



APPENDIX 6-1

BAT SURVEY REPORT

Meath County Council - Viewing Purposes Only!



Planning and
Environmental
Consultants

Bat Report

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DOCUMENT DETAILS

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Planning and
Environmental
Consultants

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1. INTRODUCTION

MKO was commissioned to undertake a bat survey for a proposed Mixed-Use Scheme at Moygaddy, Co. Meath and Co. Kildare. (Grid Ref: N 94468 39390).

MKO undertook two dusk and one dawn bat activity surveys in 2021 and a bridge inspection in August 2022, within the site of the proposed development works. The main objective of the surveys was to gather information on roosting, commuting, and foraging bats using the site and to identify any important features for bats. Three full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were deployed for the duration of the survey period (4 weeks) to record bat activity at six fixed locations.

The bat survey and assessment were informed by a desk study and with reference to the following guidelines:

- *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn.) (Collins, 2016)*
- *Bat Roosts in Trees (Andrews, 2018)*
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a)*
- *Guidelines for the Treatment of Bats during the Construction of National Road Schemes (NRA, 2006b)*
- *British Bat Calls: A Guide to Species Identification (Russ, 2012)*
- *Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. (Kelleher & Marnell, 2006)*
- *Bat Mitigation Guidelines for Ireland – V2. Irish Wildlife Manuals, No. 134. (Marnell, Kelleher & Mullen 2022)*
- *Guidance Note 08/18: Bats and Artificial Lighting in the UK (ILP, 2018)*

1.1 Policy and Legislation

All Irish bats are protected under European legislation, namely the Habitats Directive (92/43/EEC). All Irish species are listed under Annex IV of the Directive, requiring strict protection for individuals, their breeding sites and resting places. The Lesser horseshoe bat (*Rhinolophus hipposideros*) is further listed under Annex II of the Directive, requiring the designation of conservation areas for the species. Under this Directive, Ireland is obliged to maintain the favourable conservation status of Annex-listed species. This Directive has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011).

In addition, Irish species are further protected by national legislation (Wildlife Acts 1976-2021). Under this legislation, it is an offence to intentionally disturb, injure or kill a bat or disturb its roost. Any work at a roost site must be carried out with the agreement of the National Parks and Wildlife Service (NPWS) and a derogation licence must be granted before works commence.

1.2 Statement of Authority

The bat surveys were undertaken by MKO ecologists Tim Murphy (BSc.), Neil Campbell (BSc.) and Kevin McElduff (BSc.) who have over 1 years' experience in ecological consultancy. All staff have relevant academic qualifications to complete the surveys and assessments that they were required to do. This report was prepared by Tim Murphy (BSc.) and was reviewed by Aoife Joyce (BSc., MSc.). Aoife has over three years' experience in ecological assessments and has completed CIEEM and BCI courses in Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training and Kaleidoscope Pro Analysis.

2.

CHARACTERISTICS OF PROPOSED DEVELOPMENT

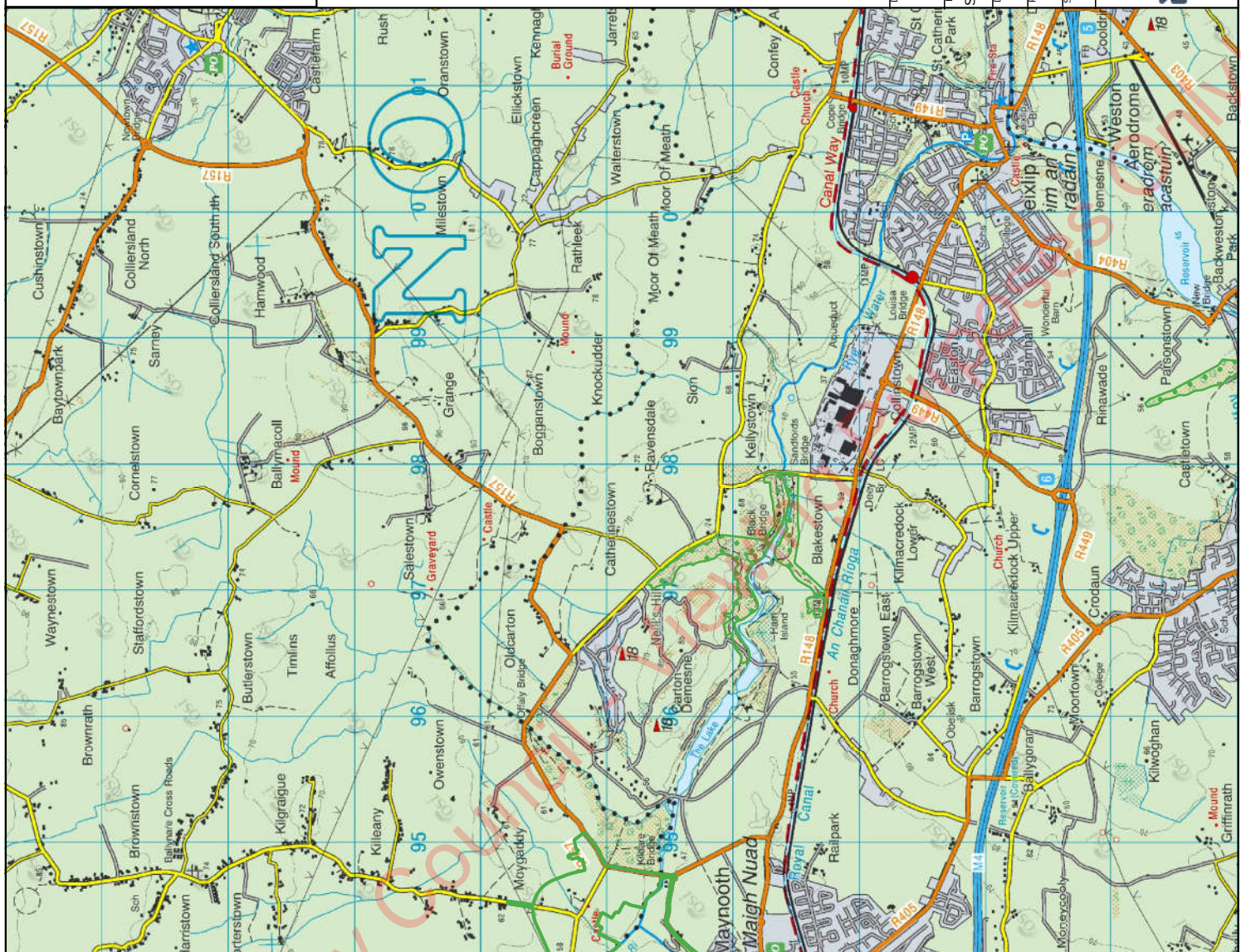
The proposed development site is located in the townland of Moygaddy, Maynooth Environs, Co. Meath and Co. Kildare (Grid Ref: N 94468 39390).

