APPENDIX 6-2

Bat Survey Report

Appendix 6-2 – Bat Survey Report

Cooloo Wind Farm, Co. Galway

DOCUMENT DETAILS

Client:	**Neoen Renewables Ireland Limited**
Project Title:	**Cooloo Wind Farm, Co. Galway**
Project Number:	**240451**
Document Title:	**Bat Survey Report**
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Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	25/08/2025	CM	AJ

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1. INTRODUCTION

MKO was commissioned to undertake a comprehensive bat impact assessment to inform a planning application for a proposed renewable energy development at Cooloo, County Galway. This report presents the results of 2024 bat surveys, detailing the survey design, methodologies, and findings. It also includes an assessment of potential effects on bats and outlines mitigation measures designed to avoid or minimise significant impacts.

Surveys were carried out throughout 2024 and 2025, based on a layout comprising nine turbines. The methodology followed industry best practice, primarily NatureScot (2021), and employed a combination of approaches, including desktop study, habitat and landscape appraisal, roost surveys, manual transects, and static detector surveys at ground level.

The assessment and recommended mitigation measures have been developed in accordance with NatureScot (2021), with further consideration of the Northern Ireland Environment Agency (NIEA) Natural Environment Division guidance (August 2021, amended May 2022), where relevant.

As detailed in Section 1.1 of Chapter 1 of the EIAR, the following terminology is used throughout this report:

- Where the 'Proposed Project' is referred to this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compound, underground cabling, peat and spoil management, site drainage, biodiversity enhancement, turbine delivery route (TDR) accommodation works and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Grid Connection' is referred to the 110kV onsite substation, battery energy storage system and 110kV underground cabling connecting to the existing Cloon 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection is described in detail in Chapter 4 of this EIAR.
- Where the 'Site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of the EIAR and encompasses an area of approx. 355 hectares.
- Where the 'Proposed Wind Farm site' is referred to, this refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route.

A full description of the Proposed Project is provided in Chapter 4 of this EIAR.

1.1 Background

Wind energy is a key component of Ireland's renewable energy strategy; however, operational wind farms may also affect bats through direct mortality and indirect impacts such as habitat loss and disturbance. Global syntheses report bat fatalities at wind farms and highlight potential cumulative, population-level risks (Arnett *et al.*, 2016). In a European context, studies collated by Voigt *et al.* (2022) estimate approximately 1.5–30 bats killed per turbine per year. UK carcass-search data indicate 0–5.25 bats per turbine per month during peak activity (July–October), with substantial between-site variation (Mathews *et al.,* 2016). While these figures are not directly transferable in an Irish context, the broadly similar bat assemblages of Ireland and Britain make them a useful reference point for assessing potential risks.

Known mechanisms of bat mortality at wind farms include collisions with moving blades (Horn *et al.,* 2008; Cryan *et al.,* 2014) and barotrauma (Baerwald *et al.,* 2008)—internal injuries caused by sudden air pressure changes. Bats may also be attracted to turbines due to behavioural and environmental factors such as habitat associations, mating activity, and weather conditions.

Robust pre-construction bat surveys are undertaken to establish baseline activity and assess the potential risks associated with turbine operation. This report presents survey results primarily focused on the Proposed Wind Farm site. The Proposed Grid Connection, including the underground cable route, was assessed as part of wider ecological surveys detailed in Chapter 6 of the EIAR.

Survey design and impact assessment were guided by current legislation, scientific literature, and best-practice guidance, with full consideration given to spatial, temporal, and behavioural patterns relevant to bat ecology.

1.2 Bat Survey and Assessment Guidance

A range of guidance documents exists for surveying bats at wind energy developments across Europe, the UK, and Ireland.

At the European level, the Advisory Committee to the EUROBATS Agreement (to which Ireland is a signatory) published the *Guidelines for Consideration of Bats in Wind Farm Projects* (Rodrigues, 2015). These offer a structured framework for assessing potential impacts on bats during planning, construction, and operation. However, as they are based on continental bat assemblages—which differ significantly from those in Ireland—some survey recommendations may not be appropriate for Irish contexts. Nonetheless, they provide a valuable benchmark and encourage the development of locally tailored guidance.

In Ireland, Bat Conservation Ireland (BCI, 2012a) issued the *Wind Turbine/Wind Farm Development Bat Survey Guidelines*, which outline surveyor competencies, health and safety, survey methods, and reporting standards. However, these guidelines are broad and not underpinned by detailed, Ireland-specific data.

In the UK, Chapter 10 of the second edition of the BCT *Bat Survey Good Practice Guidelines* (Hundt, 2012) included wind farm survey recommendations, although these were not supported by UK-specific research and were subsequently removed in the third edition (2016). Around the same time, Natural England (2014) produced interim guidance interpreting EUROBATS advice for the UK. Technical updates and discussion papers have also been issued by CIEEM through its Technical Guidance Series and the quarterly *In Practice* magazine.

The most comprehensive current guidance is *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation* (NatureScot, 2021), which replaced earlier NatureScot and Natural England publications. It provides detailed direction for assessing both direct (collision risk) and indirect impacts, as well as mitigation strategies. It now serves as the standard approach for wind farm assessments in Ireland due to its clarity, structure, and evidence base.

Additional Irish-context recommendations have since been published by the Northern Ireland Environment Agency (NIEA, 2021; amended 2022), building on NatureScot's work and providing further clarification on survey effort, curtailment, and mitigation.

The survey scope and impact assessment presented in this report follow the NatureScot (2021) guidance, with additional reference to the NIEA (2021) recommendations. The most recent edition of the BCT *Bat Surveys for Professional Ecologists* (Collins, 2023) was also used to ensure current best practice was followed throughout.

1.3 Irish Bats: Legislation, Policy and Status

Ireland has nine resident bat species, comprising more than half of Ireland's native terrestrial mammals (Montgomery *et al.,* 2014). 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, as amended).

In addition, Irish species are further protected by national legislation (Wildlife Acts 1976, as amended). 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).

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. Table 1-1 summarises the current conservation status of Irish bat species and identified threats to Irish bat populations.

Table 1-1 Irish Bat Species Conservation Status and Threats (NPWS, 2019). Pressures and Threats are ranked from medium importance (M) to high importance (H) in the 2019 Article 17 report.

Bat Species	Conservation Status	Principal Pressures and Threats
Common pipistrelle *Pipistrellus pipistrellus*	Favourable	**A05** Removal of small landscape features for agricultural land parcel consolidation (M) **A14** Livestock farming (without grazing) [impact of anti-helminthic dosing on dung fauna] (M) **B09** Clear-cutting, removal of all trees (M) **F01** Conversion from other land uses to housing, settlement or recreational areas (M) **F02** Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (M) **F24** Residential or recreational activities and structures generating noise, light, heat or other forms of pollution (M) **H08** Other human intrusions and disturbance not mentioned above (Dumping, accidental and deliberate disturbance of bat roosts (e.g. caving) (M) **L06** Interspecific relations (competition, predation, parasitism, pathogens) (M) **M08** Flooding (natural processes) (M) **D01** Wind, wave and tidal power, including infrastructure (M)
Soprano pipistrelle *Pipistrellus pygmaeus*	Favourable	
Nathusius' pipistrelle *Pipistrellus nathusii*	Unknown	
Leisler's bat *Nyctalus leisleri*	Favourable	
Daubenton's bat *Myotis daubentoni*	Favourable	
Natterer's bat *Myotis nattereri*	Favourable	
Whiskered bat *Myotis mystacinus*	Favourable	
Brown long-eared bat *Plecotus auritus*	Favourable	
Lesser horseshoe bat *Rhinolophus hipposideros*	Inadequate	

1.4 Statement of Authority

MKO employs a dedicated bat unit within its Ecology team, experienced in scoping, carrying out, and reporting on bat surveys, as well as producing impact assessments in relation to bats. MKO ecologists have relevant academic qualifications and are qualified in undertaking surveys to the levels required. MKO's Ecology team holds a bat derogation licence from NPWS. The licence is intended for professionals carrying out surveys with the potential to disturb roosting bats (i.e. roost inspections). Graduate and seasonal ecologist staff are included under the licence under condition of being accompanied by more experienced colleagues.

Survey scoping was prepared by Aoife Joyce (BSc., MSc.). Bat surveys were carried out by Ryan Connors (B.Sc., M.Sc.), Charlie Meehan (B.Sc., M.Sc.), Fredrick Mosley (B.A., M.Sc.) and Kate Greaney (B.Sc., M.Sc.). Data manual ID were carried out by Ryan Connors and Cormac Roberts. This report was prepared by Clare Mifsud (Ph.D.) and was reviewed and approved by Aoife Joyce. Staff's roles and relevant training are presented in Table 1-2 below.

Table 1-2 Project team qualifications and training.

Staff	Role	Qualifications and Training
Aoife Joyce (B.Sc., M.Sc.)	Project Director	B.Sc. (Hons) Environmental Science, University of Galway, Ireland. M.Sc. (Hons) Agribioscience, University of Galway, Ireland. Advanced Bat Survey Techniques – Trapping, biometrics, handling (BCI), Bat Impacts and Mitigation (CIEEM), Bat Tree Roost Identification and Endoscope Training (BCI), Bats in Heritage Structures (BCI), Bats and Lighting (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics).
Ryan Connors (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. (Hons) Zoology, University College Galway, Ireland. M.Sc. (Hons) Conservation Behaviour, Atlantic Technological University, Galway, Ireland. Surveying Trees for Bats (BRTS), Preliminary Ecological Appraisal (CIEEM), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Kaleidoscope Pro Analysis (Internal), Winter Tree Identification (Internal), Wintering Bird Surveying (Internal).
Charlie Meehan (B.A, M.Sc)	Seasonal Bat Ecologist	B.A. History and Classical Studies, National University of Ireland, Galway. M.Sc., Sustainable Environments, National University of Ireland, Galway. Kaleidoscope Pro Analysis (Wildlife Acoustics), Endoscope Training (Internal), Structure and Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal)
Frederick Mosley (B.A., M.Sc.)	Seasonal Bat Ecologist	B.A. (Hons) Biological and Biomedical Science Mod. Zoology, Trinity College, Dublin. M.Sc. Marine Biology, University College Cork. Kaleidoscope Pro Analysis (Wildlife Acoustics), Endoscope Training (Internal), Structure and Tree Inspection (Internal),

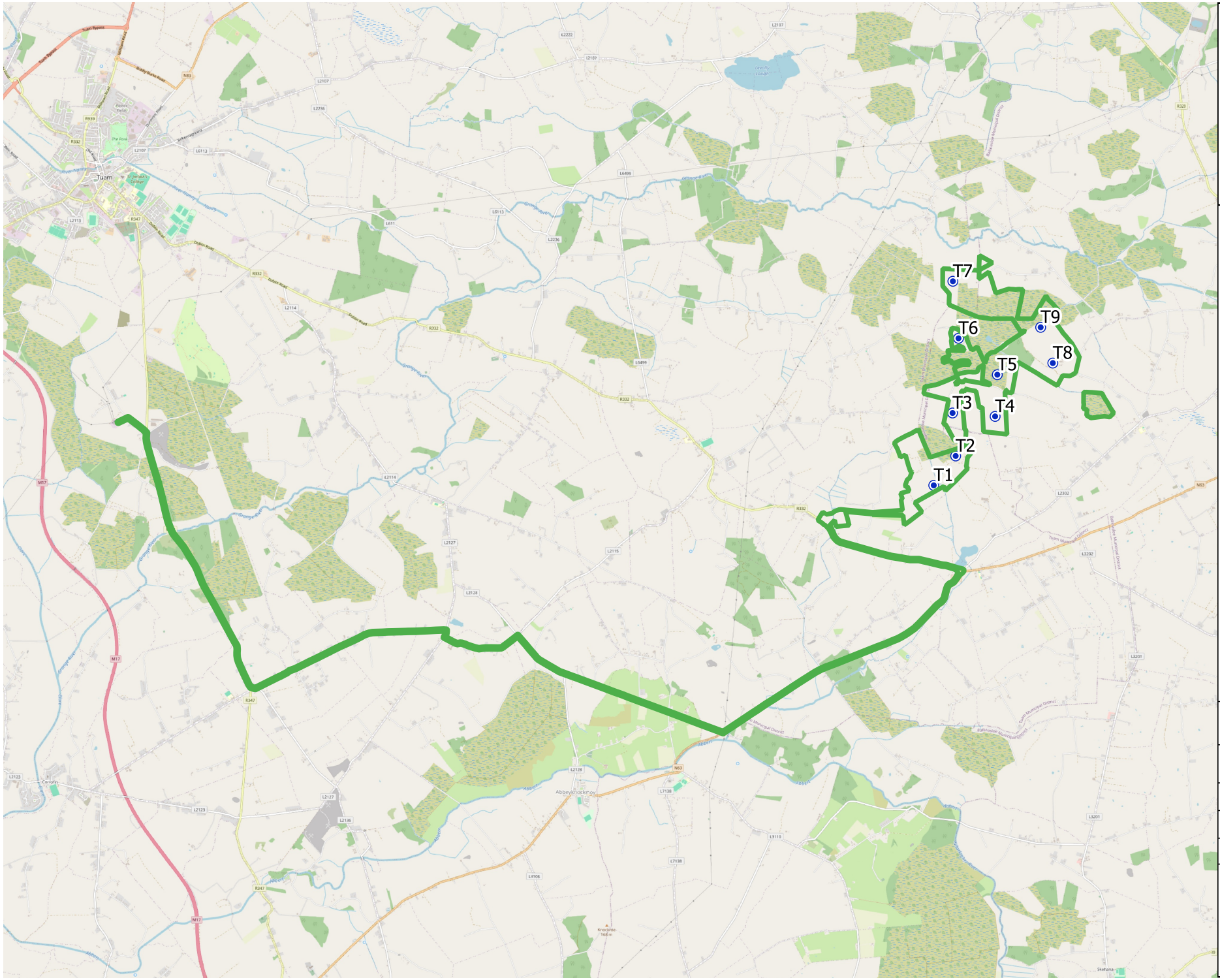
		Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal)
Kate Greaney (B.Sc., M.Sc.)	Ecologist	B.Sc. (Hons) Botany and Plant Science National university of Ireland, Galway. M.Sc. (Hons) Climate Change, Agriculture, and Food Security (MScCCAFS) National university of Ireland, Galway. Kaleidoscope Pro Analysis (Wildlife Acoustics). Endoscope Training (Internal), Emergence and Re-Entry Surveys (Internal) Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal)
Cormac Roberts	Bat Ecologist (Intern)	Currently in final year of B.Sc. Environmental Science with Ecology, Atlantic Technological University, Sligo. Assisted on over 40 dusk emergence and re-entry surveys across two bat activity periods (2024 and 2025), along with additional survey work completed outside of MKO. Experience includes Bat Habitat Appraisal (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Emergence and Re-Entry Surveys (Internal), and Kaleidoscope Pro Analysis (Internal).
Clare Mifsud (Ph.D.)	Project Bat Ecologist	B.Sc. (Hons) Biology and Chemistry (Hons), University of Malta. M.Sc. Bat Ecology and Conservation, University of Malta. Ph.D. Bat Ecology, Genetics and Conservation, University of Malta. Bat Habitat Appraisal (Internal). Bat acoustic surveys (manual transects and statics deployment). Bat echolocation analysis and species identification (Kaleidoscope, Wildlife Acoustics). Roost survey techniques and winter bat hibernation census surveys (Wroclaw University, Poland). Preliminary Roost Assessments (PRA) - buildings and trees (Internal). Thermal Imaging for bat surveys (Internal). Bat capture, tissue sampling and handling techniques (University of Leeds, UK).

2. PROJECT DESCRIPTION

The Proposed Wind Farm is located within a rural, agricultural setting in east Galway, approx. 12 km southeast of the town of Tuam. The village of Barnaderg is located approx. 3.3km west of the nearest proposed turbine, and the village of Moylough is located approx. 5.3 km east of the nearest proposed turbine. The N63 National Road runs south of the Proposed Wind Farm site in a general northeast-southwest orientation, passing within 1.3 km of the nearest proposed turbine. The Proposed Wind Farm site is accessed via local roads and private access tracks from the R332 Regional Road, which travels in a southeast-northwest direction south of the Proposed Wind Farm site. The Site location context is shown in Figure 2-1. The Site measures approx. 355 hectares.

Land use within the Site is predominately agricultural pasture. Other land uses within the Site include cutover and raised peat bogs, agricultural crops, tillage, transport and forestry. Land uses in the wider landscape comprises a mix of agriculture, peat bogs, electricity transmission and low density residential.

The Proposed Project includes the construction of nine wind turbines, each with an overall blade tip height of 180 metres, hub height of 99 metres to 105 metres, rotor diameter of 150 metres to 162 metres along with all associated infrastructure. A full description of the Proposed Project is provided in Section 4.1 of Chapter 4 of this EIAR.



Map Legend

EIAR Site Boundary

Proposed Turbine Layout

Drawing Title

Site Location

Project Title: Cooloo Wind Farm, Co. Galway	
Drawn By: MG	Checked By: CM
Project No.: 240451	Drawing No.: Figure 2-1
Scale: 1:70,000	Date: 2025-09-24

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3. METHODS

3.1 Consultation

A scoping exercise was undertaken as part of the EIAR for the Proposed Project. A Scoping Document, providing details of the Site and the Proposed Project, was prepared by MKO and circulated to consultees in April 2023, with updated details circulated in July 2025. As part of this exercise, prominent Irish conservation groups were contacted, and Bat Conservation Ireland (BCI), and the Department of Housing, Local Government and Heritage-Development Applications Unit (NPWS) were specifically invited to comment on the potential of the Proposed Project to affect bats.

Details of consultation responses specifically related to bats are provided in Section 4.1 below.

3.2 Desk Study

A desk study of published material was undertaken prior to conducting field surveys. The aim was to provide context to the Proposed Wind Farm in order to assist bat survey planning and assessment. This included the identification of designated sites, species of interest or any other potential risk factors within the Proposed Wind Farm and the surrounding region. The results of the desk study including sources of information utilised are provided below.

3.2.1 Previous Baseline Surveys (2021–2022)

Bat surveys at the Proposed Wind Farm were undertaken by MKO in 2021 and 2022. These included a bat habitat appraisal, seasonal dusk transect surveys, emergence surveys and deployment of static detectors. Although now outside the valid temporal scope for this EIAR, the data are presented as supplementary information to provide additional context on baseline conditions and to complement the 2024 survey results. Full methods and summary results from the 2021 and 2022 surveys are provided in **Appendix 1**.

3.2.2 Bat Records

A search for existing bat records was undertaken within a 10 km radius of the central point of the Proposed Wind Farm (Grid Reference: M 55846 48731). Data were sourced from the National Bat Database of Ireland (Bat Conservation Ireland, BCI) and the National Biodiversity Data Centre (NBDC). Records included results from national monitoring schemes, roost records, and ad-hoc observations. Data were provided by BCI on 14th March 2025 and supplemented by NBDC bat records for the relevant 10 km grid squares (M54 and M55). The 10 km search radius follows established best-practice guidance for wind farm bat assessments (BCI, 2012; Hundt, 2012; NatureScot, 2021).

