveys 1 and 2 had short periods of light rain towards the end of the surveys, though this was judged not to be significant to a point of limitation.

Table 1. *Emergence survey information. Weather was recorded at start of survey.*

Date	Sunset Time	Start Time/ End Time	Temperature (°C)	Wind (Beaufort)	Cloud (Oktas)	Precipitation
29.06.2023	21:23	21:08/22:53	18	1	2	0
01.08.2023	20:50	20:35/22:20	18	3	3	0
30.08.2023	19:53	19:38/21:23	17	2	0	0

2.3 DNA analysis

2.3.1 Numerous bat droppings were identified at the roost, below an access point (*Photograph 3*). Samples were collected in a sterile container and sent to ADAS Biotechnology for species identification analysis.

2.4 Limitations

2.4.1 Due to sub-optimal weather conditions throughout much of the season, dates for deployment were altered during periods of continuous rain. However, due to the amount of data collected across the active season regardless of schedule alterations, this is not considered to affect the conclusions of this report.

2.4.2 The survey schedule was also affected by surveyor availability. For example, during the third deployment, the statics recorded continuously from 29 June to 14 July. This altered the schedule for the rest of the surveys, as while the deployment in July was no longer considered necessary, the following deployments were completed earlier in the month to avoid leaving significant time periods un-surveyed. As a result, this is not considered to affect the conclusions of this report, since at least one week was recorded in each month.

2.4.3 Bats in the *Myotis* genus have not been separated to the species level due to the difficulty in differentiating their calls. Proportionately, relatively low numbers of *Myotis* calls were recorded. As all *Myotis* species have an aversion to light, the entire genus is considered equally as vulnerable for the purposes of this report.

2.4.4 Static detectors cannot distinguish between large numbers of bats, and small numbers of bats making repeated passes. High levels of bat activity can be generated by a small number of foraging bats and individual bats close to a detector. This was considered during the interpretation of the survey results.

2.4.5 It was not practical to place statics in various locations throughout the site, surrounding the MUGAs. This was partially due to access limitations, and partially due to the risk of tampering or interference if left in an area of high foot traffic. As a result, only one single suitable location was chosen at each MUGA (*Figure 2*).

3.0 RESULTS

3.1 Activity surveys

3.1.1 The number of bat 'passes' or 'registrations' shown in the following tables equates to the number of files recorded by the detector, with a maximum file length of five seconds, attributed to a species or genus of bat. A file may have registrations of more than one bat. Bat activity is measured in the number of bat registrations; therefore, this value does not directly equate to the number of bats present.

Table 2. *Summary of bat registrations at MUGA 1.*

	Deployment							
Species	**1**	**2**	**3**	**4**	**5**	**Total**	**Species % of Total**	**Genus % of Total**
Common pipistrelle	177	120	180	431	64	972	74.54%	
Soprano pipistrelle	4	16	54	29	3	106	8.13%	
Nathusius' pipistrelle	3	3	-	-	3	9	0.69%	
***Pipistrellus* sp.**	144	-	33	-	-	177	13.57%	96.93%
Serotine	2	1	7	1	-	11	0.84%	0.84%
Noctule	-	6	9	5	1	21	1.61%	
Leisler's bat	-	-	-	2	-	2	0.15%	1.76%
***Myotis* species**	-	-	-	-	-	0	0.00%	0.00%
Brown Long-eared	5	1	-	-	-	6	0.46%	0.46%
Number of registrations	335	147	283	468	71	1304		

Table 3. *Summary Table of bat registrations at MUGA 2.*

	Deployment							
Species	**1**	**2**	**3**	**4**	**5**	**Total**	**Species % of Total**	**Genus % of Total**
Common pipistrelle	1051	3032	2349	6701	1055	14188	84.55%	
Soprano pipistrelle	176	345	192	1063	457	2233	13.31%	
Nathusius' pipistrelle	11	50	-	8	50	119	0.71%	
***Pipistrellus* sp.**	20	-	41	-	-	61	0.36%	98.93%
Serotine	5	1	22	2	-	30	0.18%	0.18%
Noctule	-	35	1	18	8	62	0.37%	
Leisler's bat	-	5	-	-	-	5	0.03%	0.40%
***Myotis* species**	2	-	1	3	4	10	0.06%	0.06%
Brown Long-eared	3	18	11	31	9	72	0.43%	0.43%
Number of registrations	1268	3486	2617	7826	1583	16780		

3.1.2 The results from each deployment are summarised below. Due to the nature of the proposed development, the registrations of light-averse species, in this case *Myotis* spp. and Brown Long-eared bats, are described in greater detail.