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development (henceforth referred to as the Proposed Development). A total of three planning applications will be submitted to Meath County Council as the competent authority. One planning application seeks to provide a Strategic Employment Zone (Biotechnology & Life Sciences Campus) (Site A), the second planning application for Community Infrastructure which includes a Nursing Home and Primary Care Centre (Site B), and the third planning application for the delivery of the proposed Maynooth Outer Orbital Road (MOOR).

A planning application for a Strategic Housing Development (SHD) (Site C) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

There will also be two separate planning applications submitted to Kildare County Council (KCC) for shared infrastructure, proposed services and utilities connections to Maynooth town in County Kildare. One planning application to KCC includes a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development. The second planning application to be submitted to KCC is located to the southwest of Site C (SHD) for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments.

Figures 2-1 and 2-2 show site location and site boundaries.



Map Legend



EIAR Site Boundary



Drawing Title

EIAR Site Boundary

Project Title

Sky Castle Ltd - Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare

Drawn By

Checked by

CM

CM

Project No.

210414

Scale

1:49,500

Date

2022-08-30

Figure 2-1

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Map Legend

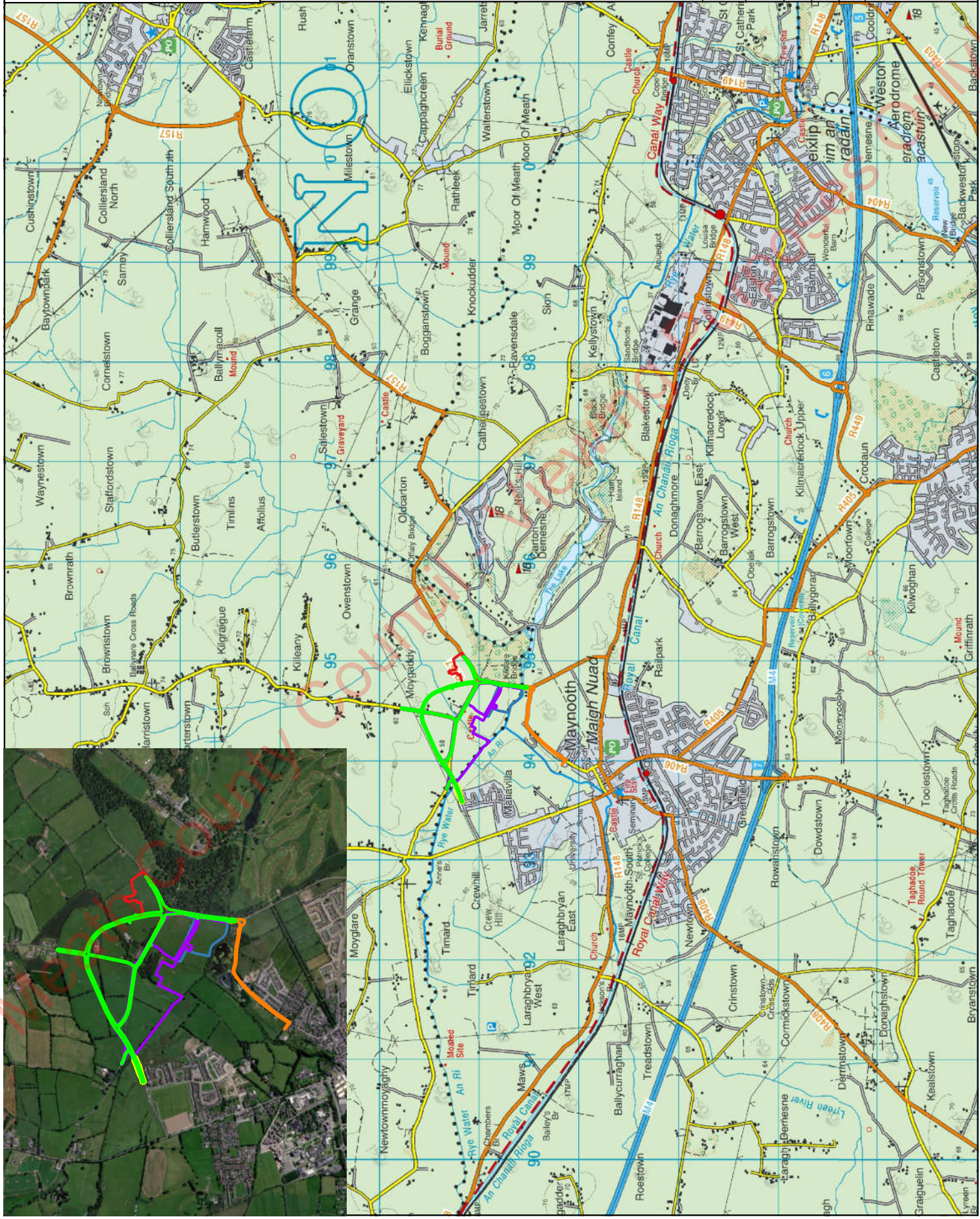
- Site A - Strategic Employment Zone
- Site B - Healthcare Facilities
- Site C - Strategic Housing Development
- MOOR- Maynooth Outer Orbital Road
- Kildare Bridge
- Moyglare Bridge

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Drawing Title	
Six Planning Applications Site Boundaries	
Project Title	
Sky Castle Ltd - Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
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Project No.	Drawing No.
210414	CM
Scale	Figure 2-2
1:49,500	2022-08-30
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3. METHODS

3.1 Consultation

A scoping exercise was undertaken as part of the proposed development. A Scoping Document, providing details of the application site and the proposed development, was prepared by MKO and circulated to the Development Applications Unit in August 2021. As of 23rd August 2022, no response has yet been received.

3.2 Desktop Study

A desktop review of published material was undertaken to inform all subsequent field studies and assessments. The aim of the desktop review was to identify the presence of species of interest within the proposed site and surrounding region.

3.2.1 National Bat Database of Ireland

The National Bat Database of Ireland holds records of bat observations received and maintained by Bat Conservation Ireland. These records include results of national monitoring schemes, roost records as well as ad-hoc observations. The database was searched for bat presence and roost records within a 10km radius of the proposed development site.

In addition, information on species' range and distribution, available in the 2019 Article 17 Reports (NPWS, 2019), was reviewed in relation to the location of the Proposed Development. The NPWS monitors the conservation status of European protected habitats and species and reports their findings to the European Commission every 6 years in the form of an Article 17 Report. The most recent report for the Republic of Ireland was submitted in 2019.

3.2.2 Designated Sites

The National Parks and Wildlife Service (NPWS) map viewer and website provides information on rare and protected species, sites designated for nature conservation and their conservation objectives. A search was undertaken of sites designated for the conservation of bats within a 10 km radius of the Study Area (BCI 2012, Hundt, 2012, SNH 2019). This included European designated sites, i.e. SACs, and nationally designated sites, i.e. NHAs and pNHAs.

3.3 Ecological Appraisal (Bats)

Bat walkover surveys of the study area were carried out during daylight hours on the 8th July, 22nd July, 9th August 2021 and 18th August 2022. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High*, *Moderate*, *Low* and *Negligible*.