3.2.3 Bat Species' Range

EU member states are obliged to monitor the conservation status of natural habitats and species listed in the Annexes of the Habitats Directive. Under Article 17, they are required to report to the European Commission every six years. In April 2019, Ireland submitted the third assessment of conservation status for Annex-listed habitats and species, including all species of bats (NPWS, 2019).

The 2019 Article 17 Reports were reviewed for information on bat species' range and distribution in relation to the location of the Proposed Wind Farm. The aim was to identify any high-risk species at the edge of their range (NatureScot, 2021).

3.2.4 Designated Sites

A search for designated conservation sites for bats was undertaken within a 10 km radius of the Proposed Wind Farm central point (Grid Reference: M 55846 48731). Data were obtained from the National Parks and Wildlife Service (NPWS) map viewer and website. The search included European designated sites (Special Areas of Conservation, SACs) and nationally designated sites (Natural Heritage Areas, NHAs and proposed Natural Heritage Areas, pNHAs) relevant to bat conservation. The 10 km radius is consistent with best-practice guidance for wind farm bat assessments (BCI, 2012; Hundt, 2012; NatureScot, 2021).

3.2.5 Landscape Features

3.2.5.1 Ordnance Survey Mapping

Ordnance survey maps (OSI 1:5,000 and 1:50,000) and aerial photographs were reviewed to identify any habitats and landscape features likely to be used by bats. Maps and images of the Proposed Wind Farm and general landscape were examined for suitable foraging or commuting habitats including woodlands and forestry, hedgerows, treelines and watercourses. In addition, any potential roost sites, such as buildings and bridges, were noted for further investigation.

3.2.5.2 Underground Sites

The University of Bristol Speleological Society (UBSS) Cave Database for the Republic of Ireland and the GSI Karst Database were consulted to identify any natural subterranean sites, such as caves, with potential to support roosting bats within 10 km of the Proposed Wind Farm (BCI, 2012). The database was last searched on 4th March 2025. In addition, the National Inventory of Architectural Heritage (NIAH) and the National Monuments Service (NMS) datasets were reviewed for records of manmade underground structures (e.g. souterrains) within 10 km of the Proposed Wind Farm that may provide suitable potential bat roosting opportunities. These datasets were also last searched on 4th March 2025.

3.2.5.3 National Biodiversity Data Centre Bat Landscape Mapping

The National Biodiversity Data Centre (NBDC) map viewer presents “Bat Landscape” maps for individual species and for all species combined. Lundy *et al.* (2011) used Maximum Entropy Models to examine the relative importance of bat landscape and habitat associations in Ireland. The resulting map provides a 5-point scale, ranging from highest habitat suitability index (presented in red) to lowest suitability index (presented in green). It is important to note that areas classified as less suitable in the model may still support locally abundant bat populations.

The location of the Proposed Wind Farm was reviewed in relation to bat habitat suitability indices. The aim of this was to assess habitat suitability for all bat species within the Proposed Wind Farm. It is worth noting that these results are based on a modelling exercise and not confirmed bat species records. Regardless, they may provide a useful indication of potential favourable bat associations within the Proposed Wind Farm.

3.2.5.4 Additional Projects in the Wider Landscape

A search for proposed, existing and permitted wind energy developments within 10 km of the Proposed Wind Farm was undertaken (NatureScot, 2021). The Wind Energy Ireland (WEI) interactive wind map (windenergyireland.com) was reviewed in conjunction with wind farm planning applications from Galway County Council. Other infrastructure developments and proposals (e.g. large road projects and extractive industries) were also noted. Information on the location and scale of these developments was gathered to inform cumulative effects. More details on other infrastructure developments within the vicinity of the Proposed Project can be found in Chapter 2 of the main EIAR.

3.2.6 Multidisciplinary Surveys

Multidisciplinary walkover surveys were undertaken throughout 2024 and 2025. The Site was systematically and thoroughly walked in a ground-truthing exercise with the habitats on the Site assessed and classified. The habitats (including any culverts/bridges) were assessed for bat commuting, foraging and roosting suitability.

Multidisciplinary walkover surveys were undertaken on the following dates:

Table 3-1 Multidisciplinary Walkover Surveys and Bat Survey Effort

Multidisciplinary Survey	Dedicated Bat Survey
13th August 2024	7th May 2024
14th August 2024	22nd May 2024
21st August 2024	27th May 2024
18th September 2024	26th June 2024
18th June 2025	23rd July 2024
2nd September 2025	27th August 2024
	10th September 2024

3.3 Field Surveys

3.3.1 Bat Habitat Suitability Appraisal

Bat walkover surveys were carried out throughout 2024 and 2025. During these surveys, habitats within the Proposed Wind Farm were assessed for their suitability to support roosting, foraging and commuting bats. Connectivity with the wider landscape was also considered. Suitability was assessed according to Collins (2023) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories are divided into *High, Moderate, Low*, *Negligible or None* and are described fully in **Appendix 2**.

3.3.2 Roost Surveys

Daytime Roost Inspections

A search for roosts was undertaken within the Proposed Wind Farm and within 200 m plus the maximum rotor radius (i.e. 81 m) of each proposed turbine location (NatureScot, 2021). The aim was to determine the presence of roosting bats and the need for further survey work or mitigation. Daytime roost inspections were carried out in May, June, July, August, and September 2024 and September 2025. Additional inspections were carried out in 2021 and 2022, as outlined below. Walkover surveys were carried out and included a search for Potential Roosting Features (PRFs) in trees, buildings, and other structures where present. These were assessed for their potential to support roosting bats according to Collins (2023) (see **Appendix 2** for roost assessment criteria).

Twelve structures, and their associated outbuildings, were identified within and around the Proposed Wind Farm site and assessed for bat roost potential (Table 3-2). These were subject to a roost assessment which comprised a detailed inspection of the interiors and exteriors to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises. Locations of all inspected structures are presented in Figure 3-1.

Targeted ground inspections were undertaken of trees within the wind farm development footprint, with particular emphasis on those scheduled for felling. Each tree was systematically checked for rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping

branches and any other potential roost features (PRFs) identified by Andrews (2018). Inspections used a high-output torch, a thermal imaging camera and an endoscope, with safe ladder access for at-height checks where required.

During the 2021-2022 survey period, roost inspections were carried out in May, July and October 2021 and April, July and September 2022. Three derelict structures were identified as potential roosts within the Site (Grid Reference: M 56150 50498 [Structure 8]; M 56163 48993 [Structure 6]; and M 57200 49346 [Structure 9]) and were subject to roost assessments. Further 2021-2022 survey details are outlined in **Appendix 1**.

Table 3-2 Structures inspected within and around the Cooloo wind farm site

Structure No.	Description	IG Reference	Nearest Turbine	Distance to nearest turbine (m)
1	Shed	M 55031 47386	T1	370
2	Large Hay Shed	M 55135 47805	T1	300
3	Small Farm Shed	M 55089 47969	T1	470
4	Cattle Shed	M 55758 49068	T3	470
5	Turf Shed	M 56299 48333	T4	245
6	Derelict Building	M 55768 49063	T5	198
7	Turf Barn	M 55966 50469	T7	350
8	Unused Building	M 56152 50500	T7	550
9	Unused House	M 57203 49326	T8	160
10	Farm Buildings	M 57430 49132	T8	430
11	Farm Buildings	M 57493 49530	T8	512
12	Unused House	M 57481 49608	T8	532

The Proposed Grid Connection underground electrical cabling route, including watercourse crossing infrastructure, and turbine delivery route accommodations works areas, were also assessed for any suitability to host roosting bats. Surveys were carried out on the 13th August 2024, 18th June 2025 and 2nd September 2025 and comprised an inspection of existing infrastructure to look for evidence of bat use and assess the roosting suitability according to Collins (2023).

Emergence Surveys

Emergence surveys at dusk were carried out which focused on the PRFs identified during the habitat appraisal. During these surveys, surveyors were equipped with Bat Logger M bat detectors (Elekon AG, Lucerne, Switzerland). The emergence surveys commenced at least 15 minutes before sunset and concluded 90 minutes after sunset. Table 3-3 summarises survey effort in relation to emergence surveys carried out in 2021, 2022 and 2024. 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.

Surveyors were located at PRFs identified during the daytime roost inspection surveys with a focus on potential access point and roosting features. The purpose was to identify any bat species, numbers, access points and roosting locations within the PRF structure. Surveys were carried out in favourable weather conditions.

Table 3-3 Emergence Surveys during the 2021, 2022 and 2024 survey periods

Date	Surveyors	Structure No.	Sunrise/ Sunset	Type	Weather
15th July 2021	Keith Costello and Cathal Bergin	No. 6	22:00	Dusk Emergence	17˚C, dry, light breeze, 100% cloud cover, moon not visible

5th September 2021	Neil Campbell and Laura McEntegart	No. 9	19:01	Dusk Emergence	12˚C, dry, light breeze, 30-60% cloud cover, moon not visible
22nd September 2022	Keith Costello and Neil Campbell	No. 9	20:57	Dusk Emergence	16 ˚C, dry, light breeze, 20% cloud cover, moon not visible
27th May 2024	Ryan Connors and Kate Greaney	No. 9	21:48	Dusk Emergence	10-12˚C, dry, calm, 40%-70% cloud cover, moon not visible
26th June 2024	Ryan Connors and Cormac Roberts	No. 8	22:08	Dusk Emergence	14˚C, dry, light breeze, 100% cloud cover, moon not visible
27th August 2024	Ryan Connors and Fredrick Mosley	No. 6	20:36	Dusk Emergence	16˚C, dry to light rain, calm to a slight breeze, 75% - 90% cloud cover, moon not visible

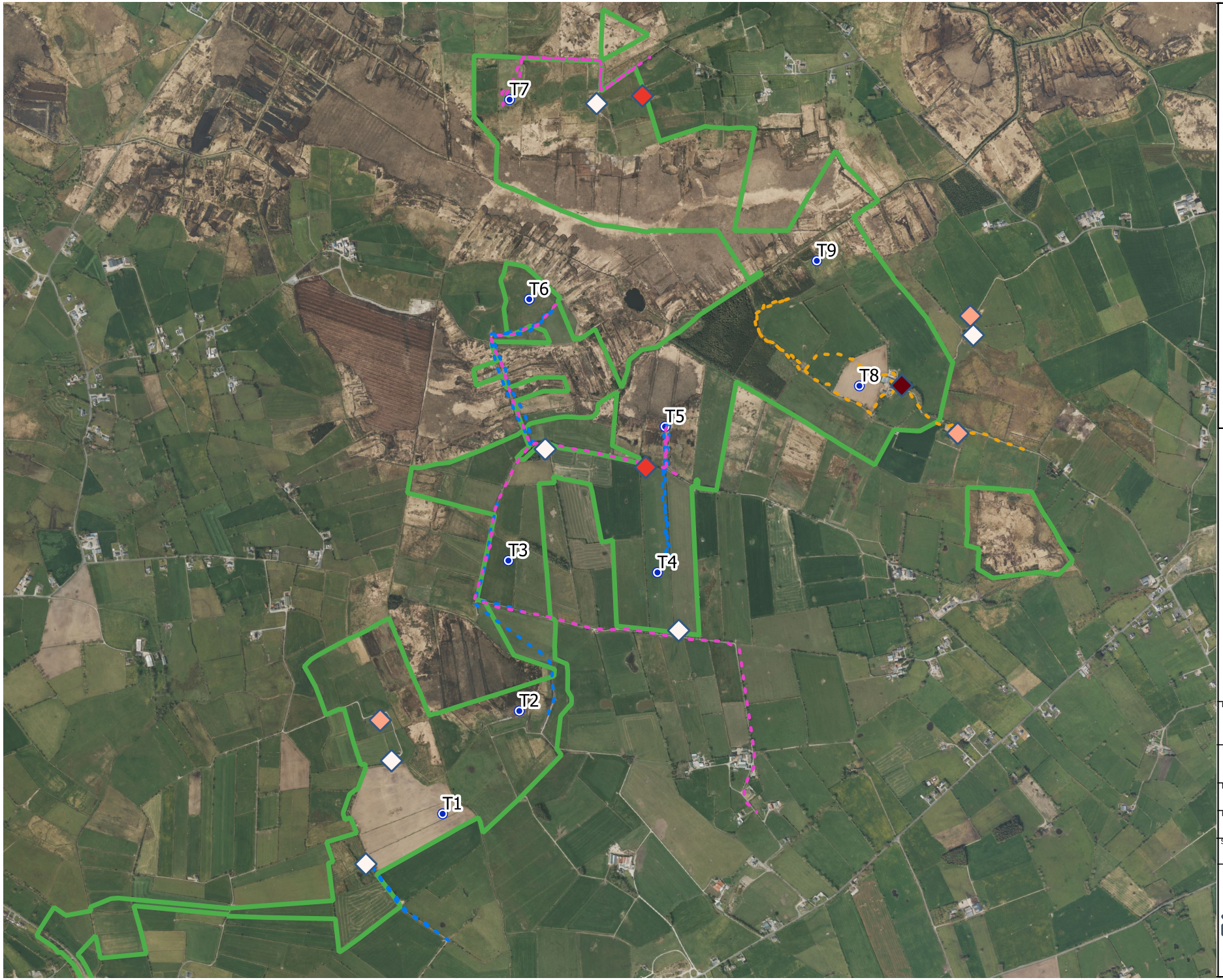
3.3.3 Manual Transects

Manual activity surveys comprised of walked transects after dusk. A series of representative transect routes were selected throughout the Proposed Wind Farm. The aim of these surveys was to record species presence, relative abundance and behaviour (foraging and commuting) within the Proposed Wind Farm, and to gather additional information on habitat features of importance to bats across the site. Transect routes were prepared with reference to the proposed layout, desktop and walkover survey results as well as any health and safety considerations and access limitations. As such, transect routes generally followed existing roads and tracks. Transect routes undertaken in 2024 are presented in Figure 3-1.

Transects were walked by two surveyors, recording bats in real time. Transects commenced immediately after the dusk emergence surveys and were completed for up to 3 hours after sunset. Surveyors were equipped with active full spectrum bat detectors, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland), and all bat activity was recorded for subsequent analysis to confirm species identifications. Transects surveys were undertaken in spring, summer and autumn 2024. Table 3-4 summarises survey effort in relation to manual transects.

Table 3-4 Survey Effort – 2024 Walked Transects

Date	Surveyors	Sunrise/ Sunset	Time	Weather	Transect (km)
27th May 2024	Ryan Connors and Kate Greaney	21:48	23:10 – 00:20	10˚C, light to moderate rain, calm, moon not visible, 70% cloud cover	3.9 km
26th June 2024	Ryan Connors and Cormac Roberts	22:08	23:35 – 01:06	12-14˚C, drizzle, light to moderate breeze, moon not visible, 95% cloud cover	5.0 km
27th August 2024	Ryan Connors and Fredrick Mosley	20:36	22:08 – 23:30	14-16˚C, dry, light breeze, moon not visible, 20% cloud cover	3.7 km



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Spring Transect 27.05.2024
- Summer Transect 26.06.2024
- Autumn Transect 27.08.2024

Bat Roost Potential of Inspected Structures

- High
- Moderate
- Low
- Negligible

Drawing Title

2024 Survey Effort

Project Title	
Cooloo Wind Farm, Co. Galway	
Drawn By: MG	Checked By: CM
Project No.: 240451	Drawing No.: Figure 3-1
Scale: 1:20,000	Date: 2025-09-24

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3.3.4 Ground-level Static Surveys

Where developments have less than 10 turbines, NatureScot (2021) requires one detector per turbine, while for larger developments the guide suggests an additional detector for every three turbines. Given that 9 turbines were proposed, 9 detectors were deployed to ensure compliance with NatureScot (2021) guidance. Automated bat detectors were deployed for at least 10 nights in spring (April – May), 20 nights of summer (June – mid-August) and 10 nights of autumn (mid-August – October) (NatureScot, 2021). Detector placement was based on the proposed turbine locations, and these are described in Table 3-5. Figure 3-2 presents static detector locations in relation to the final proposed turbine layout.

Table 3-5 Ground-level Static Detector Locations 2024

Detector ID	Location (IG Reference)	Habitat	Linear Feature within 50m	Corresponding/ Nearest Turbine(s)
D01	M 55350 47571	Improved agricultural grassland (GA1), Hedgerows (WL1)	Hedgerows (WL1)	T01
D02	M 55690 47986	Improved agricultural grassland (GA1), Dry siliceous heath (HH1)	Hedgerows (WL1)	T02
D03	M 55518 48636	Improved agricultural grassland (GA1), Hedgerows (WL1)	Hedgerows (WL1), drain	T03
D04	M 56266 48570	Improved agricultural grassland (GA1), Hedgerows (WL1)	Hedgerows (WL1)	T04
D05	M 56243 49160	Cutover bog (PB4)	Hedgerows (WL1)	T05
D06	M 55777 49644	Improved agricultural grassland (GA1)	Hedgerows (WL1)	T06
D07	M 55570 50439	Improved agricultural grassland (GA1), Hedgerows (WL1)	Hedgerows (WL1), Treelines (WL2)	T07
D08	M 56945 49356	Improved agricultural grassland (GA1)	Hedgerows (WL1)	T08
D09	M 56849 49841	Improved agricultural grassland (GA1), Recently felled woodland (WS5), Wet willow-alder-ash woodland (WN6)	Treelines (WL2)	T09

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were employed using settings recommended 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.

Onsite weather monitoring was undertaken concurrently with static detector deployments. One Vantage Pro 2 (Davis Instruments, CA, UCS) was deployed each season and night-time hourly data was tracked remotely to ensure a sufficient number of nights (i.e. minimum 10-20 nights) with appropriate weather conditions were captured (i.e. dusk temperatures above 8˚C, wind speeds less than 5 m/s and no or only very light rainfall). Table 3-6 summarises survey effort achieved in 2024 for each of the detector locations.

Table 3-6 Survey Effort - Ground-level Static Surveys 2024

Season	Survey Period	Total Survey Nights per Detector Location	Nights with Appropriate Weather
Spring	7th May – 22nd May 2024	15	13
Summer	26th June – 23rd July 2024	27	27
Autumn	27th August – 10th September 2024	14	14
Total Survey Effort		56	54

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Static Detector Locations

N

Drawing Title
2024 Static Detector Locations

Project Title
Cooloo Wind Farm, Co. Galway

Drawn By	Checked By
MG	CM
Project No.	Drawing No.
240451	Figure 3-2
Scale	Date
1:20,000	2025-09-24

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3.4 Bat Call Analysis

All sound recordings were analysed using bat call analysis software, Kaleidoscope Pro v.5.4.8 (Wildlife Acoustics, MA, USA). The aim was to identify, to a species or genus level, the bats present at the Proposed Wind Farm. All recordings were first processed using the Auto ID function of Kaleidoscope, utilising a site-specific custom classifier that included only species found within Ireland.

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 against published signal characteristics for local bat species (Russ, 1999) to manually verify species identification. All recordings were manually reviewed in Kaleidoscope to determine the final species identification.