Deployment 1: 23 May - 31 May

MUGA 1

3.1.3 Across seven nights of recording, a total of 426 sound files were analysed. A total of 102 noise files were filtered out, leaving 324 sound files with 335 calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Serotine, and Brown Long-eared bats.

3.1.4 There were five registrations of Brown Long-eared bats, equivalent to 1.49% of the total bat data for this deployment from this static detector, on 24 May between 00:15 and 01:27.

MUGA 2

3.1.5 Across seven nights of recording, a total of 1,243 sound files were analysed. A total of 26 noise files were filtered out, leaving 1,217 sound files with 1,268 calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, *Myotis* sp., Serotine, and Brown Long-eared bats.

3.1.6 There were three registrations of Brown Long-eared bats. These were on 25 May at 01:10, and on 28 May at 23:07 and 01:52. This is equivalent to 0.24% of the total bat data for this deployment from this static detector.

3.1.7 There were two registrations of *Myotis* sp. These were on 25 May at 23:49, and on 26 May at 00:30. This represents 0.16% of the total bat data for this deployment from this static.

Deployment 2: 29 June – 14 July

MUGA 1

3.1.8 Across sixteen nights of recording, a total of 2,387 sound files were analysed. A total of 2,242 noise files were filtered out, leaving 145 sound files with 147 calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Noctule, Serotine, and Brown Long-eared bats.

3.1.9 There was one registration of Brown Long-eared bat, at 00:10 on 30 June. This represents 0.68% of the total bat data for this deployment from this static detector.

MUGA 2

3.1.10 Across sixteen nights of recording, a total of 4,187 sound files were analysed. A total of 766 noise files were filtered out, leaving 3,421 sound files with 3,486 calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Leisler's bat, Noctule, Serotine, and Brown Long-eared bats.

3.1.11 There were 18 registrations of Brown Long-eared bats, representing 0.52% of the total bat data for this deployment from this static detector. These data were recorded on eight nights, between the hours of 23:21 and 02:44.

Deployment 3: 01 August – 08 August

MUGA 1

3.1.12 Across eight nights, a total of 17,043 sound files were analysed. A total of 16,819 noise files were filtered out, leaving 224 sound files with 283 calls from Common Pipistrelle, Soprano Pipistrelle, Noctule, and Serotine bats.

MUGA 2

3.1.13 Across eight nights, a total of 2,510 sound files were analysed. A total of 74 noise files were filtered out, leaving 2,436 files with 2,617 calls from Common Pipistrelle, Soprano Pipistrelle, *Myotis* sp., Noctule, Serotine, and Brown Long-eared bats.

3.1.14 One file contained a *Myotis* call, at 23:55 on 03 August. This represents 0.04% of the total bat data for this deployment from this static detector.

3.1.15 There were 11 registrations of Brown Long-eared bats across four of the nights, representing 0.42% of the total bat data for this deployment from this static detector. Ten of these sound files were recorded between the hours of 23:12 and 04:47, although one record was at 21:12.

Deployment 4: 30 August – 06 September

MUGA 1

3.1.16 Across eight nights, a total of 579 sound files were analysed. A total of 115 noise files were filtered out, leaving 464 sound files with 468 calls from Common Pipistrelle, Soprano Pipistrelle, Leisler's bat, Noctule, and Serotine bats.

MUGA 2

3.1.17 Across eight nights of recording, a total of 9,059 sound files were analysed. A total of 1,555 noise files were filtered out, leaving 7,504 sound files with 7,826 calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Noctule, Serotine, and Brown Long-eared bats.