3.3.1 Roost Surveys

During the bat walkover surveys, a search for roosts was undertaken within the boundary of the proposed development. The aim was to determine the presence of roosting bats and the need for

further survey work or mitigation. During the walkover, mature trees, a castle tower and bridge within the proposed development site were assessed for their suitability to support bats.

This comprised a detailed inspection of the exteriors and interiors (if accessible) to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes and fur oil staining and noises (Collins, 2016).

The small castle tower and bridge (IG Ref: N 94448 39151 & N 94726 38561) were subject to a roost assessment. The exteriors of the structures were inspected first from ground level, with the aid of binoculars. The search included the ground, accessible windowsills, walls, and roofs. A systematic search of all accessible interiors was also undertaken by a licensed bat ecologist. Searches were carried out with the aid of torches and a ladder and focused on walls, floors, roofs, windowsills, lintels, etc. Results of the roost assessments are detailed in section 4.3 below.

Trees within the site were also assessed from ground level, with the aid of binoculars. Any potential tree roosts were examined for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

3.4 Emergence Survey

A dusk emergence survey was carried out on the evening of the 8th July 2021 on the small castle tower (Grid Ref: N 94448 39151). Two surveyors were equipped with active full spectrum bat detectors, Batlogger M (Elekon AG, Lucerne, Switzerland). Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

Conditions were suitable for bat surveys on all survey nights. The emergence surveys commenced 30 minutes before sunset and concluded 1 hour after sunset and were followed by walked transect surveys. The purpose was to identify any bat species, numbers, access points and roosting locations within the structure.

3.5 Dusk and Dawn Activity Surveys

Dusk and dawn activity surveys were carried out on 8th July, 22nd July and 9th August 2021. Two surveyors were equipped with active full spectrum bat detectors, a Batlogger M (Elekon, Lucerne, Switzerland) and walked a transect route within the site, focusing on potentially suitable habitat features for bats. Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

The dusk survey on 8th July 2021 commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (18° C at sunset) with only light air (Beaufort Scale Force 1). The moon was not visible, and cloud cover was approximately 100% during the dusk survey.

The dawn survey on 22nd July 2021 commenced 2 hours before sunrise and was completed at sunrise. Conditions were suitable for bat survey as per Collins (2016); dry, mild (15° C at sunrise) with only light air (Beaufort Scale Force 1). Cloud cover was approximately 10% throughout the dawn survey.

The dusk survey on 9th August 2021 commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (17° C at sunset), with only light air to light breeze (Beaufort Scale Force 1). Cloud cover was approximately 25% throughout the dusk survey.

July and August are within the optimum survey period for bat activity surveys, provided weather conditions are favourable (Collins, 2016). No limitations associated with seasonality, timing or weather conditions were identified.

Table 3-1 - Bat Activity Survey Effort 2021

Date	Surveyor	Type	Sunrise/Sunset	Weather
8 th July 2021	Tim Murphy and Neil Campbell	Dusk	21:52	18° C; Dry, Light air
22 nd July 2021	Tim Murphy and Neil Campbell	Dawn	05:27	15° C; Dry, Light air
9 th August 2021	Tim Murphy and Neil Campbell	Dusk	21:05	17° C; Dry, Light air

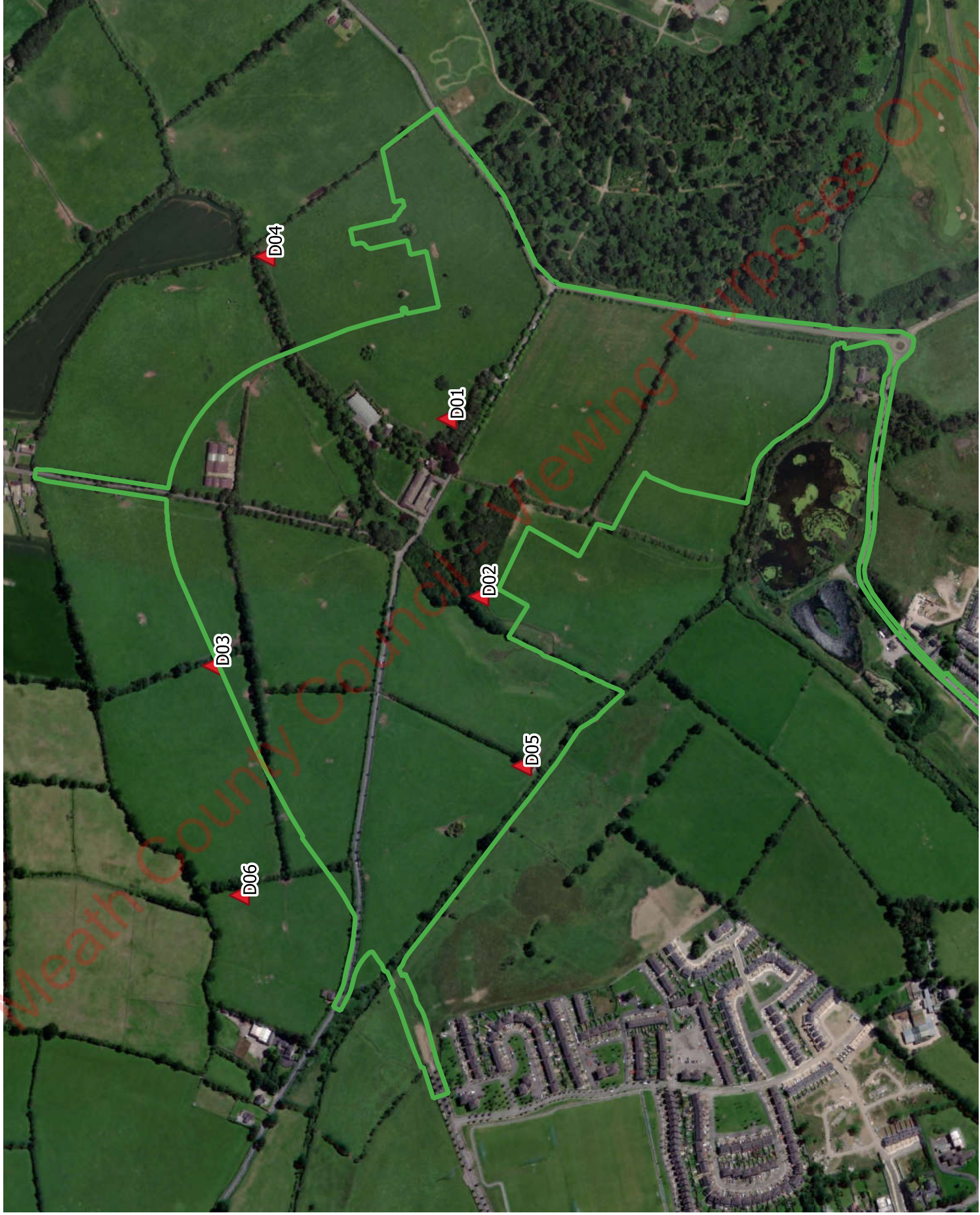
3.6

Static Detector Surveys

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity at six fixed locations over 2-week periods in 2021. The six locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats as well as open spaces within the site. Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

The survey was designed to utilise three static detectors to monitor bat activity. Two Song Meter SM4BAT detectors were deployed on site on 8th July 2021. The Song Meter SM4, dual-channel acoustic recorder is capable of the long-term acoustic monitoring of bats. After approximately two weeks, the static detectors were relocated to three separate new locations within the site. Static detector locations can be found in Figure 3-1. The static detectors were collected on the 9th August 2021.