Myotis species potentially Daubenton's bat (*Myotis daubentonii*), Whiskered bat (*Myotis mystacinus*) and Natterer's bat (*Myotis 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 (*Pipistrellus pygmaeus*) and common pipistrelle (*Pipistrellus pipistrellus*) are distinguished by having distinct frequencies (peak frequency of maximum energy in search flight) of ~55 kHz and ~45 kHz respectively (Jones & van Parijs, 1993).

Plate 3-1 below shows typical sonograms of echolocation pulses for the different pipistrelle bat species recorded with an SM4BAT static bioacoustics recording device. The recordings are illustrated using Wildlife Acoustics Kaleidoscope software.

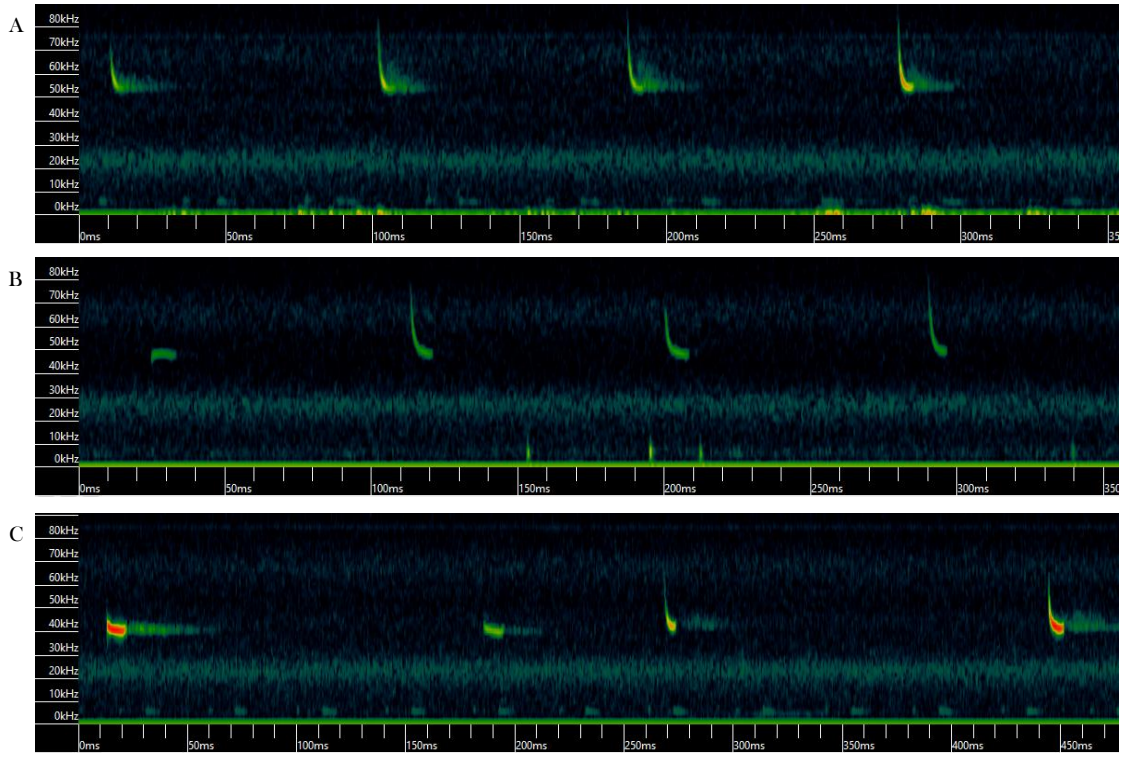

Plate 3-1 Spectrogram of echolocation pulses of (A) Soprano pipistrelle (Peak Frequency 55kHz), (B) Common pipistrelle (Peak Frequency 45kHz) and (C) Nathusius' pipistrelle (Peak Frequency 39kHz).

Echolocation calls by brown long-eared bats (*Plecotus auritus*) are intrinsically quiet and hard to record by static equipment while echolocation calls by lesser horseshoe bats (*Rhinolophus hipposideros*) are directional and can be missed by detectors, particularly manual detectors. To address this, MKO employs omni-directional microphones to limit under-recording for the latter species. Manual checking of recorded data includes also those labelled by the Kaleidoscope software as 'Noise' files and 'No ID'

files. Manually verifying and checking these files ensures that all calls for hard to detect species have been captured. Despite manual checking, a level of underrepresentation is still expected for these two species, and this is accounted for in the assessment of activity levels. Plate 3-2 shows typical spectrograms of echolocation pulses for *Myotis* spp., brown long-eared bat, Leisler's bat and a typical noise file, all recorded with the same SM4BAT recording device and illustrated using Wildlife Acoustics Kaleidoscope software.

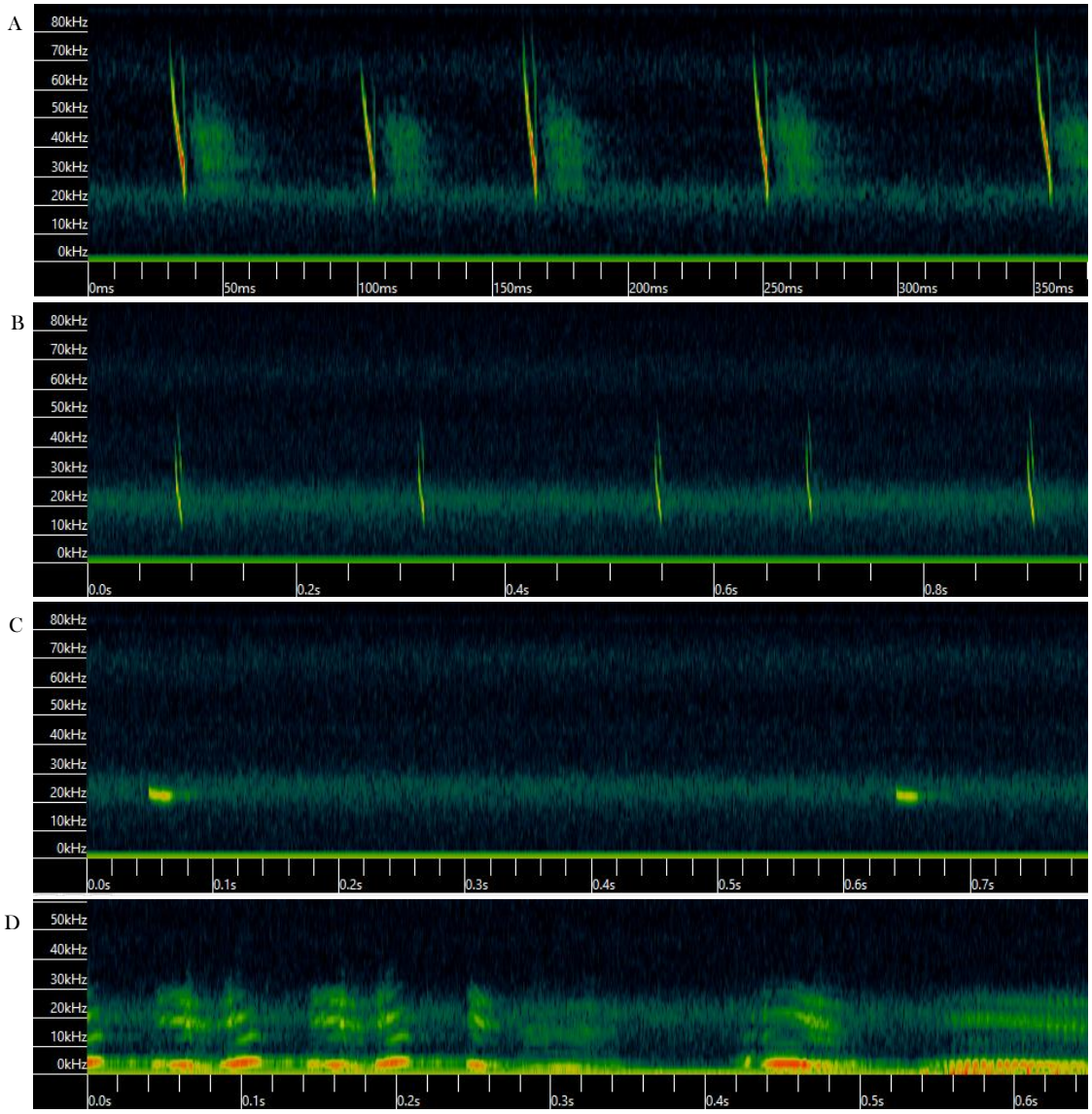

Plate 3-2 Spectrogram of typical echolocation pulses of (A) Myotis spp., *(B) Brown long-eared bat, (C) Leisler's bat and (D) typical non-bat sounds.*

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2023). 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 15s duration. All bat passes recorded in the course of this study follow these criteria, allowing comparison. In some cases, more than one bat pass is within the same recording file, in such cases the final species identification of the file is assigned to the rarer or harder to record bat species of Ireland. This protocol minimises the risk of under-representing the less frequently encountered taxon in multi-bat pass recordings. This precautionary treatment ensures that activity indices are not biased toward more common, highly detectable species and supports a conservative interpretation of potential impacts within the Environmental Impact Assessment Report.

3.5 Assessment of Bat Activity Levels

Following preliminary analysis and manual verification using Kaleidoscope Pro, statistical analysis and visualisation was performed using RStudio (version 2024.12.1+563) and R[1] (version 4.4.2). RStudio, an integrated development environment for the R programming language, was employed for data cleaning, exploration, and data visualisation. The 'ggplot2' R package was particularly instrumental in creating the data visualisations shown in the results section. Data was standardised into bat pass rates, calculated as bat passes per hour (bpph, total bat passes / night length) to account for seasonal changes in night length (Matthews *et al.*, 2016). Activity is often variable between survey nights; therefore, the median nightly pass rate (bpph) was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). During all calculations, data was rounded to the least three decimal places. When visualising the bat pass rates per season, survey effort was defined as detector hours (sum of recorded hours across all detectors). This was defined to circumvent any issues arising from differences in survey effort between detectors in a season.

The online database tool Ecobat (mammal.org.uk) is recommended by NatureScot (2021) to assess bat activity levels within a proposed wind farm site. This web-based interface, launched in August 2016, allows users to upload activity data and to contrast results with a comparable reference range, allowing objective interpretation. Uploaded data then contributes to the overall dataset to provide increasingly robust outputs. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting levels of bat activity in order to provide objective and consistent assessments. Table 3-7 defines bat activity levels as they relate to Ecobat percentile values (NatureScot, 2021). Ecobat was unavailable for a cross-site analysis of 2024 data as the platform has been undergoing maintenance since late 2022 and was not fully operational at the time of this report. Therefore, bat activity level data were assessed using site-specific activity levels.

Table 3-7 Ecobat Percentile Score and Categorised Level of Activity (NatureScot, 2021)

Ecobat Percentile	Bat Activity Level
81 to 100	High
61 to 80	Moderate to High
41 to 60	Moderate
21 to 40	Low to Moderate
0 to 20	Low

The methodology used to assess activity levels across the Proposed Wind Farm site was adapted from Mathews *et al.* (2016). For widespread species (*Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri*) activity ranges were determined using an **average** of the maximum nightly bat pass rate, measured as Bat Passes Per Hour (bpph), across all detectors, divided into quartiles. For all other species groups, the **maximum nightly bat pass rate** (bpph) recorded across all detectors, divided into quartiles was used.

Table 3-8 Site-specific Activity Level Categories based on Maximum Bat Passes per Hour (bpph)

Assessment Level	Activity Threshold as Bat Passes per Hour (bpph) for Bat Species				
	Myotis spp.	*Leisler's bat*	*Nathusius' pipistrelle*	*Soprano and Common pipistrelles*	*Brown long-eared bat*
Low	< 1.95	< 1.42	< 0.40	< 6.04	< 0.88
Moderate	1.95 – 5.85	1.42 – 4.27	0.40 - 1.20	6.04 – 18.13	0.88 – 2.63
High	> 5.85	> 4.27	> 1.20	> 18.13	> 2.63

Activity levels were assessed separately for widespread pipistrelle species (*P. pipistrellus*, *P. pygmaeus*), noctules *(N. leisleri*), *Myotis* spp. and rare or hard to record species (*Plecotus auritus, Pipistrellus nathusii*). Median and maximum nightly activity (bpph) at each detector location were then categorized as *Low*, *Moderate*, or *High* for each recorded season. Any figure below 25% of the maximum or the average maximum nightly pass rate was considered *Low* activity, while figures above 75% were

classified as *High*. Values falling between these two quartiles were defined as *Moderate*. To prevent skewing the activity thresholds, any evident outliers recorded across the detectors identified through a box-whiskered plot were excluded. Table 3-8 presents site-specific activity ranges per species group without outliers.

3.6 Assessment of Collision Risk

3.6.1 Population Risk

NatureScot (2021) provides a generic assessment of bat collision risk for UK species, based on species behaviour and flight characteristics. In the guidelines, this measure of collision risk is used, in combination with relative abundance, to indicate the potential vulnerability of British bat populations. No such assessment is provided for Irish bat populations.

In Table 3-9, an adapted assessment of vulnerability of Irish bat populations to collision with wind turbine blades is provided. This adaptation of the NatureScot Guidance Table 2 was based on collision risk and species abundance of Irish bat populations. Species' collision risk follows those described in NatureScot (2021). Relative abundance for Irish species was determined in accordance with Wray *et al.* (2010) using population data available in the 2019 Article 17 reports (NPWS, 2019). Feeding and commuting behaviours, and habitat preferences for bat species in Ireland were also considered.

Table 3-9 Population Vulnerability of Irish Bat Species (Adapted from NatureScot (2021).

Relative abundance	**Low Collision Risk**	**Medium Collision Risk**	**High Collision Risk**
Common species			Common pipistrelle Soprano pipistrelle
Rarer species	Daubenton's bat Brown long-eared bat Lesser horseshoe bat		Leisler's bat
Rarest species	Natterer's bat Whiskered bat		Nathusius' pipistrelle

Low Population Vulnerability	Medium Population Vulnerability	High Population Vulnerability

3.6.2 Site Risk

The likely impact of a development on bats is related to site-based risk factors, including habitat and development features. The cross-tablature result of habitat risk and project size determines the site risk (i.e. Low, Medium or High) (Table 3-10) i.e. Table 3a from NatureScot (2021). Table 5-1 in the results section describes the criteria and site-specific characteristics used to determine an indicative risk level for the Proposed Wind Farm. All site assessment levels, as per NatureScot (2021) are presented in **Appendix 3**.

Table 3-10 Site-risk Level Assessment Matrix (Table 3a, NatureScot (2021).

		Project Size		
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Low/Lowest Site Risk (1-2)	Medium Site Risk (3)	High/Highest Site Risk (4-5)

3.6.3 Overall Risk Assessment

An overall risk assessment was made by combining the site risk level (i.e. Low/Medium/High) and the Ecobat activity category (or the equivalent site-specific activity level thresholds), as shown in the overall risk assessment matrix table (Table 3-11) i.e. Table 3b from NatureScot (2021). The assessment was carried out for both median and maximum activity categories in order to provide insight into typical bat activity (i.e. median values) and activity peaks (i.e. maximum values) (**Appendix 4**).

Table 3-11 Overall Risk Assessment Matrix (Table 3b, NatureScot (2021).

	Ecobat activity category (equivalent site-specific activity level thresholds)					
Site Risk Level	Nil (0)	Low (1)	Low-Moderate (2)	Moderate (3)	Moderate-High (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	16	20
Highest (5)	0	5	10	15	20	25

Low Overall Risk (0-4)	Medium Overall Risk (5-12)	High Overall Risk (15-25)

This exercise was carried out for each high collision risk species. Overall risk assessments were also considered in the context of any potential impacts at the population level, particularly for species identified as having high population vulnerability (Table 3-9 above).

3.7 Limitations

A comprehensive suite of bat surveys has been undertaken at the Proposed Wind Farm in 2024 with additional supplementary surveys carried out in 2021 and 2022. The surveys undertaken, in accordance with NatureScot (2021) Guidance, provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Wind Farm on bats receptors.

Access limitations can relate to static deployments and roost inspections:

- No access issues were encountered with the Proposed Wind Farm site during static deployments, as the detectors were deployed where intended.

Survey limitations can relate to deployment coverage, data storage, equipment failure or deployment related incidents:

- Nine detectors were deployed at nine turbine locations, in line with best practice guidance, providing good survey coverage of the Site.
- MKO employs data storage redundancy methods to ensure no data is lost from the field to final analysis and no data was lost.
- SD card corruption or fill-up can prevent data from being collected during deployments and no issues with on-site data storage were encountered.
- Bat detector's microphones are checked before every season to ensure they have good sensitivity for data collection, and detectors' software updates are installed as soon as they become available. No issues related to equipment were encountered during the surveys.
- Incidents during deployments, such as tampering or livestock interference, can prevent data from being collected effectively. No incidents were reported during the surveys.

The limitations of bat activity assessment primarily relate to data analysis procedures and a lack of standardised and Ireland-based assessment methods:

- MKO's data analysis methods include manually reviewing all recordings. This workflow also includes verifying noise files and files left without a species identification after the auto ID function has been applied. Manual verification helps address the sound analysis software's limitations in accurately identifying bat species in Ireland. Manual species identification further allows for the detection of recordings containing multiple species. To maintain methodological consistency and minimise bias across datasets, only one species is reported for each recording. When multiple species are present, priority is given to hard-to-detect species during the final manual ID, compensating for the software's limitations in recognising their echolocation calls. Although this approach may introduce some bias, it is consistently applied across all MKO bat datasets. Importantly, this bias is not expected to affect the overall conclusions of the assessment, as only commonly recorded species may be slightly underreported.
- Additionally, no activity threshold currently exists for Irish bat species to objectively assess bat activity within specific habitats, and no standardised assessment method has been established across the country.

Technical difficulties associated with the deployment of an onsite weather station occurred for spring during the survey period. As a result, weather data was extracted from a nearby weather monitoring station (approximately 47 km away), for 16 days in spring, to assess appropriate weather conditions in the wider area.

The information provided in this report accurately and comprehensively describes the baseline environment; provides an accurate prediction of the likely effects of the Proposed Project; prescribes mitigation as necessary; and describes the predicted residual impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. No limitations in the scope, scale or context of the assessment have been identified. Overall, a comprehensive assessment has been achieved.

4. SURVEY RESULTS

4.1 Consultation

4.1.1 Bat Conservation Ireland

Bat Conservation Ireland were invited to comment on the potential of the Proposed Project to affect bats. A reply was received on the 19th April 2023 indicating that being a small organisation with limited resources, the organisation does not have the capacity to get involved in planning issues and therefore the organisation cannot be consulted.

4.1.2 Development Applications Unit - NPWS

The Development Applications Unit were also invited to provide any feedback, comments or suggestions they might have relating to the Proposed Project. A response was received from the Department of Housing, Local Government and Heritage on the 29th of May 2023, in which they gave the following response with respect to bats:

Bat roosts may be present in trees, buildings and bridges. Bat species are protected under the Wildlife Act, 1976 to 2018, and are subject to a regime of strict protection pursuant to the requirements of the Habitats Directive (92/43/EEC) as transposed in Irish law in Regulation 51 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended). Therefore, damage/disturbance to any such roosts must be avoided in the first instance. While the Minister may grant a derogation licence under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011-2015, a licence can only be granted once a number of strict criteria have been met (see Regulation 54). An assessment of the impact of the proposed wind farm on bat species should be carried out noting recent guidance available, "Bat and Onshore Wind Turbines: Survey, Assessment and Mitigation, 2019" published jointly by Scottish Natural Heritage and Bat Conservation Trust and other stakeholders. The Department would like to highlight new research on patterns of bat activity in upland wind farms1 which indicates it is more appropriate to use 30 day survey periods with static automated detectors, in each season, and in different weather conditions to reduce sampling bias and to accurately determine when the curtailment mitigation is required during the operational phase. This survey should include use of detectors at different heights. Any proposed bat friendly lighting should be proven to be effective and follow up-to date guidance.