3.1.18 Three sound files contained calls by *Myotis* bats, representing 0.04% of the total bat data for this deployment from this static detector. These data were recorded on two nights, between the hours of 21:43 and 23:02.

3.1.19 There were 31 registrations of Brown Long-eared bats, representing 0.40% of the total bat data for this deployment from this static detector. These data were recorded between the hours of 21:00 and 04:25.

Deployment 5: 29 September – 06 October

MUGA 1

3.1.20 Across eight nights, a total of 500 sound files were analysed. A total of 429 noise files were filtered out, leaving 71 sound files with calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, and Noctule bats.

MUGA 2

3.1.21 Across eight nights, a total of 2,189 sound files were analysed. A total of 631 noise files were filtered out, leaving 1,558 sound files with 1,583 calls from Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, *Myotis* sp., Noctule, and Brown Long-eared bats.

3.1.22 Four sound files with *Myotis* bat calls, most likely Daubenton's and Natterer's bats, were recorded across two of the nights, representing 0.25% of the total bat data for this deployment from this static detector. Two of these files were recorded at 22:15 on 01 October, while the other two files were recorded at 21:30 on 05 October.

3.1.23 Nine sound files with Brown Long-eared bat calls were recorded across four of the nights, representing 0.57% of the total bat data for this deployment from this static detector. These sound files were recorded between the hours of 21:54 and 05:28.

3.2 Emergence surveys

Survey 1: 29 June 2023

3.2.1 No emergences were observed. Relatively low levels of bat activity were recorded throughout the survey, with discrete periods of activity by commuting Common Pipistrelles between 21:57 and 22:49.

3.2.2 A single commuting Common Pipistrelle was observed during this first visit.

Survey 2: 01 August 2023

3.2.3 No emergences were observed on this survey. Relatively low levels of bat activity were recorded throughout the surveys, with activity by Common Pipistrelle at 21:17, 21:34, 21:55, 22:05, 22:08.

Survey 3: 29 August 2023

3.2.4 One bat emerged from the roost at 20:08 (*Photograph 4*). This bat did not echolocate when emerging and, therefore, could not be identified using sound file analysis.

3.2.5 A single Common Pipistrelle foraged from 20:20 until the end of the survey at 21:25.

3.3 Bat dropping analysis

3.3.1 The bat droppings were identified as originating from Common Pipistrelle. For further information on the analysis results, please see *Appendix C*.

4.0 DISCUSSION

4.1 Activity surveys

4.1.1 Throughout the survey season, MUGA 1 had relatively low levels of bat activity in comparison to MUGA 2. MUGA 2 is located in close proximity to a tree line, used as commuting and foraging habitat by at least eight bat species. Meanwhile, MUGA 1 is surrounded by buildings, with limited foraging potential, and with a higher existing level of lighting (dpa lighting consultants, 2023a).

4.1.2 The majority of the bat activity recorded on site was by species that are known to be tolerant to light, namely the Pipistrelles, Serotine, Noctule, and Leisler's bat. However, some species are deterred by artificial lighting, with Long-eared bats, *Myotis* species, Barbastelle, and Horseshoe bats shown to avoid artificial lights (ILP, 2018). This aversion to light means that poorly-planned lighting can act as barriers along commuting corridors, potentially limiting access to usual foraging habitats. Of these light-averse species, *Myotis* and Brown Long-eared are present on site.

4.1.3 In the case of this proposed development, the percentage of activity on site attributed to light-averse species is relatively low, accounting for just 0.46% of bat registrations at MUGA 1, and 0.49% of registrations at MUGA 2.

4.1.4 It is our understanding that the pitches, and therefore the lights, will not be in use past 21:00 at any time, and lights will be turned off earlier on weekends. Throughout the monitoring period, Brown Long-eared bats were recorded on site between the hours of 21:00 and 22:00 on just five occasions. The majority of activity on site by light-averse species generally takes place later at night, several hours after the pitches and lights would no longer be in use. This suggests that these bats are not roosting on or close to the site, but simply commuting.