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Map Legend

- EIAR Site Boundary
- ▲ Detector Locations

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Static Detector Locations	
Project Title	Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare
Drawn By	TM
Checked By	AJ
Project No.	210414
Drawing No.	Fig - 3-1
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Date	23.08.2022

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3.6.1 Analysis of Static Detector Results

Echolocation signal characteristics (including signal shape, peak frequency of maximum energy, signal slope, pulse duration, start frequency, end frequency, pulse bandwidth, inter-pulse interval and power spectra) were compared to published signal characteristics for local bat species (Russ, 1999). Myotis species (potentially Daubenton’s bat (*M. daubentonii*), Whiskered bat (*M. mystacinus*), Natterer’s bat (*M. nattereri*) were considered as a single group, due to the difficulty in distinguishing them based on echolocation parameters alone (Russ, 1999). The echolocation of soprano pipistrelle (*P. pygmaeus*) and common pipistrelle (*P. pipistrellus*) are distinguished by having distinct (peak frequency of maximum energy in search flight) of ~55 kHz and ~46 kHz respectively (Jones & van Parijs, 1993).

Plate 3-1 below shows a typical sonogram of echolocation pulses for common pipistrelle recorded with a SM4BAT bio-acoustic static bat recording device. The recorded file is illustrated using Wildlife Acoustics Kaleidoscope software.

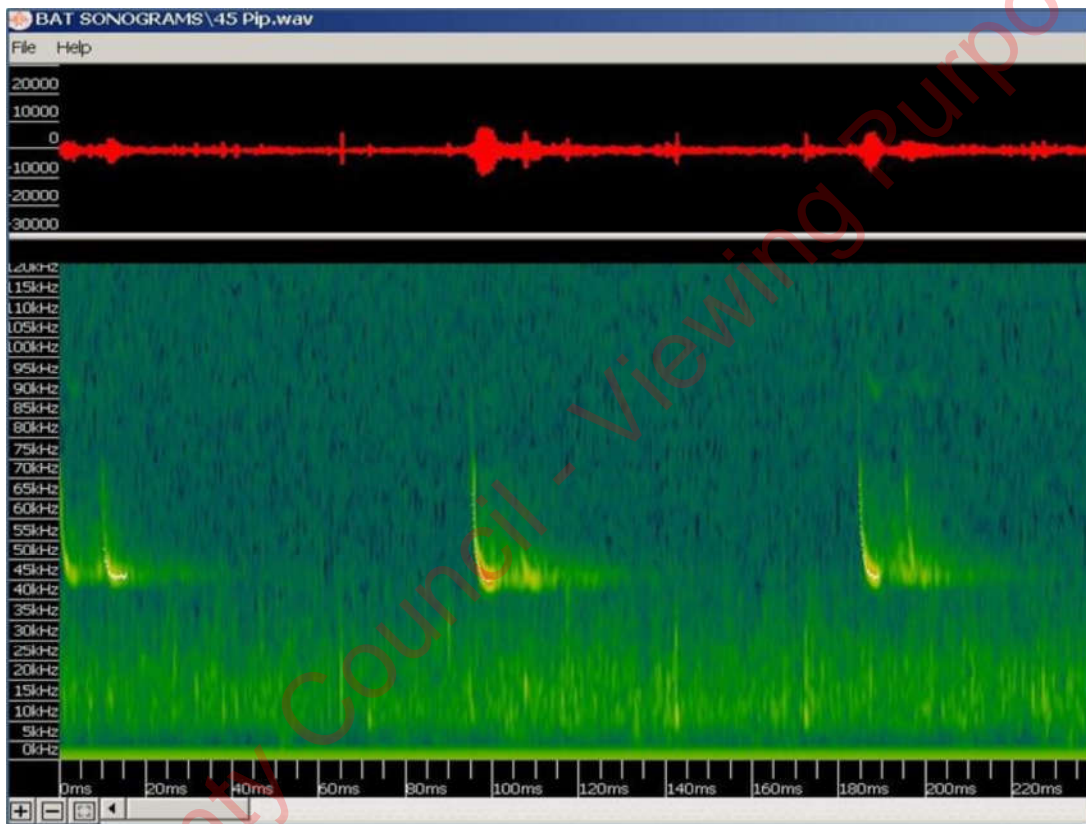


Plate 3-1 Sonogram of Echolocation Pulses of Common pipistrelle (Peak Frequency 45kHz)

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, ‘bat passes’ was used as a measure of activity (Collins, 2016). For the purposes of this survey, a bat pass was defined as a recording of an individual species/species group’s echolocation containing at least two echolocation pulses and of maximum 15 seconds length.

Survey Limitations

Survey design and effort was created in accordance with the most current best practice guidelines for surveying bats (Collins, 2016).

The information provided in this report accurately and comprehensively describes the baseline environment. July and August are within the optimal survey period for bat activity surveys, (Collins, 2016). In addition, there were no limitations associated with weather conditions or access. Therefore, a full and comprehensive survey was achieved.

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4. RESULTS

4.1 Desktop Study

4.1.1 National Bat Database of Ireland

A review of the National Biodiversity Data Centre was made on the 26th November 2021, to obtain bat records from within 1km and 10km of the proposed development site.

Within the 1km square (N9439) there were no records of any bat species. Within the 10km hectad search (N93) there were records of seven bat species. Table 4-1 lists the bat species recorded within the hectad which pertains to the current study area (N93).

Table 4-1 NBDC Bat Records

Hectad	Species	Database	Status
N93	Daubenton's bat <i>Myotis daubentonii</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Common pipistrelle <i>Pipistrelle pipistrellus</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Natterer's bat <i>Myotis nattereri</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Brown long-eared bat <i>Plecotus auritus</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Lesser Noctule <i>Nyctalus leisleri</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Whiskered Bat <i>Myotis mystacinus</i>	National Bat Database of Ireland	HD Annex IV, WA

4.1.2 Designated Sites

Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs) and the proposed development site is situated outside the known range of this species. Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) may be designated for any bat species. A search of NHAs and pNHAs within a 10 km radius of the Study Area found no sites designated for the conservation of bats.

4.2 Bat Habitat Appraisal

A walkover survey was conducted on the 8th July, 22nd July and 9th August. Habitats within the site include **Improved Agricultural Grassland (GA1)**, **Stone Walls and Other Stonework (BL1)**, **Scrub (WS1)**, **Hedgerow (WL1)**, **Treeline (WL2)**, **Buildings and Artificial Surfaces (BL3)** **Eroding/Upland rivers (FW1)** and **(Mixed) broadleaf woodland (WD1)**.