All recommendations made by the Department were fully considered in the design of bat surveys and the preparation of this report.

The above-mentioned research is based on an online webinar *'Patterns of Bat Activity at Upland Windfarms: Implications for Sampling and Mitigation'* (CIEEM, 2021). The presenter stated during the 'Summary & Questions' that their Scottish company undertake surveys for '30 days' although they 'haven't derived 30 days in any scientific way', and concludes that they 'have not looked to see what is the optimum efficiency'. The information presented has not been published and the speaker states that 'there have been meetings to review the guidance' (i.e. SNH, 2019). However, it is stated that it is likely the SNH (2019) guidelines will not change and that there may only be clarification issued on the existing guidelines, 'rather than necessarily changing it'.

Updated guidance was released by NatureScot 2021 (formerly SNH) in 2021. Surveys at the site were undertaken in accordance with this updated guidance; therefore, it is considered that the survey effort is fully in line with the industry best practice and a comprehensive assessment was achieved.

4.2 Desk Study

4.2.1 Previous Baseline Surveys (2021–2022)

Baseline bat surveys undertaken in 2021 and 2022, in accordance with SNH (2019) and NatureScot (2021) guidance, comprised a desk study, habitat suitability appraisal, roost inspections, dusk emergence surveys, manual transects, and ground-level static detector surveys.

One building within the survey area was confirmed as a soprano pipistrelle roost. Static detector surveys in 2022 recorded approximately 59,516 bat passes, dominated by common pipistrelle and soprano pipistrelle, with smaller proportions of Leisler's bat, *Myotis* spp., brown long-eared bat, Nathusius' pipistrelle, and one lesser horseshoe bat pass.

Static detector surveys in 2021 revealed a total of 55,229 bat passes, also dominated by common and soprano pipistrelle. Fewer records of Leisler's bat, *Myotis* spp., brown long-eared bat and Nathusius' pipistrelle were also recorded.

It was noted that although the site is outside the current known range for lesser horseshoe bat, a single bat pass was recorded at D09 in autumn 2022. No other records of lesser horseshoe bat were recorded during the survey effort in either 2021 or 2024. This single lesser horseshoe bat record is considered to be an outlier and based on the results from the 2021, 2022 and 2024 surveys, it is in not anticipated that a larger population of lesser horseshoe bat resides in the area. Regardless, the record has been considered. It is noted that lesser horseshoe bats are considered a low collision risk species, and no net loss of habitat connectivity is anticipated as a result of the Proposed Project. The Site will remain suitable for potential future lesser horseshoe bat activity.

A full summary of methods and results from the 2021 and 2022 survey period is provided in **Appendix 1**.

4.2.2 Bat Records

Bat Conservation Ireland

A data request was sent to Bat Conservation Ireland for records of bat activity and roosts within a 10 km radius of an approximate central point in the Proposed Wind Farm (Grid Reference: M 55846 48731).

Available bat records were provided by BCI on 14th March 2025. The search included roosts, transects and ad-hoc observations, with eight roosts and nine ad-hoc observations identified. Based on these previous bat records, seven of Ireland's nine resident bat species were recorded within 10 km of the Proposed Wind Farm. The results of the database search are provided in Table 4-1.

Table 4-1 National Bat Database of Ireland Records within 10 km

Survey Type	Species	Grid reference	Date	Location
Roost	*Pipistrellus pipistrellus, Pipistrellus pygmaeus, Myotis* spp., *Nyctalus leisleri, Plecotus auritus*	M 47000 42000	N/A	Ballynapark, Tuam, County Galway
	Myotis nattereri, Myotis daubentonii, Plecotus auritus, Unidentified bat	M 47300 42300	N/A	Ballynapark, Tuam, County Galway
	Pipistrellus pygmaeus	M 50272 43581	N/A	Abbey West, Tuam, County Galway

	Myotis daubentonii	M 63015 53627	N/A	Shankill, Ballinsloe, County Galway
	Rhinolophus hipposideros	M 47000 55000	N/A	Carrowrevagh, Tuam, County Galway
	Unidentified bat	M 53400 53700	N/A	Levally, Tuam, County Galway
	Unidentified bat	M 54600 52500	N/A	Levally, Tuam, County Galway
	Unidentified bat	M 51700 43600	N/A	Abbey East, Athenry-Oranmore, County Galway
Ad-hoc	*Pipistrellus pygmaeus*	M 51700 43600	25/04/2005	Consultancy Surveys
	Pipistrellus pygmaeus	M 47300 42300	15/10/2005	Consultancy Surveys
	Pipistrellus pygmaeus	M 50200 44200	22/04/2007	Consultancy Surveys
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Myotis daubentonii, Myotis nattereri, Nyctalus leisleri	M 48000 49900	24/05/2009	BATLAS 2010
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Myotis daubentonii, Nyctalus leisleri	M 60095 49975	02/09/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus	M 51682 43604	04/09/2019	BATLAS 2020
	Pipistrellus pygmaeus	M 55760 46400	04/09/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus	M 54273 56560	11/09/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri	M 63800 40100	03/09/2020	National Biodiversity Data Centre Bat Records

National Bat Database of Ireland

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 10 km radius of the Proposed Wind Farm (last search 30th August 2025). Hectad M54 and M55 lies within 10 km of the Proposed Wind Farm. Two of Ireland's nine resident bat species were recorded within 10 km of the proposed works. The results of the database search are provided in Table 4-2.

Table 4-2 NBDC Bat Records within 10 km of Proposed Project

Hectads	Species	Database	Designation
M54/M55	Common pipistrelle (*Pipistrellus pipistrellus*)	National Bat Database of Ireland	HD Annex IV, WA

Hectads	Species	Database	Designation
M54/M55	Soprano pipistrelle (*Pipistrellus pygmaeus*)	National Bat Database of Ireland	HD Annex IV, WA

4.2.3 Bat Species Range

The potential for negative impacts is likely to increase where there are high risk species at the edge of their range (NatureScot, 2021). Therefore, range maps presented in the 2019 Article 17 Reports (NWPS, 2019) were reviewed in relation to the location of the Proposed Wind Farm.

The Proposed Wind Farm is outside the current known range for the lesser horseshoe bat, Nathusius' pipistrelle and Whiskered bat and is within the range of all other bat species.

4.2.4 Designated Sites

Within Ireland, the lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs). The Proposed Wind Farm is within less than 3 km of the smaller parts of *Lough Corrib SAC*, however, this SAC was designated for a *Rhinolophus hipposideros* roost which is more than 30 km away from the Proposed Project.

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 Proposed Wind Farm found no sites designated for the conservation of bats.

4.2.5 Landscape Features and Habitat Suitability

A review of mapping and photographs provided insight into the habitats and landscape features present at the Proposed Wind Farm. In summary, the Proposed Wind Farm is mainly composed of grasslands largely improved agricultural grassland. The site also contains woodland habitats with conifer plantations and areas of peatland habitats. The site contains landscape features that can be suitable for use by bats including a number of buildings and structures, hedgerows and treelines.

A review of the National Inventory of Architectural Heritage (NIAH) and the National Monuments Service (NMS) datasets did not indicate the presence of subterranean sites within the Proposed Wind Farm.

A search of the UBSS Cave Database for the Republic of Ireland, the GSI Karst Database and Appendix 8-2 of this EIAR, found no caves within the Proposed Wind Farm, and two within 10 km of the Proposed Wind Farm (Table 4-3).

A review of the NBDC bat landscape map provided a habitat suitability index of 20.89 (Green) to 22.67 (Yellow). This indicates that the Proposed Wind Farm has *Low* habitat suitability for bat species.

Table 4-3 Caves within 10 km of the Proposed Project

Caves	Distance from closest proposed turbine (km)	Grid reference
Pallnadingdong Cave (GSI)	9.247	M 50000 40100
Ballyglunin Cave (GSI)	10.156	M 46900 42000

4.2.6 Additional Projects in the Wider Landscape

Table 4-4 provides an overview of wind farms in the vicinity of the Proposed Project. Thirteen other large infrastructure developments and proposals (e.g., road upgrades, quarries and residential developments) were identified within 10km of the Proposed Project.

Table 4-4 Additional Developments within 10 km of the Proposed Project

Wind Farm	Status	No. of Turbines	Turbine Tip Height (m)	Approx. Distance from Proposed Project (km)
Cloonlusk Wind Farm	Existing	2	119	8
Clonberne Wind Farm	In Planning	11	180	6

Other ACP/EIA projects:

- ACP Case ID – 300560 128 no. dwelling houses, vehicular access from R332 and all associated site development works.
- ACP Case ID – 302597 Permission for the development at this site, the existing Cloon to Lanesboro 110 kV Overhead Line which is approximately 65 kilometres long.
- ACP Case ID – 304472 Conversion and change of use of first floor to 17 apartments and development from basement to roof level of the premises.
- ACP Case ID – 305813 50 bedroom Residential Care Centre and all associated works.
- ACP Case ID – 306155 Quarry
- ACP Case ID – 306685 Construction and operation of solar PV panels, including an electrical substation compound, control building, up to 9 inverter units, underground cable ducts, The planning application is accompanied by a Natura Impact Statement.
- ACP Case ID – 307791 Construction of a Concrete Batching Plant on and adjacent to a Quarry site previously approved under Planning Reference 06/2275 and An Bord Pleanala Reference PL.07.222783. The Planning Application is accompanied by a Natura Impact Statement (NIS).
- ACP Case ID – 310144 10 year planning permission for upgrades to wastewater facilities.
- ACP Case ID – 312875 N63 Liss to Abbey Realignment Scheme.
- ACP Case ID – 317330 Quarrying operations including the extraction of minerals (sand and gravel). The planning application is accompanied by an Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS).
- ACP Case ID – 318460 Permission for development consisting of the importation of inert soil & stone material for the site restoration of a former gravel pit for a period of ten years & all associated ancillary works. A Natura Impact Statement (NIS) submitted with Further Information.
- ACP Case ID – 320087 Substation comprising of 220kV Gas Insulated Switchgear Building, Independant Power Producer Compound, Battery Energy Storage System Compound, Undergorund Grid Connection and Associated Cabling.
- ACP Case ID – 321022 Development of quarry and associated site development and operational works. Permission is sought for an operational lifetime of 10 years. The application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement.

4.3 Field Surveys

4.3.1 Bat Habitat Suitability Appraisal

4.3.1.1 Proposed Wind Farm Infrastructure

A total of eighteen habitats were recorded within the Proposed Wind Farm, including:

- Wet grassland (GS4)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Arable crops (BC1)
- Buildings and artificial surfaces (BL3)
- Stone walls and other stonework (BL1)
- Recolonizing bare ground (ED3)
- Conifer plantation (WD4)
- Broadleaved woodland (WD1)
- Scrub (WS1)
- Wet grassland/scrub (GS4/WS1)
- Cutover bog (PB4)
- Cutover raised bog (PB1)
- Poor fen (PF2)
- Treelines (WL2)
- Hedgerows (WL1)
- Lowland/depositing rivers (FW2)
- Drainage ditches (FW4)

The habitats within the Proposed Wind Farm are dominated by grasslands with agricultural fields that are typically bordered by hedgerows or treelines and occasionally stone walls. Scrub can also be found throughout the Proposed Wind Farm in various areas and forms a mosaic with bog habitats and grassland areas. Chapter 6 of the main EIAR describes the various habitats within the site in more detail.

The desktop study and walkover surveys were used to assess habitats for their suitability to support foraging, commuting, and roosting bats, according to Collins (2023). Bat habitat suitability categories, divided into *High*, *Moderate*, *Low*, *Negligible* or *None* are described fully in Appendix 2.

Areas of exposed grassland and agricultural land, earth banks, recolonising bare ground and artificial surfaces were considered of *Negligible* suitability (Plate 4-1), i.e. no obvious habitat features on site likely to be used as flight paths or by foraging bats. Areas of bog, heathland, open habitats and isolated treelines that may be used by a small number of bats and are poorly connected to the wider landscape, were considered of *Low* suitability for foraging and commuting bats (Plate 4-2). Hedgerows, treelines, lowland/depositing rivers, drainage ditches, scrub and conifer plantation edges were considered of *Moderate* suitability for foraging and commuting bats as they provide connectivity as linear features within the Site and to the surrounding landscape (Plate 4-3; Plate 4-4).

Plate 4-1 Exposed agricultural land and earth bank next to T1, assigned Negligible suitability for commuting and foraging bats.

Plate 4-2 Hawthorn treeline at T6, assigned Low suitability for commuting and foraging bats.

Plate 4-3 Habitat near T3, with a treeline, hedgerow and lowland river, considered Moderate suitability for commuting and foraging bats.

Plate 4-4 Treelines and scrub near T8, assigned Moderate suitability for commuting and foraging bats.

Twelve buildings and associated structures were inspected for bat roosting suitability. Six structures were assessed as offering *Negligible* roosting potential, three structures had *Low* roosting potential, two buildings had *Moderate* roosting potential and one with *High* roosting potential. Details of the buildings inspection and dusk emergence surveys are presented below in Section 4.3.2.

All trees and treelines within the wind farm footprint, particularly those scheduled for felling at the TDR entrance and near Turbines 1, 3, 5, 6 and 8, were inspected for potential roost features (PRFs) following Andrews (2018), including rot holes, hazard beams, cracks/splits, partially detached bark, knot holes and branch junctions. No PRFs were identified on any tree, including those scheduled for felling. Any superficial features observed offered no roosting potential; accordingly, all inspected trees were assessed as *None* in line with Collins (2023). Further detail on inspected trees is provided in Section 4.3.2.

4.3.1.2 Proposed Grid Connection

The Proposed Grid Connection will consist of a permanent on-site 110kV substation compound, which will be connected to the existing Cloon 110kV substation in the townland of Cloonacaragh via an underground 110kV electrical cable. The cabling route, approximately 20.1 km in length, is located primarily within the public road corridor. The proposed on-site substation is situated within Improved Agricultural Grassland (GA1), while habitats along the Proposed Grid Connection route include Buildings and Artificial surfaces (BL3), Cutover Bog (PB4), Treelines (WL2), Hedgerows (WL1), Wet grassland (GS4), Parkland and Scattered Trees (WD5), Conifer Plantation (WD4), (Mixed) Broadleaved Woodland (WD1), Dry Meadows and Grassy Verges (GS2), and various watercourses. Further details of habitats within the Proposed Grid Connection footprint are provided in Chapter 6, Section 6.4.1.6 of the EIAR.

The habitat at the proposed 110kV on-site substation and adjacent temporary construction compound comprises Improved Agricultural Grassland (GA1) and Scrub (WS1), with no removal of trees or hedgerows proposed during construction. Therefore, no loss of bat roosting, commuting, or foraging habitat is anticipated in this area.

With regard to commuting and foraging bats, features along the Proposed Grid Connection route, such as Treelines (WL2), Hedgerows (WL1) and isolated mature trees were assessed during field surveys in August 2024 and September 2025. These features were assigned *Low* to *Moderate* suitability for commuting and foraging bats due to their connectivity with the wider landscape and presence of linear features (Collins, 2023).

Regarding roosting bats, habitat features along the Proposed Grid Connection route were assessed in August 2024 and September 2025 for their potential to support bat roosts. A disused railway bridge was assessed as having *Low* roost potential (Table 4-5). While no evidence of bat roosting was recorded during the ground-based survey, this feature may nonetheless offer limited roosting opportunities. Trees

proposed for removal as part of the grid connection consisted primarily of hedgerow and scrub species such as hawthorn, holly and alder which were assessed as having no *(None)* roosting potential.

Watercourse/Railway Crossings

The Proposed Grid Connection underground cabling route will traverse 8 no. watercourse crossings that will require works. Six of these watercourse crossings have an existing culvert or bridge and these structures were assessed for bat roost potential during field surveys conducted on 13th August 2024, 18th June 2025 and 2nd September 2025. No evidence of bat roosts was recorded at any of the inspected structures. The findings are described in Table 4-5 below. The other two watercourse crossings (WC1, WC4) consist of field drains and lack suitable structures for bat roost potential. Further details on these can be found in Chapter 6, Section 6.4.1.6.1.

The construction methodology for the 4 mapped watercourse crossings has been designed to eliminate the requirement for in-stream works on these locations requiring a crossing to be constructed to traverse the watercourse with the cabling ducts, as outlined in Chapter 4 of this EIAR. The locations of the watercourse crossings are shown on Figure 4-15 in Chapter 4 of the EIAR.

Table 4-5 Bat Roost Suitability of Bridges/culverts along the Proposed Grid Connection underground cabling route

Crossing	Grid Reference	Bridge/Culvert type	Photo	Bat Roost Potential	Extent of Works
WC2	M 53917 46891	Concrete pipe culvert		No evidence of bats found. The structure has a smooth, solid concrete surface with no gaps, cracks or crevices. No *(None)* bat roost potential.	Option B – Standard Formation Crossing under Culvert
WC3	M 53657 44939	Concrete box culvert		No evidence of bats found. The structure has a smooth, solid concrete surface with no gaps, cracks or crevices. No *(None)* bat roost potential.	Option B – Standard Formation Crossing under Culvert

WC5	M 49584 45287	Stone Arch Bridge		No evidence of bats found. No access for bats due to dense vegetation overgrowth blocking the stone bridge structure. *Negligible* bat roost potential.	Option A – Standard Formation Crossing over Culvert
WC6	M 49317 45375	Concrete pipe		No evidence of bats found. The structure has a smooth, solid concrete surface with no gaps, cracks or crevices. Loose boulders on top of the concrete pipe with large gaps unsuitable for roosting. No *(None)* bat roost potential.	Option D – Horizontal Directional Drilling

WC7	M 53134 44601	Concrete pipe culvert		No evidence of bats found. The structure has a smooth, solid concrete surface with no gaps, cracks or crevices. No *(None)* bat roost potential.	Option A – Standard Formation Crossing over Culvert
WC8	M 44508 46972	Stone Arch Bridge		No evidence of bats found. Some deep crevices present at the wall and under the arch. **Moderate** bat roost potential. No works proposed on bridge infrastructure.	Option D – Horizontal Directional Drilling offset from bridge

Railway Crossing	M 46211 44967	Stone Arch Bridge		No evidence of bats found. Some wide shallow gaps present at the lower part of the wall giving the structure a ***Low*** bat roost potential. No works are proposed on bridge infrastructure.	Option D – Horizontal Directional Drilling offset from bridge.