4.1.5 Another noted effect of increased artificial lighting is that nocturnal insects are attracted to these well-lit areas. This means that prey for light-averse bat species will be less abundant in the preferred darker areas, resulting in increased competition by light-tolerant species, in turn leading to a reduction in foraging value of this habitat.

4.1.6 However, the data collected shows that bats at this site will not be affected by artificial lighting in this way. Light-averse bats are recorded on site very occasionally, and Brown Long-eared bat activity rarely consisted of more than two passes in a single night. This suggests that the site is not an important foraging habitat for this species, but rather forms part of a commuting corridor through the wider landscape. The activity of *Myotis* spp. on site is similar, with even fewer registrations than Brown Long-eared bats. Even if this were the preferred foraging habitat for these species, and activity levels were higher, the times at which they are present on site is later at night than the latest time at which the floodlights will be in use.

4.1.7 To some degree, the attraction of nocturnal insects may benefit the light-tolerant bat species that emerge earlier at night, with Pipistrelles, Serotine, Noctules and Leisler's bats having been observed to feed around artificial lights (Blake et al 1994; Stone et al 2015.).

4.2 Roost emergence surveys

4.2.1 Due to the number of droppings present, this roost was considered likely to be in use by Common Pipistrelle as a maternity roost, though no bats were recorded during the maternity period. This is most likely a result of the warmer-than-usual weather experienced at this time of year, and any bats typically using this roost may have moved to a cooler roost elsewhere. The single bat emergence during Survey 3 suggests that, this year at least, this roost could be considered primarily as a transient or day roost.

4.2.2 The concern with lighting roost entrances is that bat emergence may be delayed until the lights are turned off (ILP, 2018). However, according to the current lighting plan, no additional light will fall directly on the entrance point to the confirmed roost location. The bat observed emerging from the roost flew in the direction of the treeline, confirming this as a commuting route by bats from this roost, and supporting the concern that light spill onto the tree line may indirectly impact the utilisation of this roost. However, due to the light-tolerant species that was recorded using the roost, and the fact that the lighting will not fall on the entrance to the roost, the proposed lighting plan will not cause any adverse effects on the integrity of this roost.

4.3 Implications of lighting plan

4.3.1 Standard guidance (ILP, 2018) suggests that, for the benefit of light averse bat species, the overall light cast onto the tree line should not exceed the light intensity of a full moon. This is approximately equivalent to a value of 0.3 lux at the edge of the tree line.

4.3.2 The lighting plans developed by dpa lighting ltd. (C10229-EX-LL+LCP-001, C10229-EX-LL+LCP-002) suggest that the light spill onto the surroundings of MUGA 1 and MUGA 2 will be higher than this, with up to 200 lux onto the faces of the buildings surrounding MUGA 1 and onto the treeline behind MUGA 2.

4.3.3 While it is true that the implementation of artificial lighting according to the currently proposed lighting plan may affect any light-averse bats roosting on the sides of school buildings facing MUGA 1, the data suggests that such bat roosts are absent. No *Myotis* activity was registered here at any time, and no Brown Long-eared activity was recorded until several hours after the lights would no longer be active, under the proposed schedule of use.

4.3.4 Similarly, while the lighting plan may theoretically affect the commuting corridor behind MUGA 2, the bats that would be affected by this are arriving on site later than the lights will be used, and infrequently compared to the majority of the other bats species using the site.

4.3.5 According to drawing C10229-EX-LL+LCP-002, the high potential roost feature on the tree is in an area of relatively low light spill from the proposed lighting, at 1.0 lux. However, it is important to note that this light level would still be sufficient to entomb a light-averse species. While all activity by light-averse species was recorded after 21:00, even in months of earlier darkness, there could be concern that these bats would not be aware of the lighting on the return commute, and may decide to roost in the feature. The time at which the bat could then emerge would subsequently be limited to 21:00 at the

earliest. This effect could be avoided if the light spill in this area were to be reduced to 0.3 lux. This may be made possible by installing additional barriers to light.