With regard to foraging and commuting bats, the exposed areas of open grassland habitats were considered *Negligible-Low* suitability, i.e. habitat that could be used by small numbers of commuting or foraging bats (Collins, 2016). Mature hedgerows, treelines and scrub habitats show potential for foraging and commuting bats. These habitats connect the wider area via linear features such as the Blackhall Little Stream and Rye Water River. As such, these habitats were classified as *Moderate* suitability, i.e. Continuous habitat connected to the wider landscape that could be used by bats for commuting such as

lines of trees and scrub (Collins, 2016). Low stone walls, which form the field boundaries may be utilized by occasional commuting and foraging bats and were classified as having *Low* suitability for commuting and foraging bats.

With regard to roosting bats, mature trees were assessed for their suitability to support roosting bats. A number of individual trees throughout the proposed development site were assessed as have *Low-Moderate* roosting potential. This included two individual mature ash (*Fraxinus excelsior*) trees located on the eastern boundary of site A, two individual mature ash trees located on the eastern boundary of site B, One mature Ash and one mature Sycamore (*Acer pseudoplatanus*) at the eastern section of site C and one mature ash at the northern boundary of the MOOR along the Blackwater little stream.

A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (Collins, 2016). All other hedgerows and treelines which are being retained were assessed as having *Negligible* roosting potential due to their size and lack of PRFs.

The castle tower was assessed as having *High* roosting potential i.e. a structure with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat (Collins, 2016) due to the presence of a number of PRF's visible during the roost inspection. The bridge did not provide any significant suitable roosting features and was classified as "*Negligible*" to "*Low*" Suitability for roosting bats.

All other habitats present were assigned a *Negligible* value. Further details on structures within the site, can be found in section 4.3 below.



Plate 4-1 WL1 present in the northern section of the site



Plate 4-2 WL2 in the background & GAI in the foreground

4.3 Roost Surveys

4.3.1 Castle Tower

A dedicated exterior roost inspection survey was undertaken during daylight hours on 8th of July 2021 (Plate 4-3 – 4-5). The tower castle is two stories and approximately 30 feet tall. The tower consists of stone walls and a partially collapsed stone roof. The interior of the structure was accessible through the main door at the ground level and the multiple windows on the first floor. The PRF's consisted of ivy cover over outer walls and a large number of crevices in the stonework. Gaps with potential for roosting bats were present between the stonework. The ivy cover was extensive along the south facing wall. Due to the number of PRF's, the tower was identified as having "*High suitability*" potential for roosting bats, i.e. a structure with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size,

shelter, protection, conditions and surrounding habitat (Collins, 2016). No evidence of bat use, including droppings, fur oil staining, signs of feeding remain etc., were identified within or surrounding the building. No bats were observed exiting or entering the building during the dusk activity survey.



Plate 4-3 South facing wall of the castle tower with dense ivy cover

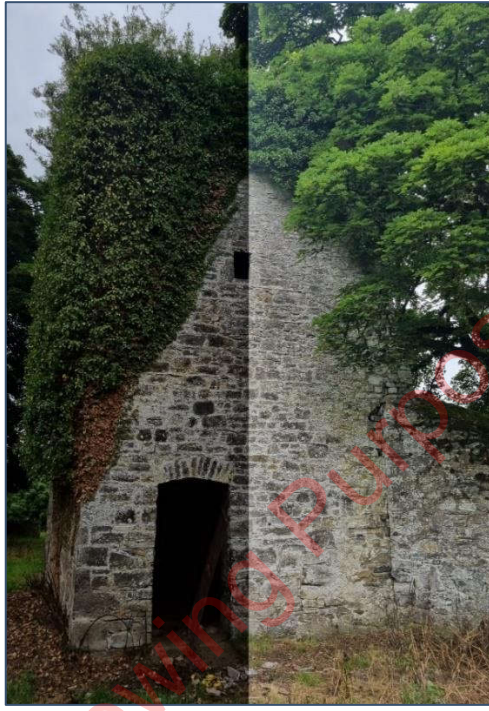


Plate 4-4 East facing wall of the castle tower with potential access through door and window



Plate 4-5 North facing wall of castle tower with potential access through windows

4.3.2 Kildare Bridge

A dedicated exterior roost inspection survey was undertaken on Kildare bridge (Grid Ref: N 94726 38561) during daylight hours on 18th of August 2022 (Plate 4-6 – 4-7). The bridge did not provide any significant suitable roosting features and no evidence of bats or bat use was found during the inspection. As such, it was classified as “Negligible” to “Low” Suitability for roosting bats.



Plate 4-6 Exterior bridge view



Plate 4-7 Interior bridge view

The results of the bat surveys, carried out in 2021 indicate that the proposed development site does provide suitable habitat for a roosting bat population of ecological significance; however, no roosts were identified on site.

4.4 Emergence Survey

An emergence survey was carried out on 8th July 2021 by two surveyors to assess the castle tower structure. During the emergence survey, no bats were observed exiting or entering the structure. However, bats were observed commuting and foraging between the trees and commuting to surrounding areas. It is noted that there are structures located to the north of the castle tower, not forming part of the application, which may also provide potential habitat for roosting bats.

4.5 Dusk and Dawn Activity Surveys

Numerous foraging and commuting bats were recorded during the dusk and dawn bat activity surveys. Overall, bat activity was low with a total of 521 bat passes recorded across all surveys. Activity was dominated by common pipistrelle (*Pipistrellus pipistrellus*) n=293. This was followed by Leisler's bat (*Nyctalus leisleri*) n=159 and soprano pipistrelle (*Pipistrellus pygmaeus*) n=67. In addition, very small numbers of brown long-eared bat (*Plecotus auritus*) n=2 were also recorded. Activity levels were concentrated along the treeline edge habitats and field boundary hedgerows bordering the Study Area (Figure 4-1 – 4-3). Plate 4-8 shows total bat species composition and Table 4-2 presents the results per survey. Plate 4-9 shows total bat passes per night.