4.3.1.3 Turbine Delivery Accommodation Works

As described in Chapter 4, Section 4.5.2 of this EIAR, limited turbine delivery route accommodation works are required to facilitate the transport of turbine components to the Proposed Wind Farm site. These works include the removal of a small area of Improved Agricultural Grassland (GA1) bordered by low-growing Hedgerow (WL1). This habitat was assessed as *Low* value for bat foraging and commuting, with no (*None*) potential for roosting bats.

At the site entrance, the turbine delivery route (TDR) overrun area will require the removal of a treeline (WL2). Although the treeline offers *Moderate* suitability for commuting and foraging bats, targeted ground-level inspections including use of endoscope and thermal scope (following Andrews, 2018) confirmed that none of the trees contained potential roost features (PRFs). Accordingly, all trees were classified as having no (*None)* roosting potential in line with Collins (2023).

4.3.2 Roost Surveys

4.3.2.1 Daytime Roost Inspections

Twelve structures and their associated outbuildings were identified within and around the Proposed Wind Farm as containing features with potential to support roosting bats. These were assessed during daytime surveys in 2024 in accordance with the grading criteria described by Collins (2023) (see Appendix 2). Each structure was subject to external inspection, and internal inspection where accessible, to identify evidence of bat use and assess roosting potential.

Of the twelve structures surveyed, six were assessed as having *Negligible* bat roost potential, three as *Low,* two as *Moderate*, and one as *High*. Eleven of the twelve structures will be retained and avoided as part of the Proposed Project. One structure (Structure 6, a derelict building near Turbine 5) was assessed as having *Moderate* roost potential and is proposed for demolition. Further details on the structures are provided below and are summarised in Table 4-6.

The following sections describe the structures grouped by their assessed roost potential, from *High* to *Negligible*, with photographs and key features noted for each.

Table 4-6 Structures Inspected for Roost Potential Within and Around the Proposed Cooloo Wind Farm Site

Structure No.	Description	IG Ref	Nearest Turbine	Distance to nearest turbine (m)	Bat Roost Potential
1	Shed	M 55031 47386	T1	370	*Negligible*
2	Large Hay Shed	M 55135 47805	T1	300	*Negligible*
3	Small Farm Shed	M 55089 47969	T1	470	*Low*
4	Cattle Shed	M 55758 49068	T3	470	*Negligible*
5	Turf Shed	M 56299 48333	T4	245	*Negligible*
6	Derelict Building	M 56165 48995	T5	198	*Moderate*
7	Turf Barn	M 55966 50469	T7	350	*Negligible*
8	Vacant Single-Storey House	M 56152 50500	T7	550	*Moderate*
9	Vacant Farmhouse	M 57203 49326	T8	160	*High*

10	Farm Buildings	M 57430 49132	T8	430	*Low*
11	Farm Buildings	M 57493 49530	T8	512	*Negligible*
12	Storage Farmhouse	M 57481 49608	T8	532	*Low*

4.3.2.1.1 *Structures with High Roost Potential*

Vacant Farmhouse Building (Structure 9, IG Ref: M 57203 49326)

Located approximately 160 m east of Turbine 8, this two-storey vacant farmhouse building was assessed as having *High* bat roost potential in accordance with Collins (2023). The building forms part of a wider farm complex and is situated within Improved Agricultural Grassland (GA1), with treelines in the surrounding landscape providing strong ecological connectivity. Plates 4-5 to 4-8 illustrate the external condition, interior features, evidence of droppings, and the bat staining observed.

Plate 4-5 External view of the vacant farmhouse building showing intact slate roof and concrete-rendered exterior.

Plate 4-6 Internal room on the second floor showing widespread peeling paint and scattered bat droppings.

Plate 4-7 Close-up view of bat droppings on the floor in an upper-storey bedroom.

Plate 4-8 Staining on the ceiling of an upper-storey bedroom, consistent with bat occupancy.

The building has a concrete-rendered exterior and is roofed with slate, with a significant crack on one gable-end wall that may provide access points for bats. Doors and most windows were closed, although one second floor window remained open. Full access was gained to the interior for detailed inspection.

Evidence of active bat use was recorded throughout the building's interior. Scattered droppings were found on the ground-floor windowsill and within the bathroom, notably inside the bathtub. Further droppings were present on the upper floors, including on floors and a mattress within one of the bedrooms. Additional droppings were observed on a second-storey windowsill, with one bedroom exhibiting visible bat staining on the ceiling. Butterfly wing remains were also found in the same bedroom as the staining, suggesting potential bat feeding activity.

Walls and ceiling throughout the property showed widespread peeling paint, indicative of prolonged dereliction and minimal recent disturbance. These conditions, combined with multiple internal and external features, offer a variety of suitable roosting opportunities for crevice- and void-roosting bat species. The presence of bat droppings and feeding remains confirms active bat occupation.

4.3.2.1.2 *Structures with Moderate Roost Potential*

Vacant Single-Storey House (Structure 8, IG Ref: M 56152 50500)

Located approximately 550 m east of Turbine 7, this single-storey vacant house was assessed as having *Moderate* bat roost potential, in line with Collins (2023). The building lies within a larger agricultural setting comprising Improved Agricultural Grassland (GA1) and is surrounded by a farm complex. A hedgerow extends from the building, providing connectivity to the wider landscape.

The structure has an intact slate roof, although small gaps were noted between the roofline and wall junctions. Two chimneys are present, and no gutters were installed. While the structure is generally intact, signs of age and abandonment were evident. Windows were partially open, and the front door was ajar at the time of the survey, allowing potential access to the interior.

Plate 4-9 External view of the vacant single-storey house (Structure 8) showing intact slate roof and surroundings.

Plate 4-10 Internal view of Structure 8 showing accessible attic space via broken ceiling planks.

Plate 4-11 External view of the derelict building (Structure 6), showing broken roof slates, and surrounding habitat.

Plate 4-12 Internal view of Structure 6, showing fallen planks and lack of underfelt, indicative of limited shelter for roosting bats.

Internally, the house showed clear signs of long-term disuse. Fixtures and fittings were broken, paint was peeling throughout, and furnishings were left in place. Curtains were checked for roosting bats. The attic space was accessible and open, providing a sheltered void with potential to support crevice- or void-roosting species. A small number of bat droppings were recorded on the floor.

The combination of open attic space, structural features (e.g. roof-wall gaps, chimneys), and minor evidence of bat use supports a classification of *Moderate* bat roost potential. Plates 4-9 to 4-10 illustrate the external and internal condition of the building.

Derelict Building (Structure 6, IG Ref: M 55768 49063)

Located approximately 198 m south of Turbine 5, this derelict single-storey structure was assessed as having *Moderate* bat roost potential in accordance with Collins (2023). The building is situated within Improved Agricultural Grassland (GA1) and is bordered by mature conifer trees that do not offer roosting potential and hedgerows that form part of the local field boundary network, providing habitat connectivity.

Externally, the structure is heavily degraded, with a partially collapsed slate roof, broken walls, and a visibly cracked chimney. The building is constructed primarily from concrete, and access was easily gained due to the absence of doors. Gaps between the remaining roof slates and cracks in the chimney structure provide potential ingress points for crevice-roosting bats.

Internally, the building was in a severely deteriorated condition, with fallen planks, exposed beams, and widespread structural damage. The attic space was open to the elements, lacking any underfelt or thermal insulation, reducing its suitability as a sheltered roosting environment. Despite the presence of potential roost features no evidence of bat use was observed during the inspection.

The *Moderate* classification reflects the availability of crevice features on the roof and chimney that could be used opportunistically by roosting bats, though the open and exposed nature of the interior lowers its overall suitability. Plates 4-11 and 4-12 above show the external condition of the building and the exposed attic space.

4.3.2.1.3 *Structures with Low Roost Potential*

Small Farm Shed (Structure 3, IG Ref: M 55089 47969)

Located approximately 470 m southwest of Turbine 1, this small farm shed was assessed as having *Low* bat roost potential in accordance with Collins (2023). The structure consists of brick walls with a corrugated iron roof and door and is situated within Improved Agricultural Grassland (GA1), with a few scattered trees in the surrounding area.

Potential access for bats is available via small gaps between the building and the door, as well as between the roof and the wall plate. A small window also allows potential access to the interior. The inside of the shed was partially illuminated due to areas of uncovered roofing. Internal walls displayed several deep crevices between bricks and concrete, with embedded stones creating some minor surface irregularities. While no major roosting features were identified, and the structure is relatively exposed, the presence of these minor features supports the classification of *Low* roost potential. No evidence of bat use was recorded during the surveys.

Plates 4-13 and 4-14 show the external view of the shed and the internal condition, including exposed roof areas and internal crevices.

Farm Buildings (Structure 10, IG Ref: M 57430 49132)

Located approximately 430 m southeast of Turbine 8, this group of farm buildings forms part of an active agricultural holding. The site includes modern corrugated iron sheds in regular use, alongside an older stone-built structure with a corrugated iron roof. Exterior visual inspections revealed several cracks in the stone walls that may offer limited roosting opportunities for crevice-dwelling bat species. Several open windows were noted, providing potential access to the building interior.

The surrounding habitat comprises Improved Agricultural Grassland (GA1), with small hedgerows and a group of trees connected to field boundaries, offering some connectivity to the wider landscape. Due to the limited number and quality of roosting features, this structure was assessed as having *Low* bat roost potential in accordance with Collins (2023). No evidence of roosting bats were identified during

the inspection. Plates 4-15 to 4-16 below show the main farm building and associated structures observed during the inspection.

Plate 4-13 External view of Structure 3, with corrugated iron roofing, located southwest of Turbine 1.

Plate 4-14 Interior of the farm shed showing exposed roofing, with minor crevices between bricks and concrete.

Plate 4-15 Exterior view of Structure 10 - crevices in the wall which may provide roosting potential.

Plate 4-16 Corrugated iron sheds adjacent to the main building, currently in use as part of the active farm complex.

Plate 4-17 External view of the storage farmhouse Structure 12 showing lifted slates and general condition of the roof.

Plate 4-18 Internal view of the structure, showing current agricultural storage use and lack of suitable roosting features.

Storage Farmhouse (Structure 12, IG Ref: M 57481 49608)

Located approximately 530 m northeast of Turbine 8, this single-storey derelict house was assessed as having *Low* bat roost potential in accordance with Collins (2023). The building features a slate roof that is partially broken, with visibly lifted slates and two chimney stacks. All windows were open at the time of survey, allowing potential access to the interior. No underfelt or crevice-rich features were visible, and no signs of roosting bats were recorded during inspection.

The interior is currently used for agricultural storage and was cluttered with farming materials. No internal features suitable for bat roosting were observed, though the lifted slates may offer limited potential for occasional use by individual bats. The surrounding landscape comprises Improved Agricultural Grassland (GA1), with connecting hedgerows providing some degree of ecological linkage to the wider environment. No evidence of roosting bats were identified during the inspection. Plates 4-17 to 4-18 illustrate the exterior condition and internal storage use of the structure.

4.3.2.1.4 Structures with Negligible Roost Potential

Six structures within and around the Proposed Wind Farm were assessed as having *Negligible* bat roost potential in accordance with Collins (2023). These structures comprise modern agricultural sheds and outbuildings in regular use for turf storage, general farm storage, or agricultural operations. All were of recent construction, typically using corrugated metal or concrete materials, and lacked suitable features such as crevices, cavities, or enclosed spaces that could support roosting bats. No evidence of bat use was recorded at any of these locations, and all were considered suboptimal for supporting either crevice- or void-roosting species.

Full details of these structures, including grid references and proximity to turbines, are provided in Table 4-6. Representative photographs are provided in Plates 4-19 to 4-24, which illustrate the external condition and construction type of each structure, confirming their *Negligible* suitability for bats.

Plate 4-19 Internal view of Structure 1, a small cattle shed with corrugated iron roof.

Plate 4-20 Internal view of Structure 2, a large farm shed constructed of brick and corrugated iron.

Plate 4-21 External view of Structure 4, a large modern cattle shed with surrounding trees.

Plate 4-22 External view of Structure 5 used as a turf storage shed.

Plate 4-23 Internal view of Structure 7, a cattle shed with turf storage.

Plate 4-24 External view of Structure 11, a large metal agricultural shed.

4.3.2.1.5 Tree Inspections

Ground-level inspections of trees and treelines within and adjacent to the Proposed Cooloo Wind Farm were undertaken in 2024 and 2025 to assess their potential to support roosting bats. Surveys focused on areas where tree removal is required for wind farm infrastructure, including turbine bases and associated bat buffers, turbine hardstands, access roads, the grid connection route, and the Turbine Delivery Route (TDR). The locations and outcomes of all inspections are shown in Figure 4-1, with a summary provided in Table 4-7.

A treeline west of Turbine 1 was inspected on 10th September 2024 and 2nd September 2025. This treeline, which will be subject to works including road upgrades and installation of the grid connection route, comprised ash, alder, hawthorn and holly. A total of 50 trees were inspected and no potential roost features (PRFs) were identified. Plates 4-25 and 4-26 illustrate examples from this treeline.

Plate 4-25 Example of an ash tree at the treeline west of T1.

Plate 4-26 Example of hawthorn at treeline inspected west of T1.

Several individual willow trees near Turbines 2, 3 and 9 were inspected on 10th September 2024 and 2nd September 2025. No PRFs were recorded and all were assessed as offering no roosting potential. These trees are proposed for removal to accommodate bat buffer zones and turbine hardstands.

Trees south of Turbine 5, including ash, Scots pine and hawthorn hedgerows, were inspected on 2nd September 2025. No PRFs were present and all were classified as having no roosting potential. These features are proposed for removal to facilitate access roads and turbine hardstands.

A treeline southeast of Turbine 6, inspected on 2nd September 2025, comprised ash and several hawthorns. No PRFs were identified and the treeline was assessed as offering no roosting potential.

Trees surrounding Turbine 8 were inspected on 27th August 2024 and 2nd September 2025. The ash and hawthorn trees within the turbine buffer zone contained no PRFs and were assessed as having no roosting potential. Plate 4-27 illustrates the treeline at T8.

Mixed-species trees at the TDR overrun area (site entrance) were inspected on 10th September 2024 and 2nd September 2025. No PRFs were present and all were classified as having no roosting potential. Plate 4-28 provides an overview of the treeline at the TDR overrun area.

Plate 4-27 Ash treeline located northwest of T8.

Plate 4-28 Mixed treeline within the TDR overrun area.

In total, 106 trees within the Proposed Wind Farm site were inspected during the 2024–2025 survey period and no potential roost features were identified and all were assessed as having no roosting potential for bats.

Table 4-7 Summary of tree inspections, roost potential, and proposed retention or removal within the Cooloo Wind Farm site.

Nearest Turbine	Inspection Dates	PRFs / Notes	Trees/Hedgerows to be Removed / Retained	Bat Roost Suitability	Grid Reference
T1 (West treeline)	10th September 2024 and 2nd September 2025	Ash trees, alder, hawthorns and holly, no PRFs	Treeline within felling area to accommodate road upgrade works.	*None*	M 55069 47360
T2 (single tree)	10th September 2024	Willow, no PRFs	Proposed removal for bat buffer	*None*	M 55694 47997
T3 (single tree)	10th September 2024 and 2nd September 2025	Willow, no PRFs	Proposed removal for bat buffer	*None*	M 55659 48687
T5 (11 trees)	2nd September 2025	Ash tree, Scots pines and hawthorn hedgerow, no PRFs	Proposed removal for access roads and turbine hardstand	*None*	M 56199 48993
T6 (13 trees)	2nd September 2025	Ash tree and hawthorns, no PRFs	Proposed for removal for bat buffer and turbine hardstand	*None*	M 55761 49606
T8 (13 trees)	27th August 2024 and 2nd September 2025	Ash trees and hawthorns, no PRFs	Two ash trees and a hawthorn will be removed to accommodate the bat buffer.	*None*	M 56982 49416
T9 (2 trees)	10th September 2024	Willow, no PRFs	Proposed removal for bat buffer and turbine hardstand	*None*	M 56821 49792

TDR Overrun Area (25 trees)	10th September 2024 and 2nd September 2025	Mixed species including ash, alder, beech, hawthorn, sycamore and oak trees. No PRFs.	Trees will be removed for site entrance works	*None*	M 53795 47063

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout

Bat Roost Suitability Tree Assessment

- PRF
- FAR
- None

N

Drawing Title

Tree Inspections

Project Title: Cooloo Wind Farm, Co. Galway	
Drawn By: MG	Checked By: CM
Project No.: 240451	Drawing No.: Figure 4-1
Scale: 1:15,810	Date: 2025-09-24

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4.3.2.2 Emergence Surveys

Emergence surveys were carried out in spring, summer and autumn of 2024. Prior to this, additional emergence surveys were carried out in summer and autumn 2021 and autumn 2022.

Vacant Farmhouse Building (Structure 9) was surveyed in autumn 2021, 2022 and spring 2024. This structure was confirmed as a bat roost as soprano pipistrelle bats were observed emerging from the structure (Table 4-8). Structures assessed as having *Negligible* roosting potential were not subject to further survey (Collins, 2023). Structures with *Low* potential were located outside the recommended search buffer, no evidence of roosting bats were identified during the daytime inspections and the structures will be retained and avoided; therefore, were not subject to emergence surveys.

During the summer 2024 survey period, a dusk emergence survey was conducted at the Vacant Single-Storey House (Structure 8). One soprano pipistrelle was recorded emerging from a hole in the roof on the south-eastern side of the house. Leisler's bats, common and soprano pipistrelles were recorded commuting and foraging by the treeline to the south-east of this structure.

Emergence surveys were completed at Derelict Building (Structure 6) in summer 2021 and autumn 2024. No bats were observed emerging from this structure during the surveys. Pipistrelle species and Leisler's bats were observed foraging along a treeline nearby the building during the surveys. Table 4-8 summarises the findings of the bat activity surveys carried out on the structures.

Table 4-8 Emergence Survey Results 2024 and additional from 2021 and 2022

Structure	PRF Suitability	IG Ref	Survey Type	Date Surveyed	Survey Results
Derelict Building (Structure 6)	*Moderate*	M 55768 49063	Dusk Emergence Summer 2021	15th July 2021	No bats recorded emerging
Vacant Farmhouse Building (Structure 9)	*High – confirmed roost*	M 57203 49326	Dusk Emergence Autumn 2021	5th October 2021	7 Soprano pipistrelles observed emerging
Vacant Farmhouse Building (Structure 9)	*High – confirmed roost*	M 57203 49326	Dusk Emergence Autumn 2022	22nd September 2022	20 Soprano pipistrelles observed emerging
Vacant Farmhouse Building (Structure 9)	*High – confirmed roost*	M 57203 49326	Dusk Emergence Spring 2024	27th May 2024	10 Soprano pipistrelles observed emerging
Vacant Single-Storey House (Structure 8)	*Moderate – confirmed roost*	M 56152 50500	Dusk Emergence Summer 2024	26th June 2024	One Soprano pipistrelle confirmed emerging
Derelict Building (Structure 6)	*Moderate*	M 55768 49063	Dusk Emergence Autumn 2024	27th August 2024	No bats recorded emerging

4.3.3 Manual Transects

Manual transects were undertaken in spring, summer and autumn 2024. Details of additional transects carried out in 2022 are included in Appendix 1.