4.3.6 Therefore, based on the data collected, the lighting plan in its current form has the potential to cause an adverse impact on bats at this site, at MUGA 2. However, if sufficient measures are put in place to further amend the degree of light spill at MUGA 2, this impact will be reduced to the point that bats will not be negatively affected, under the condition that the use of the pitches remains limited to no later than 21:00.

5.0 CONCLUSIONS

5.1.1 Throughout the survey season, the vast majority of bat calls recorded on site were light-tolerant species, with more than 99.5% of the total registrations being from a combination of Pipistrelle species, Serotine, Noctule and Leisler's bats.

5.1.2 The remaining <0.5% registrations were from light-averse species; *Myotis* species and Brown Long-eared bats. The activity level of these species on site was lower than the light-tolerant species, and suggests commuting behaviour and infrequent foraging, primarily along the treeline by MUGA 2. This activity was at no time recorded earlier than 21:00, the time of night at which the use of the pitches and proposed floodlights will cease.

5.1.3 Despite the light spill onto building faces at MUGA 1, as shown in the current proposed lighting plan, this plan is considered to be acceptable for this part of the site. The light-averse bats, those that would be potentially negatively impacted by the lighting scheme, were at no point recorded using this section of the site at a time at which they could be affected.

5.1.4 At MUGA 2, light-averse bats were also recorded later at night, and always after 21:00. However, due to some concerns about light spill onto a high potential roosting feature in the treeline behind MUGA 2, additional mitigation is recommended here to reduce the proposed light level from 1.0 lux to a maximum of 0.3 lux.

5.1.5 Additionally, it is important that the pitches are not lit past 21:00 on any occasion, particularly in the months of April and October, at a time when the sun sets earlier and light-averse bats will emerge earlier.

5.1.6 If the construction phase takes place during the active bat season, any work past 21:00 under artificial light should be avoided.

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FIGURES

508500 508600 508700 508800 508900 509000 509100 509200 509300

191600 191500 191400 191300 191200 191100 191000

The Hall School/The Grange

Green Lane

Green Lane

A404

Northwood Methodist Church

Northwood Library

Eastbury Rd

Northwood

Underground-Northwood

Maxwell Road

Northwood College

Rickmansworth Road

Murray Road

Murray Road

A404

Legend:

Blue line boundary

Red line bundary

Rev	Date	Description	Drn	Chk	App
00	14/12/2023	2484985	RG	RS	JP

Northwood College London

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 1:

Site Location Plan

0 30 60 90

Metres

SCALE: 1:2,500 @ A3

N W E S

REV 00

Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2484985 - Northwood College London\03 - APRX\2484985 - Northwood College London - Figure 1 - Site Location Plan.aprx

508750 508800 508850 508900 508950 509000 509050 509100

191450 191400 191350 191300 191250 191200 191150

Legend:

- Blue line boundary
- Red line bundary
- Static location
- Roost

Rev	Date	Description	Drn	Chk	App
00	14/12/2023	2484985	RG	RS	JP

Northwood College London

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 2:

Survey Locations

0 10 20 30

Metres

SCALE: 1:1,250 @ A3

N W E S

REV 00

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APPENDIX A – LEGISLATION

The Wildlife and Countryside Act (WCA) 1981
https://www.legislation.gov.uk/ukpga/1981/69

The Wildlife and Countryside Act 1981 (as amended) is the primary piece of legislation relating to nature conservation in the UK.

Under Section 9 of the WCA, for animals listed on Schedule 5 that are also on the 'Habitats Regulations' (see below), it is an offence in England to intentionally or recklessly:

- disturb any such animal while it is occupying a structure or place of shelter or protection;
- obstruct access to any structure or place used by any such animal for shelter or protection.

There are also restrictions on transport, possession and sale.

It has recently become possible to obtain a derogation licence from Natural England to permit activities which would otherwise contravene the regulations above, including for development purposes, when certain conditions are met. The application process is the same as for licences under the Habitats Regulations.

Failure to satisfy the Regulations and obtain a licence where required could result in prosecution and lead to fines and possible imprisonment.