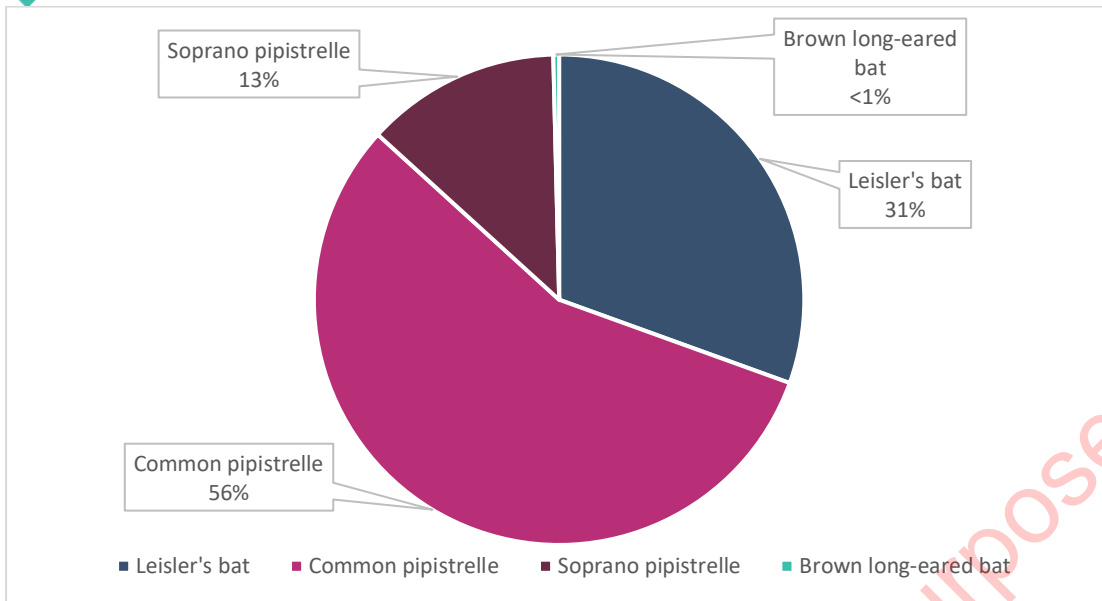


Plate 4-8 Species Composition – Dusk and Dawn surveys

Table 4-2 - Manual Transect Bat Pass Results Per Survey

Species	Dusk 8 th July 2021	Dawn 22 nd July 2021	Dusk 9 th August 2021	Total
Brown long-eared bat	-	-	2	2
Leisler's bat	150	6	3	159
Common pipistrelle	124	47	122	293
Soprano pipistrelle	46	3	18	67
Grand Total	320	56	145	521

There was an accumulation of bat activity around the small castle tower and surrounding WD1 habitat to the eastern section of Site C (Figure 4-1). The concentration of activity can be attributed to the surveyors being positioned here for 1.5 hours during the emergence survey on the small castle tower. Bats were recorded commuting between the structure and foraging along woodland, hedgerow and treeline boundaries. However, no bats were observed emerging or re-entering the structure. This was followed by walked transects for the remainder of the surveys.

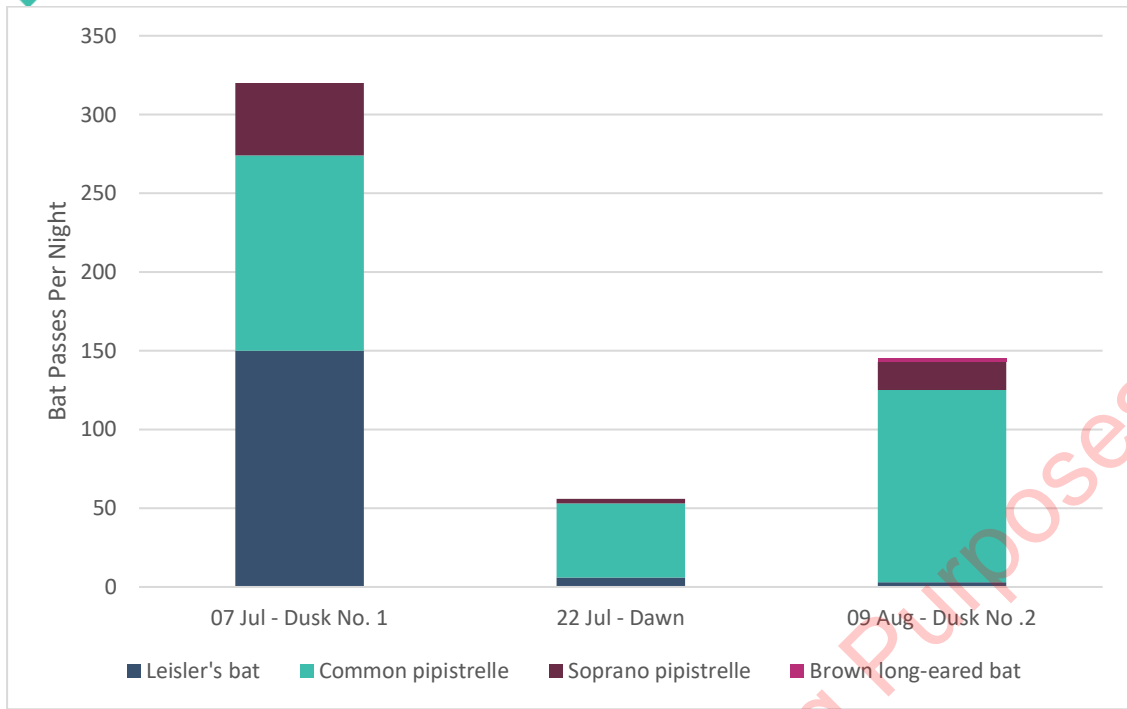


Plate 4-9 Species Composition Per Survey

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Map Legend

- EIAR Site Boundary
- Transect Route

Species

- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

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Drawing Title	
Manual Transect Results - 7th July 2021	
Project Title	
Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
Drawn By	Checked By
TM	AJ
Project No.	Drawing No.
210414	Fig 4-1
Scale	Date
1:6500	23.08.2022

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Map Legend

- EIAR Site Boundary
 - Transect Route
- Species**
- Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle

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Drawing Title	
Manual Transect Results - 22nd July 2021	
Project Title	
Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
Drawn By	Checked By
TM	AJ
Project No.	Drawing No.
210414	Fig 4-2
Scale	Date
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- Map Legend**
- EIAR Site Boundary
 - - - Transect Route
- Species**
- Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle
 - Brown long-eared bat

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Drawing Title	
Manual Transect Results - August 9th 2021	
Project Title	
Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
Drawn By	Checked By
TM	AJ
Project No.	Drawing No.
210414	Fig 4-3
Scale	Date
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Static Detector Survey Results

Three static detectors were deployed on the site at six different locations (Figure 3-1), based on likely areas of bat activity, for a total of 33 nights in July/August 2021. These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.2 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 20,160 bat passes were recorded.

Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Bat species included: common pipistrelle (*Pipistrellus pipistrellus*) n=10,061, Leisler's bat (*Nyctalus leisleri*) n=6,062 and soprano pipistrelle (*Pipistrellus pygmaeus*) n=3,596. *Myotis* spp. n=276, brown long-eared bat (*Plecotus auritus*) n=97 and nathusius' pipistrelle (*Pipistrellus nathusii*) were rarely encountered, with 1% or less compared to the total bats recorded (Plate 4-10).