Bat activity was recorded in all seasons in 2024. A total of 355 bat passes were recorded, including emergence surveys. In general, common pipistrelle (n=133) was recorded most frequently, followed by soprano pipistrelle (n=111) and Leisler's bat (n=103). *Myotis* spp. (n=4) and brown long-eared bat (n=4) were less frequent (Plate 4-29).

Species composition and activity levels varied between survey periods. To account for differences in survey effort, results were expressed as bat passes per kilometre surveyed. Plate 4-30 presents results for

individual species per survey period, while Figures 4-2 to 4-4 illustrate the spatial distribution of bat activity. Activity was concentrated along woodland edges, treelines, hedgerows, and other linear features such as roads and tracks.

The summer surveys recorded significantly fewer bat passes (n = 52) compared with spring (n = 103) and autumn (n = 200). Common pipistrelle was most frequently recorded in spring, while soprano pipistrelle was recorded in similar numbers during spring and autumn. Leisler's bat activity peaked in autumn, and the species was absent in spring. *Myotis* spp. were recorded exclusively in autumn, whereas brown long-eared bats were recorded in both spring and autumn.

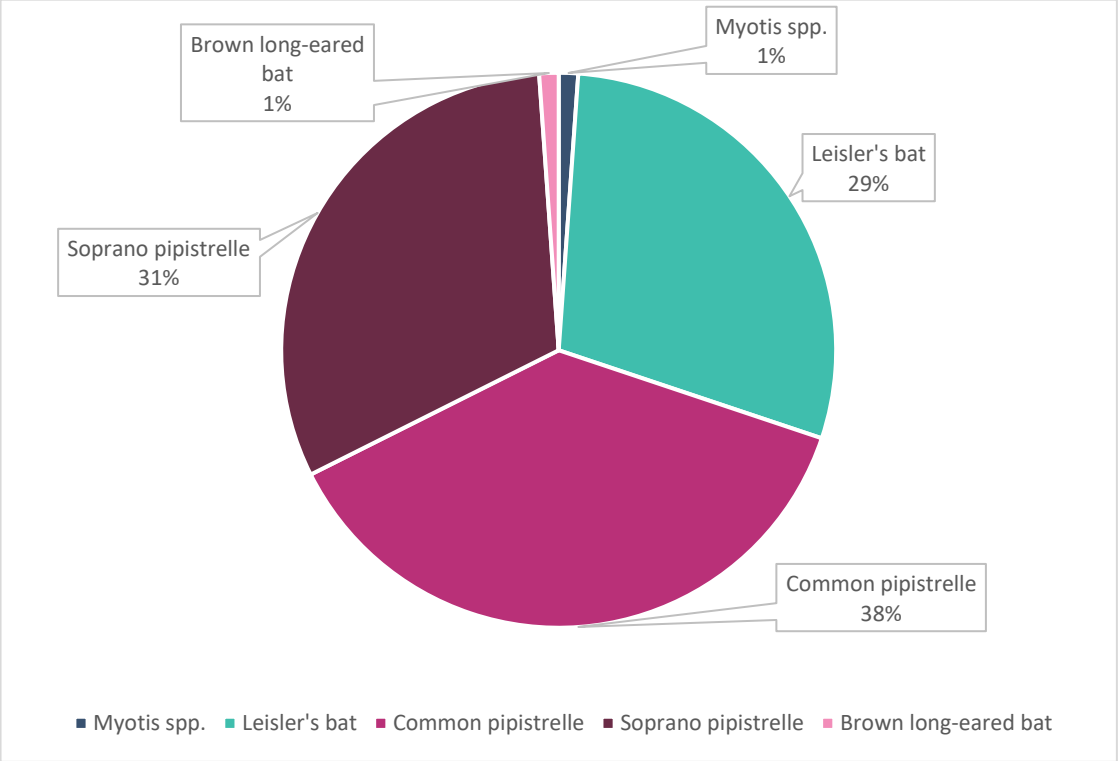

Plate 4-29 2024 Manual Activity Surveys (Total Species Composition)

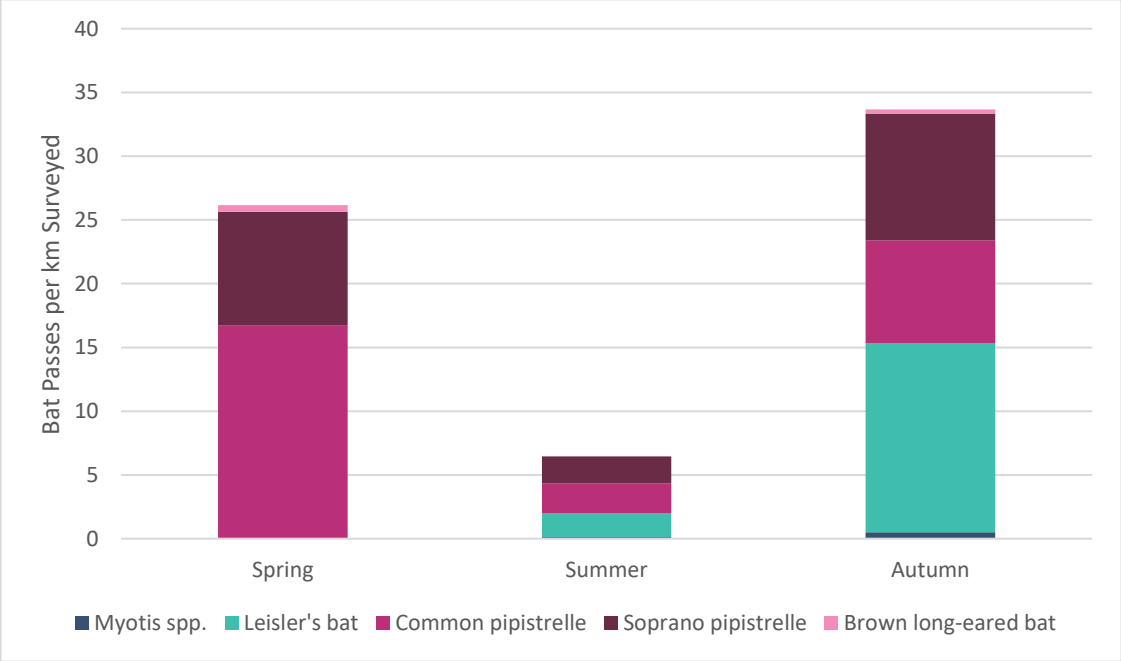

Plate 4-30 2024 Transect Results – Species Composition Per Survey Period

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Spring Transect

Spring Manual Results 27th May 2024

- Common pipistrelle
- Soprano pipistrelle
- Brown long-eared bat

Drawing Title

Spring Manual Results

Project Title: Cooloo Wind Farm, Co. Galway	
Drawn By: MG	Checked By: CM
Project No.: 240451	Drawing No.: Figure 4-2
Scale: 1:5,000	Date: 2025-09-24

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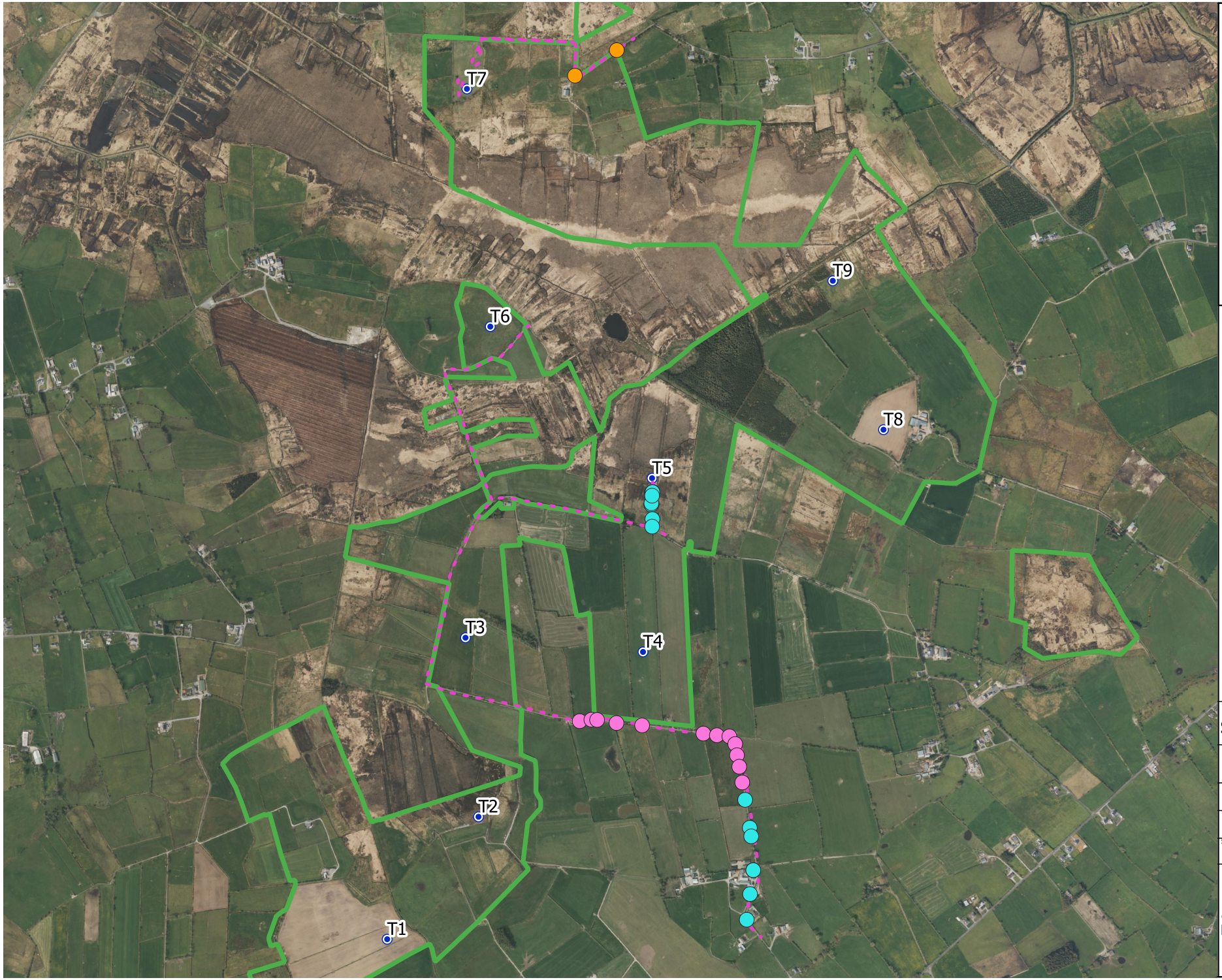

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Summer Transect

Summer Manual Results 26th June 2024

- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

Drawing Title

Summer Manual Results

Project Title: Cooloo Wind Farm, Co. Galway	
Drawn By: MG	Checked By: CM
Project No.: 240451	Drawing No.: Figure 4-3
Scale: 1:16,800	Date: 2025-09-24

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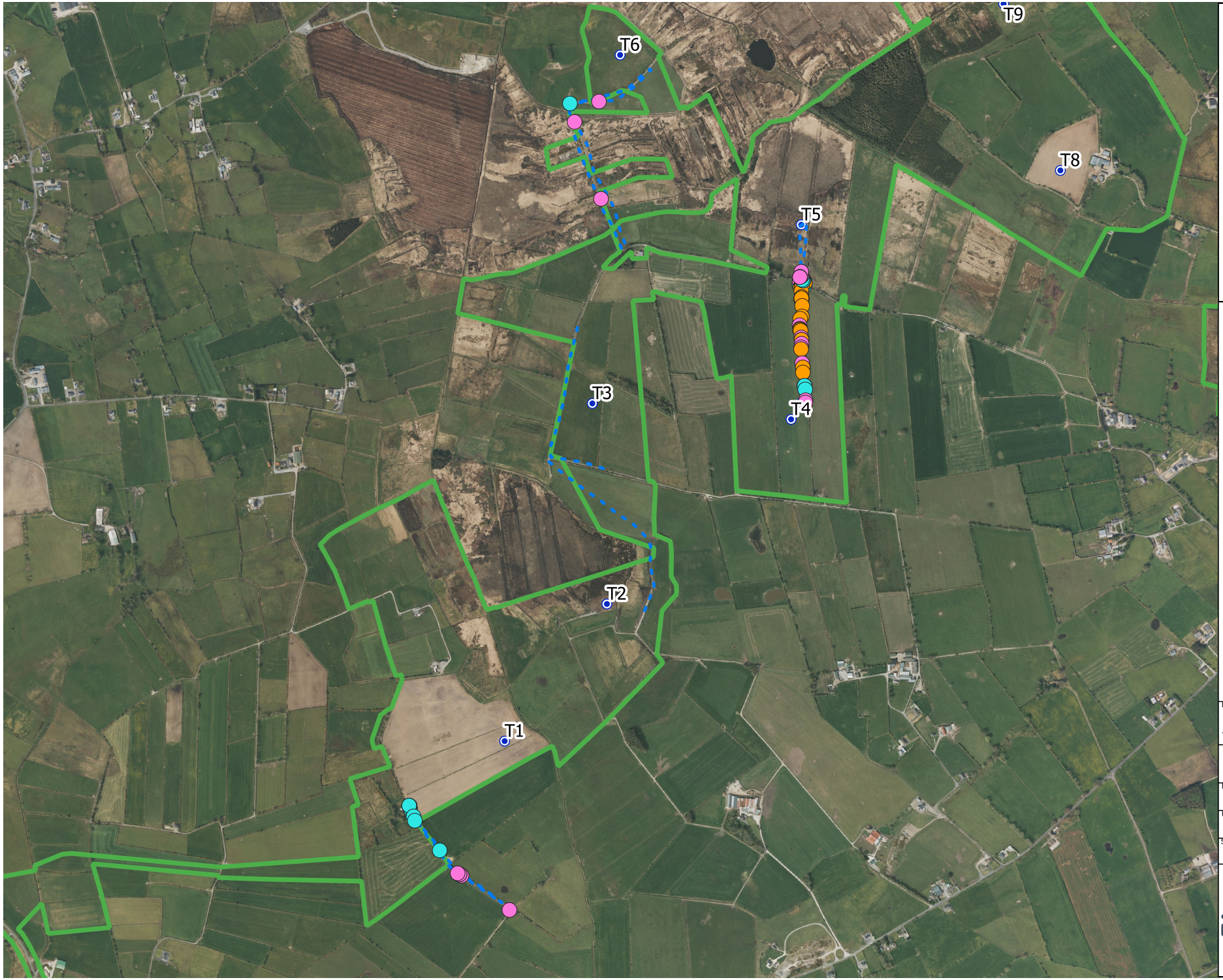

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Autumn Transect

Autumn Manual Results 27th August 2024

- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

Drawing Title

Autumn Manual Results

Project Title: Cooloo Wind Farm, Co. Galway	
Drawn By: MG	Checked By: CM
Project No.: 240451	Drawing No.: Figure 4-4
Scale: 1:15,000	Date: 2025-09-24

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4.3.4 Ground-level Static Surveys

In total, 81,713 bat passes were recorded across all deployments in 2024. In general, Common pipistrelle (n=46,446) occurred most frequently, followed by soprano pipistrelle (n=25,194). Instances of Leisler's bat (n=7,998), *Myotis* spp. (n=1,470), brown long-eared bat (n=393) and Nathusius' pipistrelle (n=212) were recorded less frequently during the 2024 survey period. Plate 4-31 presents relative species composition across all ground-level static detector surveys.

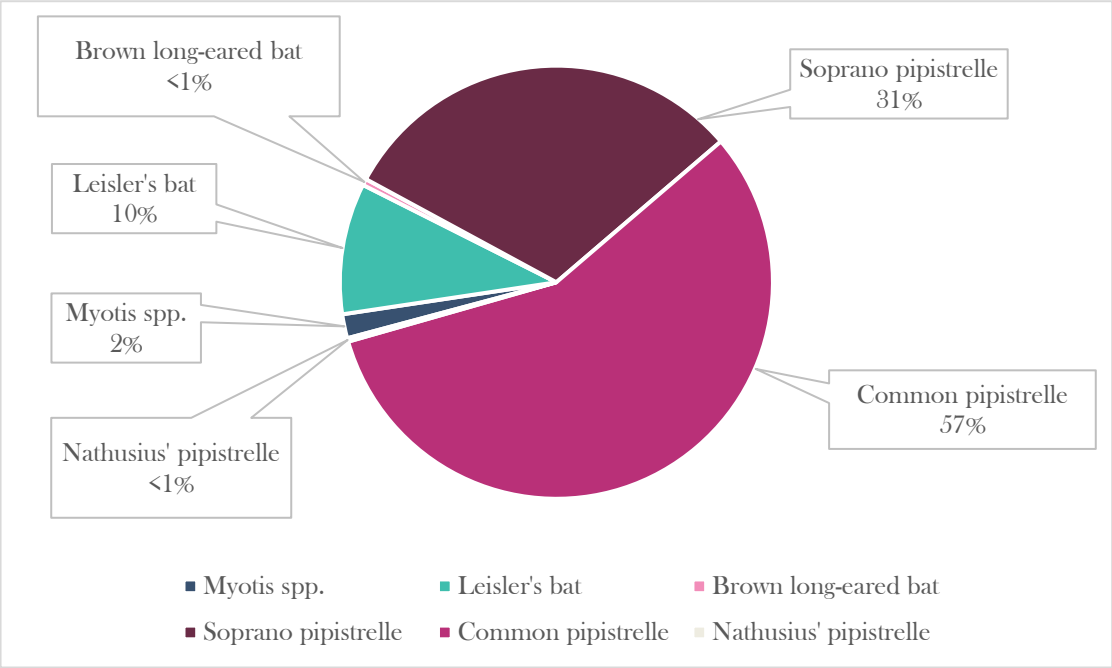


Plate 4-31 2024 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes)

Bat activity was standardised as bat passes per hour (bpph) for each survey season to account for potential bias associated with varying night lengths. The results are presented in Plate 4-32 and Table 4-9. Spring activity was dominated by common pipistrelle, while summer and autumn activity was primarily associated with common pipistrelle and soprano pipistrelle. Leisler's bat and *Myotis* spp. were recorded consistently across all three survey periods, whereas brown long-eared bat and Nathusius' pipistrelle were recorded infrequently.

The median bat activity recorded at each detector during each survey period is presented in Plates 4-33 and 4-34 (the latter uses a varied scale axis to illustrate differences between detectors). Results indicate clear seasonal and spatial variation in median activity levels. In spring, activity at detector D07 was notably higher than at all other locations, dominated by common pipistrelle passes; this detector was situated within a hedgerow adjacent to improved agricultural grassland. During summer, overall bat activity decreased substantially, although Leisler's bat activity increased markedly at detector D02. In autumn, detector D01 recorded the highest activity levels, characterised by a substantial proportion of soprano pipistrelle passes. Across all other detector locations, activity remained generally low throughout the survey periods.

The Median Nightly Pass Rate (i.e. total bat passes per hour, per night) was used to provide a robust measure of typical bat activity at the Proposed Wind Farm, reducing the influence of occasional high-activity nights on overall results (Plate 4-35). This approach is recommended in order to account for variability in nightly activity caused by weather conditions, seasonal changes, and other environmental factors (Lintott & Mathews, 2018). Plates 4-36 to 4-38 present the Median Nightly Pass Rate per species for each deployment location, enabling direct comparison across detectors and survey periods. Zero values, representing nights when a given species was not detected, were retained in the dataset to avoid overestimating activity levels.