The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations')

[https://www.legislation.gov.uk/uksi/2017/1012/introduction]

The Regulations (as amended) provide for the designation and protection of European Protected Species (EPS), including bats.

Under Regulations 43, it is an offence to:

a) deliberately capture, injure or kill a wild animal of a EPS,

b) deliberately disturb wild animals of any such species,

c) damage or destroy a breeding site or resting place of such an animal.

For the purposes of paragraph (b), above, disturbance of animals includes in particular any disturbance which is likely to:

a) 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

b) to affect significantly the local distribution or abundance of the species to which they belong.

There are also restrictions on transport, possession and sale.

It is possible to obtain a derogation licence from Natural England to permit activities which would otherwise contravene the regulations above, including for development purposes, when certain

conditions are met. Failure to satisfy the Regulations and obtain a licence where required could result in prosecution and lead to fines and possible imprisonment.

The Natural Environment and Rural Communities (NERC) Act 2006;
https://www.legislation.gov.uk/ukpga/2006/16

The Natural Environment and Rural Communities (NERC) Act 2006, Section 40 requires that any public body or statutory undertaker in England must have regard to the purpose of conservation of biological diversity in a manner that is consistent with the exercise of their normal functions. This may include enhancing, restoring or protecting a population or a habitat. The intention is to help ensure that biodiversity becomes an integral consideration in the development of policies, and that decisions of public bodies work with the grain of nature and not against it.

As part of this duty, statutory undertakers must have regard to the list of habitats and species which are of principal importance for the purpose of maintaining and enhancing biodiversity. For England, the duty to compile such a list is captured under Section 41 of the NERC Act. The lists for England are accessible online via the National Archive[1];

[1] https://webarchive.nationalarchives.gov.uk/ukgwa/20140712055944/http:/www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx

APPENDIX B - PHOTOGRAPHS

Photograph 1. MUGA 1 static location.

Photograph 2. MUGA 2 static location.

Photograph 3. Common Pipistrelle droppings at bat roost.

Photograph 4. Emergent bat from roost.

APPENDIX C– DNA ANALYSIS

Client:

Ruby Hill
RSK Biocensus

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 516747
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: **6027954-90**

Client Identifier:	2484985 Northwood	**Sample Description:**	Container of intact droppings
Date of Receipt:	07/07/2023	**Material Tested:**	1 dropping processed

Determinant	Result (closest match)	Method	Date of DNA Sequence Analysis
Cytochrome oxidase subunit 1 (COI) DNA sequence	***Pipistrellus pipistrellus***	DNA extraction from a single dropping followed by PCR amplification of a short fragment of the COI gene, DNA sequencing and comparison to a database of known DNA sequences for species identification	19/07/2023

Sequence Alignment* **Sequence Identity** 161/161 (100%)

```
Query  1    TAGTTCCACTAATAATTGGAGCCCCTGACATGGCATTTCCTCGTATAAATAATATAAGTT  60
            ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  132  TAGTTCCACTAATAATTGGAGCCCCTGACATGGCATTTCCTCGTATAAATAATATAAGTT  191

Query  61   TCTGACTCCTACCTCCTTCTTTTCTACTACTACTAGCCTCGTCTATAGTAGAAGCGGGAG  120
            ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  192  TCTGACTCCTACCTCCTTCTTTTCTACTACTACTAGCCTCGTCTATAGTAGAAGCGGGAG  251

Query  121  CGGGTACAGGCTGAACAGTCTACCCCCCTCTAGCAGGAAAC  161
             |||||||||||||||||||||||||||||||||||||||||
Sbjct  252  CGGGTACAGGCTGAACAGTCTACCCCCCTCTAGCAGGAAAC  292
```

Report Prepared by:	**Dr Steve Kane**	**Report Issued by:**	**Dr Helen Rees**
Signed:		**Signed:**	
Position:	**Research Scientist**	**Position:**	**Director: Biotechnology**
Date of preparation:	**19/07/2023**	**Date of issue:**	**19/07/2023**

**DNA sequence alignment for the test sample (Query) matched to a known sequence (Sbjct).*
$The identity or percentage match of the two sequences (ideally 100%).