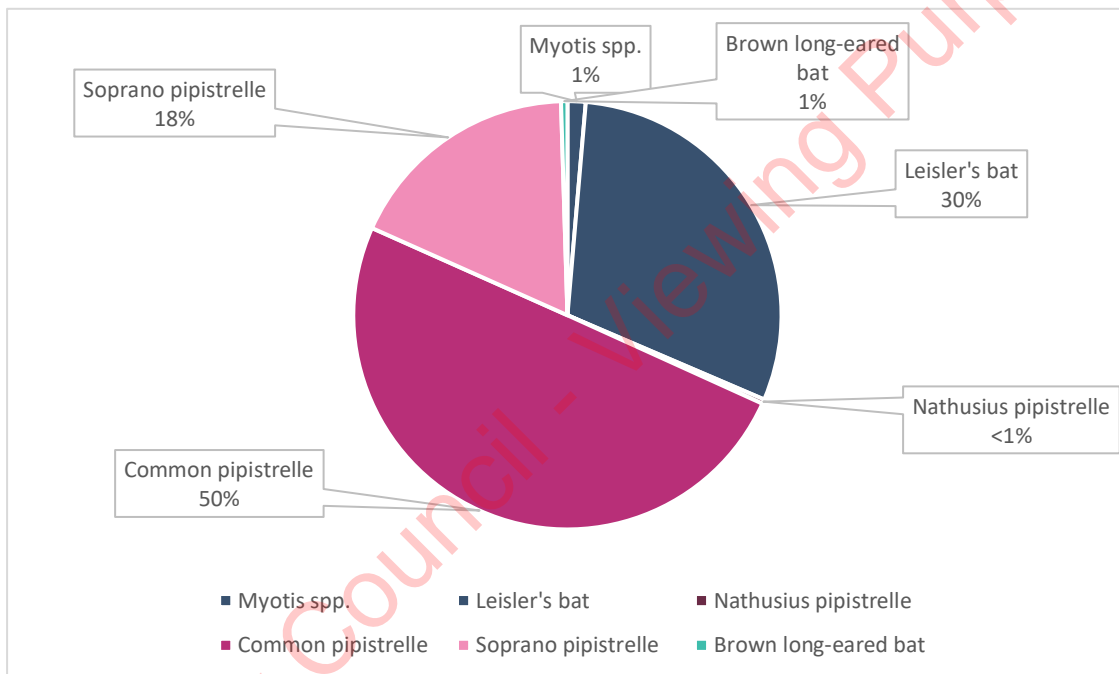


Plate 4-10 - Species Composition

Plate 4-11 shows total bat passes per detector. Detectors D01, D02 and D03 are associated with the first two-week deployment from 8th July to 22nd July 2021. Detector D01 was located to the northeast of Site C along a birch treeline habitat next to and open grassland. Detector D02 was located to the southeast of Site C along a treeline edge habitat, adjacent to the stream running north to south through the Study Area. Detector D03 was located along the hedgerow in the northwest of the Maynooth Outer Orbital Road (MOOR) Site. This area has a strong linear feature, that could provide suitable commuting and foraging opportunities for bats.

Detectors D04, D05 and D06 are associated with the second two-week deployment from 22nd July to 9th August 2021. Detector D04 was located north of Site A and east of the MOOR Site where two hedgerows converge. This area had high quality linear features suitable for foraging and commuting bats. Detector D05 was located along a hedgerow next to the Rye Water River along the southern boundary of Site C. Detector D06 was located to the northwest of Site C and the MOOR Site. Figure 3-1 shows all static detector locations.

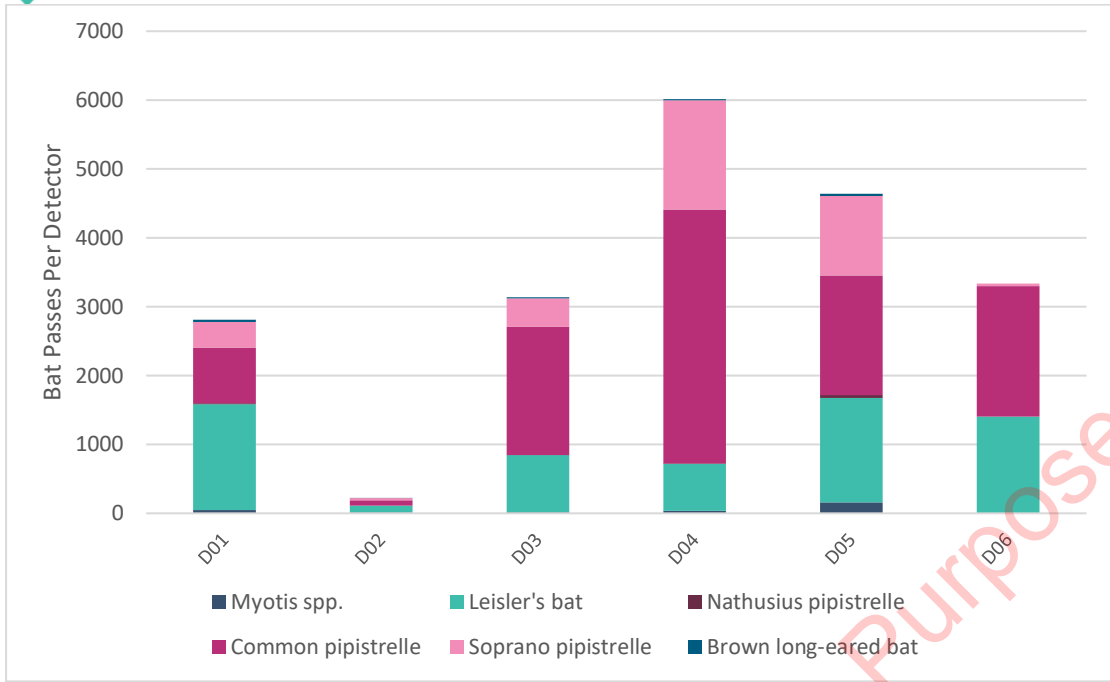


Plate 4-11 - Bat Passes Per Detector

Analysis of the detector recordings also highlighted the total bat passes per night. Species composition per night is shown in Plate 4-12. Nights from 1 to 16 are associated with the first deployment locations (D1, D2 and D3). Nights from 17 to 33 include bat passes from the second deployment locations D4, D5 and D6. Activity varied across each deployment and each night. The graph demonstrates that common pipistrelle, Leisler’s bat and soprano pipistrelle species were most commonly recorded during the survey periods. These species are common and widespread across Ireland.