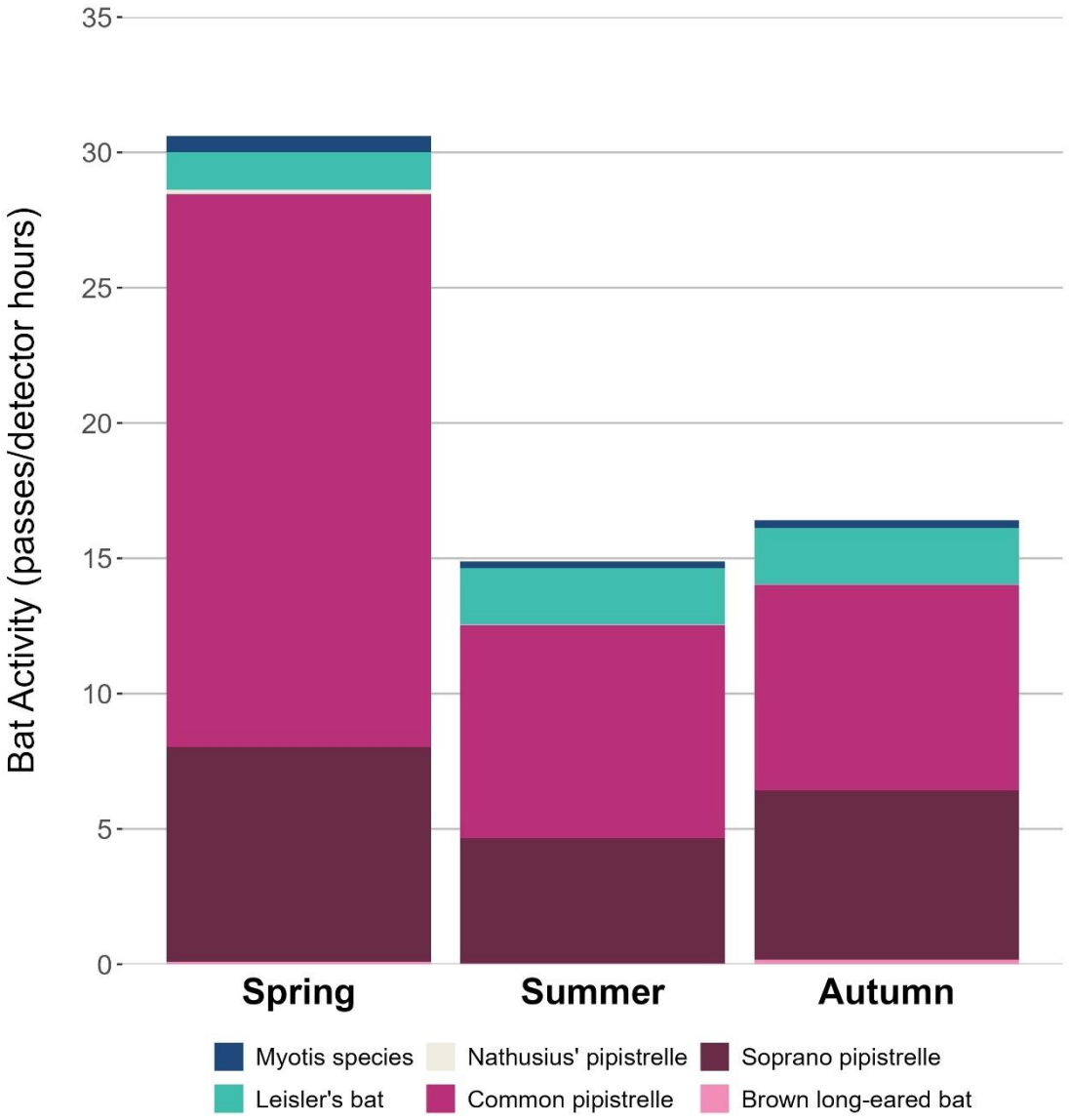


Plate 4-32 2024 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

Table 4-9 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

	Spring	Summer	Autumn
Total Survey Hours	**122.4**	**198.9**	**135.7**
Myotis spp.	0.614	0.245	0.273
Leisler's bat	1.384	2.09	2.095
Nathusius' pipistrelle	0.157	0.015	0.01
Common pipistrelle	20.433	7.865	7.605
Soprano pipistrelle	7.922	4.643	6.25
Brown long-eared bat	0.108	0.023	0.177

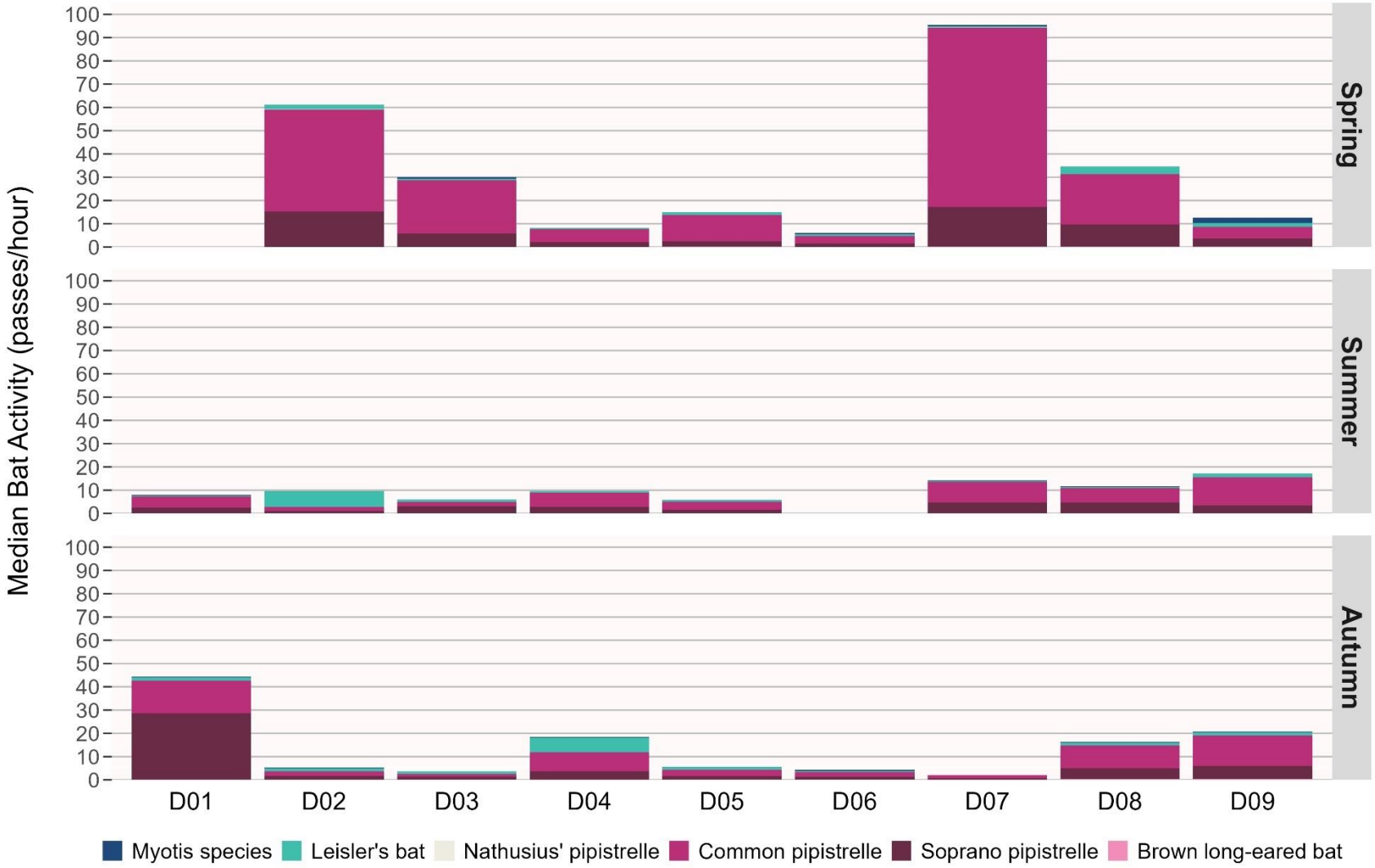


Plate 4-33 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period.

Plate 4-34 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale).

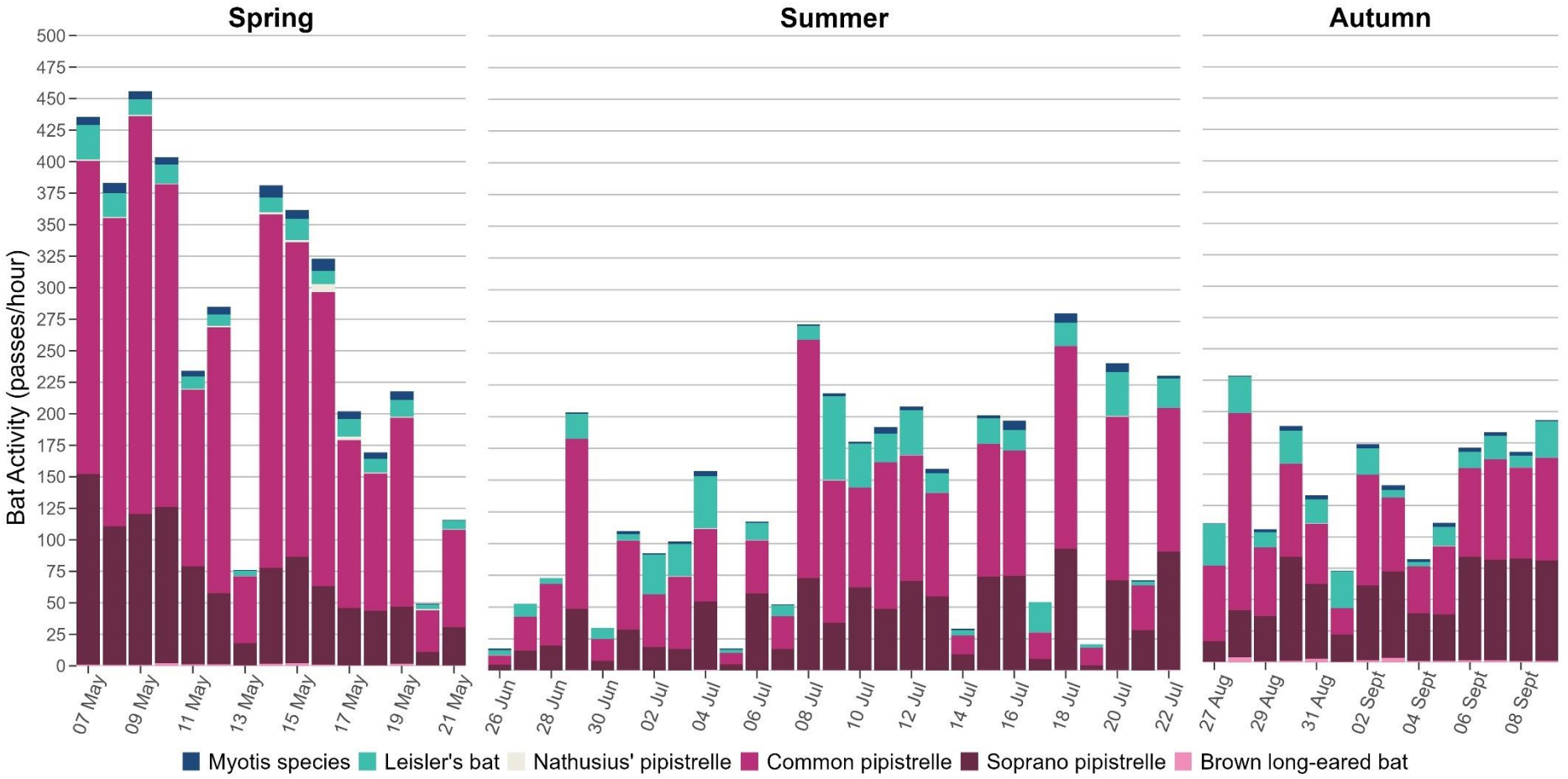


Plate 4-35 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night

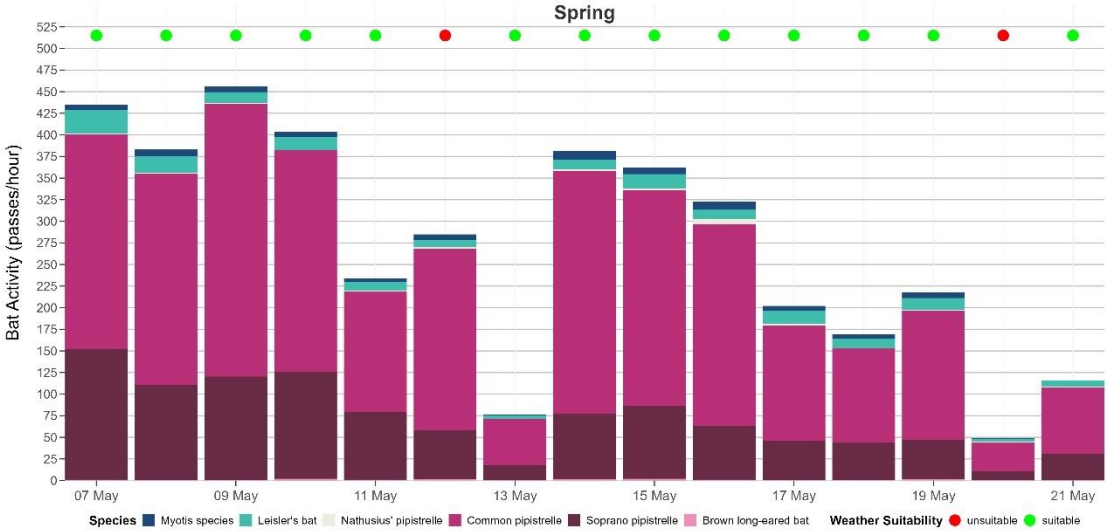


Plate 4-36 Static Detector Surveys: Spring Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability

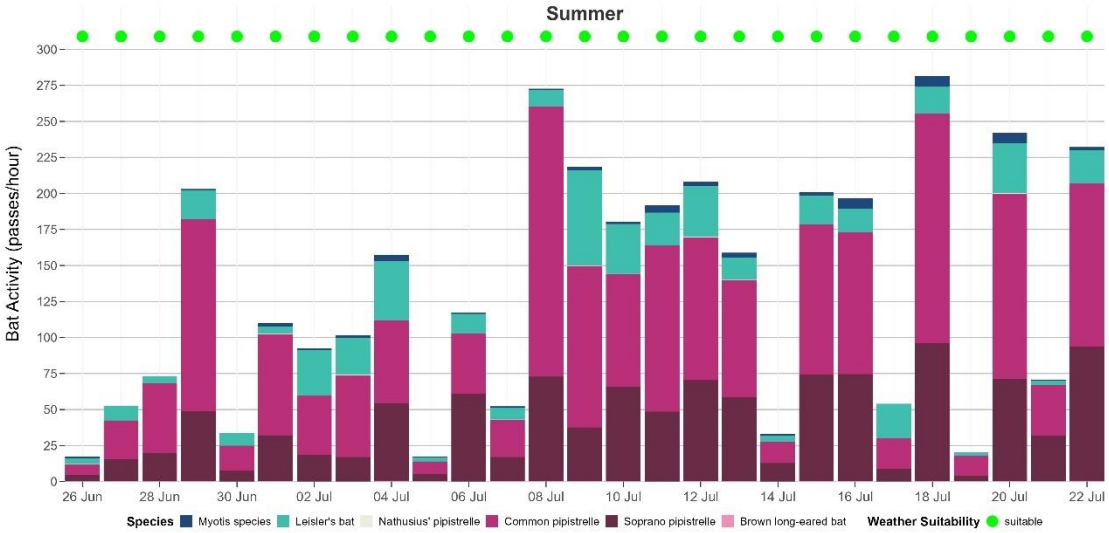


Plate 4-37 Static Detector Surveys: Summer Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability

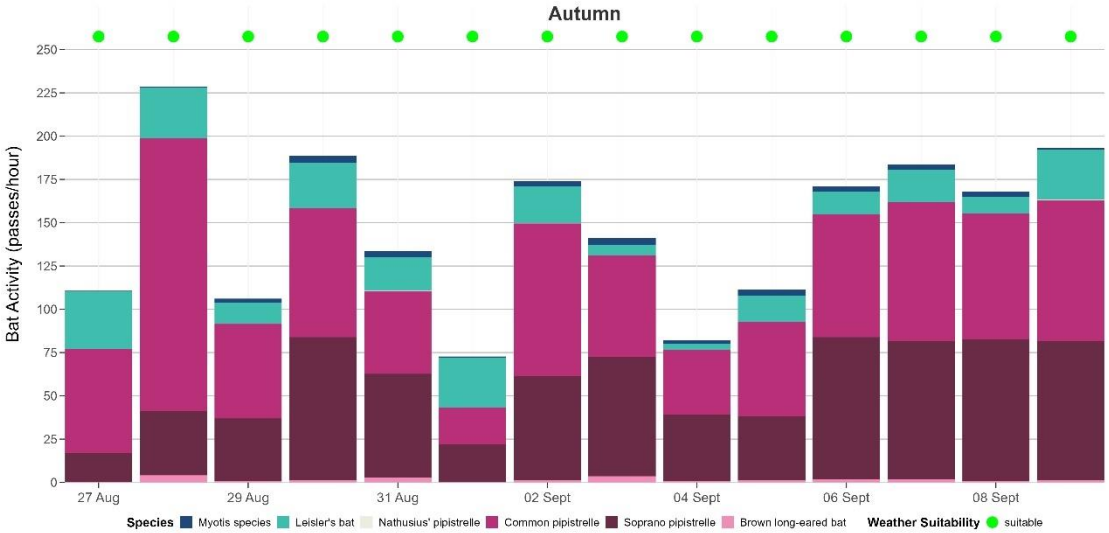


Plate 4-38 Static Detector Surveys: Autumn Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability

4.4 Assessment of Bat Activity Levels 2024

4.4.1 Adapted Site-specific Ranges

Low, *Medium* and *High* activity levels were assigned to median and maximum pass rates (bpph) identified during spring, summer and autumn at the detectors deployed across the Proposed Wind Farm, as adapted from Mathews *et al.* (2016). Table 4-10 shows the results of the site-level assessment as calculated on a site-specific activity level. Where no maximum activity at a detector is reported, no data was recorded for that species throughout the deployment.

Leisler's bat typically exhibited *Low* to *Moderate* median activity levels in spring, with generally *Low* activity observed in summer and autumn. However, a significant outlier was detected at D04 during autumn, recording a *High* median activity of 6.15 bpph and a maximum activity of 24.60 bpph. This detector was situated within a hedgerow (WL1) adjacent to improved agricultural grassland (GA1).