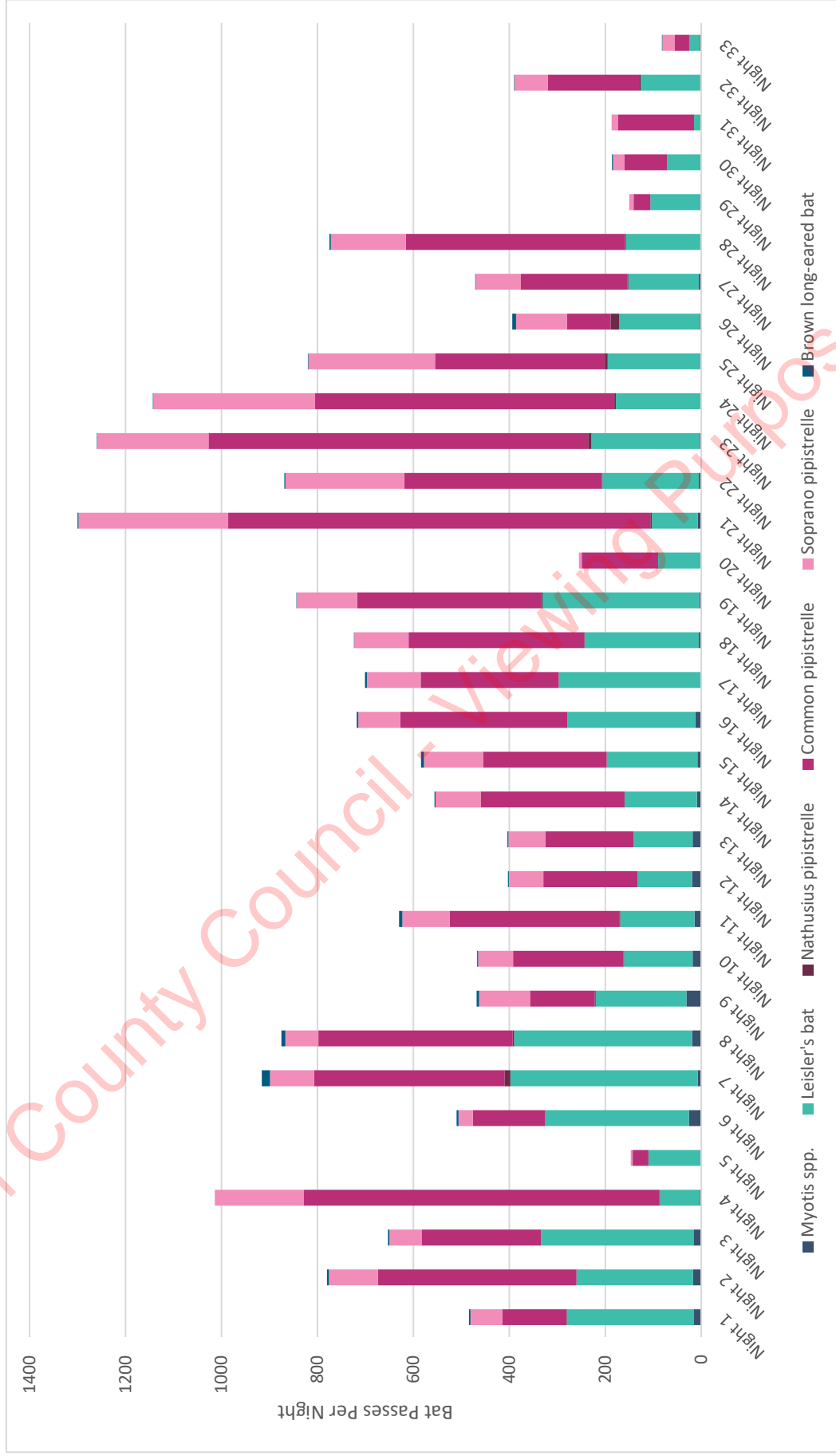


Plate 4-12 - Bat Passes Per Night

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4.7 Importance of Bat Population Recorded at the Site

Ecological evaluation within this section follows a methodology that is set out in Chapter three of the ‘*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*’ (NRA, 2009).

All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts 1976-2021.

Bats as an Ecological Receptor have been assigned *Local Importance (Higher value)* on the basis that the habitats within the proposed development site are utilized by a regularly occurring bat population of *Local Importance*.

No roosting bats or evidence of bat use was identified within the structures or trees within the site. The results of the bat surveys, carried out in 2021 indicate that the proposed development site does provide suitable habitat for a roosting bat population of ecological significance. However, no roosting site of *National Importance* (i.e. site greater than 100 individuals) was recorded within the site.

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5. OVERALL FINDINGS

The daytime roost inspections identified the Kildare bridge and castle tower as having “Negligible” to “Low” and “*High*” roosting potential, respectively, due to the presence/lack of presence of PRFs. No evidence of roosting bats was identified within any of the structures during the daytime roost inspections. Mature trees within the site may provide potential suitable roosting habitat for bats, although no roosts were identified during the surveys.

Following the daytime inspections, a dedicated emergence survey was carried out on the tower castle. No bats were observed emerging from the structure; however, bats were observed commuting and foraging along linear habitat features within the proposed development site. The site does not support any maternity roosts or a roost of National Importance.

Bat activity levels were mainly associated with woodland edge, treeline and hedgerow habitats within the proposed development site. Species composition was comprised predominantly of common pipistrelle, Leisler’s bat and soprano pipistrelle, all of which are common and widespread across Ireland.

Impact Assessment and proposed mitigation measures are outlined in Section 6.7 of Chapter 6.

6. CONCLUSION

In total, six bat species were recorded across the proposed development site. No roosting bats were identified within the site. Foraging and commuting was mainly associated with woodland edge, mature treeline and hedgerows habitats forming field boundaries.

The surveys methodology and results provided in this report are in accordance with the relevant industry guidance. The information provided in this report accurately and comprehensively describes the baseline environment. July and August are within the optimal survey period for bat activity surveys. In addition, there were no limitations associated with weather conditions or access. Therefore, a full and comprehensive survey was achieved.

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7. **BIBLIOGRAPHY**

- Andrews, H. (2018) *Bat Roosts in Trees*. AEcol, Bridgewater.
- Aughney, T., Kelleher, C. & Mullen, D. (2008) *Bat Survey Guidelines: Traditional Farm Buildings Scheme*. The Heritage Council, Áras na hOidhreachta, Church Lane, Kilkenny.
- Aughney, T., Langton, S. & Roche, N. (2011) *Brown long-eared bat roost monitoring scheme for the Republic of Ireland: synthesis report 2007 - 2010*. *Irish Wildlife Manual s, No. 56*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Bontadina, F., Schofield, H. and Naef-Daenzer, B. (2002) *Radio-tracking reveals that lesser horseshoe bats (*Rhinolophus hipposideros*) forage in woodland*. *Journal of Zoology* 258: 281–290.
- ILP (2018) Guidance Note 08/18: Bats and Artificial Lighting in the UK. *Bats and the Built Environment Series*. Institute of Lighting Professionals, Warwickshire, UK.
- Boye, P., & Dietz, M. (2005). *Development of good practice guidelines for woodland management for bats*. English Nature.
- CIEEM (2013) *Competencies for Species Surveys: Bats*. Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins, J. (ed) (2016) *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, England.
- Fossitt, J. A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council Dublin Ireland.
- Kelleher, C. & Marnell, F. (2006) *Bat Mitigation Guidelines for Ireland*. *Irish Wildlife Manuals, No. 25*. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Mitchell-Jones, A.J. & McLeish, A.P. (eds) (2004) *'Bat Workers' Manual' (3rd edn)*. JNCC, Peterborough.
- Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.
- National Roads Authority (2006) *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes*. National Roads Authority, Dublin Ireland.
- National Roads Authority (2006b) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes*. National Roads Authority, Dublin, Ireland.
- Russ, J.M. (2012) *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, Exeter.
- Stone, E. L., Jones, G., & Harris, S. (2009). *Street lighting disturbs commuting bats*. *Current biology*, 19(13), 1123-1127.
- Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*. The Bat Conservation Trust, England.