For common pipistrelle, median bat activity was generally *Low* to *Moderate* across summer and autumn. Common pipistrelle exhibited increased activity during the spring season, as four detectors recorded *High* median activity, accompanied by significantly higher maximum activity levels compared to the rest of the Proposed Wind Farm during those periods. The highest median activity of 77.00 bpph was recorded at D07 in spring with a highest maximum activity of 138.60 bpph.

Soprano pipistrelle generally displayed *Low* median bat activity, with occasional instances of *Moderate* Activity. D01 in autumn was the sole detector recording *High* median activity, with a rate of 28.60 bpph and a maximum of 52.70 bpph.

Myotis spp. recorded relatively *Low* activity compared to other species across the Proposed Wind Farm. Median activity was generally *Low* in all three seasons, with the exception of D09, which recorded *Moderate* median activity in spring. *High* maximum activity was also observed at D09 during spring at a value of 7.80 bpph.

Brown long-eared bat exhibited *Low* median activity at all detectors in all periods across the Proposed Wind Farm. Maximum bat activity for the species peaked at D09 in autumn with a rate of 3.50 bpph.

Nathusius' pipistrelle also recorded *Low* median activity at all locations in all seasons throughout 2024, with a median activity of 0.20 bpph or less for all locations. *Moderate* to *High* maximum activity levels was recorded during spring.

Table 4-10 Median Nightly Bat Activity (bpph) per Species, per Season, per Detector Location 2024 None, Low, Moderate, High

2024 Season	Detector	*Myotis* spp.		Leisler's bat		Nathusius' pipistrelle		Common pipistrelle		Soprano pipistrelle		Brown long-eared bat	
		Median Bat Activity	Max Bat Activity	Median Bat Activity	Max Bat Activity	Median Bat Activity	Max Bat Activity	Median Bat Activity	Max Bat Activity	Median Bat Activity	Max Bat Activity	Median Bat Activity	Max Bat Activity
Spring	D01	0.00	0.10	0.00	1.10	0.00	0.10	0.00	5.20	0.00	2.70	-	-
	D02	0.00	0.20	1.90	9.40	0.20	1.10	43.80	87.20	15.20	35.90	0.00	0.60
	D03	0.80	3.20	0.70	2.10	0.00	0.90	22.70	43.50	5.90	21.90	0.00	0.70
	D04	0.00	0.10	0.50	1.50	0.00	0.40	5.70	11.40	2.00	7.20	0.00	0.60
	D05	0.10	0.70	1.30	2.30	0.00	1.30	11.20	23.60	2.40	20.00	0.10	0.20
	D06	0.40	1.00	0.80	2.20	0.00	0.40	3.20	13.00	1.60	3.30	0.00	0.20
	D07	0.50	1.70	0.60	1.80	0.10	1.20	77.00	138.60	17.10	67.10	0.10	0.60
	D08	0.20	0.70	3.10	7.80	0.10	1.60	21.70	46.00	9.40	26.60	0.20	0.50
	D09	2.50	7.80	1.50	5.20	0.00	0.70	5.00	15.20	3.60	9.80	0.10	1.10
Summer	D01	0.30	3.10	0.60	1.60	0.00	0.10	4.70	36.10	2.50	53.10	0.00	0.40
	D02	0.00	0.10	6.90	49.50	0.00	0.30	1.70	12.60	1.10	11.70	0.00	0.30
	D03	0.00	0.30	1.10	11.00	0.00	0.10	1.70	5.60	3.20	11.70	0.00	0.10
	D04	0.00	0.50	0.80	6.50	0.00	0.10	6.00	25.20	2.80	15.90	0.00	0.10
	D05	0.10	0.50	0.70	2.70	0.00	0.10	3.50	71.90	1.60	49.50	0.00	0.10
	D06	-	-	0.00	1.40	-	-	0.00	21.20	0.00	12.10	-	-
	D07	0.30	4.70	0.30	4.80	0.00	0.10	8.80	36.00	4.80	18.80	0.00	0.10
	D08	0.30	0.90	0.50	2.00	0.00	0.10	6.20	72.00	4.70	23.70	0.00	0.10
	D09	0.10	1.00	1.70	24.00	0.00	0.40	12.10	62.00	3.40	11.70	0.00	0.30
Autumn	D01	0.25	1.30	1.50	3.70	0.00	0.10	13.90	27.40	28.60	52.70	0.05	0.70
	D02	0.20	0.90	1.35	9.40	0.00	0.10	1.85	6.80	1.80	6.40	0.00	0.40
	D03	0.20	0.60	1.00	2.60	-	-	1.10	3.70	1.40	3.00	0.10	0.40
	D04	0.30	0.70	6.15	24.60	0.00	0.10	8.15	36.30	3.70	39.90	0.00	0.30
	D05	0.10	0.60	1.15	4.30	-	-	2.80	11.00	1.45	11.30	0.10	0.40
	D06	0.50	1.20	0.40	1.70	0.00	0.10	2.05	12.30	1.25	6.00	0.10	0.30
	D07	0.00	0.30	0.00	0.30	0.00	0.10	1.25	15.10	0.75	6.50	0.00	0.10
	D08	0.40	0.90	1.15	8.20	0.00	0.20	9.95	68.10	4.55	7.80	0.30	0.70
	D09	0.35	0.70	1.35	5.70	0.00	0.10	13.00	27.90	5.50	11.50	0.55	3.50

4.5 Importance of Bat Population Recorded at the Proposed Wind Farm

Ecological evaluation within this section follows the approach outlined in Chapter 3 of the *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (NRA, 2009).

All bat species in Ireland are protected under international and national legislation, including the Bonn Convention (1992), Bern Convention (1982), and the EU Habitats Directive (92/43/EEC). In Ireland, they are also protected under the Wildlife Acts 1976 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011.

Bats have been assessed as Ecological Receptors of **Local Importance (Higher Value)** based on the presence of a regularly occurring bat population recorded within the Proposed Wind Farm, including confirmed roosts and use of the site for foraging and commuting.

During the 2021, 2022 and 2024 survey periods, two active roosts were confirmed through dusk emergence surveys. One structure supported a small soprano pipistrelle roost with 7 individuals recorded in 2021, 20 individuals recorded during autumn of 2022 and 10 individuals observed emerging during spring of 2024. Another structure was confirmed to support a single soprano pipistrelle. No large or significant maternity roosts (i.e. >100 individuals or of National Importance) were identified within the Proposed Wind Farm.

5. RISK AND IMPACT ASSESSMENT

This risk and impact assessment has been undertaken in accordance with NatureScot guidance. As per NatureScot guidance, wind farms present four potential risks to bats:

- Collision mortality, barotrauma and other injuries
- Loss or damage to commuting and foraging habitat
- Loss of, or damage to, roosts
- Displacement of individuals or populations

For each of these four risks, the detailed knowledge of bat distribution and activity within the Proposed Wind Farm has been utilized to predict the potential effects of the Proposed Project on bats.

5.1 Collision Mortality

5.1.1 Assessment of Site-Risk

The likely impact of a proposed development on bats is related to site-based risk factors, including habitat and development features. The site risk assessment, as per Table 3a of the NatureScot guidance, is provided in Table 5-1 below.

Table 5-1 Site-risk Level Determination for the Proposed Project (Adapted from NatureScot, 2021)

Criteria	Site-specific Evaluation	Site Assessment
Habitat Risk	Two low-value roosts (≤20 specimens) were identified within the Proposed Wind Farm. No roost was identified within the structure proposed for demolition. The habitats within the Proposed Wind Farm offer suitable foraging and commuting opportunities for bats, particularly along treelines, hedgerows, woodland edges and linear features. While bat activity was confirmed throughout the site (including *High* activity at some detectors), the site does not represent a habitat mosaic of particularly high quality.	Medium
Project Size	Following the criteria set out in NatureScot (2021) the project is of *Medium* scale as it consists of 9 no. turbines. Whilst those turbines are over 100 m in height, it is not a strategic infrastructural development and is well below the number of turbines that would constitute a *Large* development (NatureScot, 2021). There are three other wind farms within 10 km, two turbines are existing, one is permitted and eleven are in planning. No other large infrastructure projects (e.g., major roads) are located in the vicinity.	Medium
Site Risk Assessment (Plate 3-3, NatureScot 2021)	Taking account of confirmed low-value roosts, moderate habitat value, and a medium-scale project, the site is assessed as posing a **Medium Site Risk (3)** to bats.	**Medium Site Risk (3)**

5.1.2 Assessment of Collision Risk

The following high-risk species were recorded during the dedicated surveys:

- Leisler's bat,
- Common pipistrelle
- Soprano pipistrelle

- Nathusius' pipistrelle

Overall collision risk for these species was determined in accordance with Table 3b of NatureScot (2021) guidance (Appendix 4), by cross-referencing the site risk level (Medium) with species-specific activity categories. Assessments were undertaken for both **median** activity (representing typical conditions) and **maximum** activity (representing peak levels). NatureScot recommends using the most appropriate measure (i.e. median or maximum) to determine overall risk. As per NatureScot guidance there is no requirement to complete an Overall Risk Assessment for low-risk species. During the extensive suite of surveys undertaken the following low-risk species were recorded:

- *Myotis* spp.
- Brown long-eared bat

Overall activity levels were *Low* for the above species; therefore, no significant collision related effects are anticipated. Activity levels for these species will continue to be assessed during operational monitoring following the implementation of best practice mitigations provided. Further mitigation will be implemented after Year 1 if deemed necessary.

5.1.2.1 Leisler's bat

The Proposed Wind Farm lies within the current known range of the Leisler's bat (*Nyctalus leisleri*) in Ireland (NPWS, 2019). Leisler's bats are considered a species of high population vulnerability due to their high risk of turbine collision (NatureScot, 2021). Leisler's bat was recorded during all static and manual activity surveys in 2024 across the Proposed Wind Farm. When interpreted in the context of the medium site risk (see Section 4.5) and using Table 3b of NatureScot (2021), Leisler's bat activity was characterised by *Low* typical collision risk in all seasons (based on median activity rates), and *Medium* collision risk at peak activity levels (see Table 5-2).

Notably, a high peak activity level was recorded at detector D04 in autumn, with a median activity rate of 6.15 bpph and a maximum of 24.60 bpph. Walked transect results also detected higher activity levels of Leisler's bat activity during the autumn period, consistent with its known seasonal increase in activity levels.

Based on the combined transect and static survey results, the local habitat context characterised mainly by agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines, the overall collision risk for Leisler's bat at the Proposed Wind Farm is assessed as *Low* at typical activity levels, but with *Medium* risk at peak levels, particularly at detector locations showing concentrated activity in autumn.

Table 5-2 Leisler's bat - Overall Risk Assessment

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot 2021)
Spring 2024	Medium (3)	Low-moderate (2)	Typical Risk is Low (6)	Moderate (3)	Peak Risk is Medium (9)
Summer 2024*		Low-moderate (2)	Typical Risk is Low (6)	Moderate-high (4)	Peak Risk is Medium (12)
Autumn 2024		Low-moderate (2)	Typical Risk is Low (6)	Moderate-high (4)	Peak Risk is Medium (12)

**The summer median value for D02 was identified as an outlier and was excluded from the assessment of Typical Activity as it considerably skews the data, providing an inaccurate representation of the typical activity observed across the Proposed Wind Farm.*

5.1.2.2 Soprano pipistrelle

The Proposed Wind Farm lies within the range of the soprano pipistrelle (NPWS, 2019). This species is classified as a common species with medium population vulnerability and is considered to have a high collision risk (Table 3-9). Soprano pipistrelle activity was recorded throughout the survey periods at the Proposed Wind Farm. When evaluated against the identified site risk and in accordance with Table 3b (NatureScot, 2021), the overall typical activity risk for soprano pipistrelle was *Low* during all seasons. However, peak activity levels reached *Moderate* to *Moderate-High* resulting in a Medium peak risk classification (see Table 5-3 below).

Based on site visits and survey data, including walked transects, the typical (median) activity levels correspond with the habitat composition of the Proposed Wind Farm, characterised mainly by agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines.

Therefore, the collision risk to the local soprano pipistrelle population is assessed as *Low* at typical activity levels and *Medium* risk at peak activity levels across all seasons.

Table 5-3 Soprano pipistrelle - Overall Risk Assessment

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot 2021)
Spring 2024	Medium (3)	Low-moderate (2)	Typical Risk is Low (6)	Moderate-high (4)	Peak Risk is Medium (12)
Summer 2024		Low (1)	Typical Risk is Low (3)	Moderate-high (4)	Peak Risk is Medium (12)
Autumn 2024		Low (1)	Typical Risk is Low (3)	Moderate (3)	Peak Risk is Medium (9)

5.1.2.3 Common pipistrelle

The Proposed Wind Farm is located within the current range of the common pipistrelle (NPWS, 2019). Common pipistrelle is classified as a common species with medium population vulnerability and a high collision risk (Table 3-9). This species was recorded during all activity surveys across the Proposed Wind Farm. When assessed against the identified site risk and following Table 3b (NatureScot, 2021), overall typical activity risk for common pipistrelle was *Medium* in spring and *Low* during summer, and autumn. Peak activity levels were consistently *Moderate* to *High* across all seasons, resulting in a *Medium* peak risk classification (see Table 5-4 below).

Based on site visits and survey data, including walked transects, the typical (median) activity reflects the habitat composition of the Proposed Wind Farm, characterised mainly by agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines.

Therefore, a *Low* typical collision risk is assigned during summer and autumn and *Medium* typical risk during spring. A *Medium* peak risk is assigned to the local population of common pipistrelle throughout all survey seasons.

Table 5-4 Common pipistrelle - Overall Risk Assessment

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot 21	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot 2021)
Spring 2024	Medium (3)	Moderate (3)	Typical Risk is Medium (9)	Moderate-high (4)	Peak Risk is Medium (12)
Summer 2024		Low-moderate (2)	Typical Risk is Low (6)	Moderate-high (4)	Peak Risk is Medium (12)
Autumn 2024		Low-moderate (2)	Typical Risk is Low (6)	Moderate-high (4)	Peak Risk is Medium (12)

**The spring median values for D02 and D07 were identified as outliers and were excluded from the assessment of Typical Activity as it considerably skews the data, providing an inaccurate representation of the typical activity observed across the Proposed Wind Farm.*

5.1.2.1 Nathusius' pipistrelle

The Proposed Wind Farm is outside the current known range of Nathusius' pipistrelle (NPWS, 2019), although a small number of bat passes were recorded during the 2024 static detector surveys. Nathusius' pipistrelle is considered a rarer species, of high population vulnerability and high collision risk (Table 3-9). Despite the site being beyond its typical Irish range, detections occurred across several locations at low levels**,** suggesting occasional presence or exploratory movements rather than sustained use of the site.

When assessed in the context of the site risk and in accordance with Table 3b (NatureScot, 2021), typical activity risk for Nathusius' pipistrelle was *Low* across all seasons. Peak activity reached *Moderate* levels only in spring, resulting in a *Medium* peak risk, while summer and autumn peaks remained *Low* (see Table 5-5 below).

No activity was recorded during walked transects, and detections from static monitoring were infrequent and of low intensity. This is consistent with the surrounding landscape of the Proposed Wind Farm site, characterised mainly by agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines, and located beyond the species' known core distribution.

Accordingly, the collision risk to the local population of Nathusius' pipistrelle is considered *Low* across all survey seasons with a *Medium* peak risk assessed for spring.

Table 5-5 Nathusius' pipistrelle - Overall Risk Assessment

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot 2021)
Spring 2024	Medium (3)	Low (1)	Typical Risk is Low (3)	Moderate (3)	Peak Risk is Medium (9)
Summer 2024		Low (1)	Typical Risk is Low (3)	Low (1)	Peak Risk is Low (3)
Autumn 2024		Low (1)	Typical Risk is Low (3)	Low (1)	Peak Risk is Low (3)

5.1.3 Collision Risk Summary

Following NatureScot (2021) guidance and the site-specific activity thresholds, typical site-level collision risk for high-risk bat species at the Proposed Wind Farm was assessed as *Low*, with the exception of common pipistrelle which showed *Medium* typical risk in spring. At peak activity levels, the risk

assessment reached *Medium* for Leisler's bat, common pipistrelle, and soprano pipistrelle (see Tables 5-2 to 5-4).

Overall bat activity levels were considered representative of the habitat composition at the Cooloo Proposed Wind Farm, which includes agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines, all of which provide suitability for foraging and commuting bats. Both static detector data and manual transect surveys indicated typical activity for an intensively farmed landscape, though comparatively elevated activity was noted in specific areas.

Detailed detector-level analysis identified seven locations that recorded *High* median activity for high collision-risk species (Table 5-6). Most high activity records occurred in spring, with four detectors (D02, D03, D07, and D08) exceeding high activity thresholds for common pipistrelle. In summer, D02 recorded high Leisler's activity, while in autumn, D01 exceeded the threshold for soprano pipistrelle, and D04 recorded high Leisler's bat activity.

These findings indicate localised peaks in bat activity along edge habitats such as hedgerows, particularly at D04 and D07, both of which were situated adjacent to improved grassland and linear features. Walked transects also recorded higher Leisler's bat activity during autumn, consistent with seasonal trends for this species.

While high activity was observed at these locations, the bat felling buffer strategy (Section 6.1.3) and the design of the Proposed Wind Farm have been implemented to avoid or minimise potential impacts on key linear and treeline habitats. Habitat conditions at some high-activity detectors (e.g. D04) will be altered during construction, and these changes will be monitored.

A bat monitoring and mitigation strategy has been devised in line with Appendix 5 of NatureScot (2021). Should Year 1 post-construction monitoring identify significant bat fatalities, a curtailment protocol will be implemented. This would be tailored to site-specific seasonal and species-specific patterns and may include curtailment based on wind speed thresholds, weather-based triggers, and increased buffer zones as required.

Table 5-6 Detector Location Recording High Median Activity in 2024 for High-risk Bat Species

Detector ID	Turbine	Species	*High* Median Activity Survey Period
D01	T01	Soprano pipistrelle	Autumn 2024
D02	T02	Common pipistrelle	Spring 2024
D02	T02	Leisler's bat	Summer 2024
D03	T03	Common pipistrelle	Spring 2024
D04	T04	Leisler's bat	Autumn 2024
D07	T07	Common pipistrelle	Spring 2024
D08	T08	Common pipistrelle	Spring 2024

5.2 Loss or Damage to Commuting and Foraging Habitat

In the absence of appropriate design, the loss or degradation of commuting and foraging habitat has the potential to reduce feeding opportunities and/or displace local bat populations. The Cooloo Wind Farm site is predominantly comprised of agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines.

Approximately 0.7 hectares (ha) of conifer forestry will be felled to accommodate the bat buffer (Section 6.1.3) associated with T9 and development footprint. An additional 10.55 ha of monoculture Sitka spruce conifer woodland will be removed resulting in a total loss of 11.25 ha of conifer woodland.

Further details on vegetation removal required within and around development footprint is detailed in Chapter 4 and Chapter 6 of this EIAR. Any tree removal will be undertaken to maintain an appropriate buffer between turbine blade tips and adjacent canopy, in line with current best practice (Natural England, 2014; NatureScot, 2021). As the plantation was established as a commercial crop, this felling is expected regardless of the wind farm proceeding. The removal of dense closed canopy plantation may result in a positive effect to bat populations by increasing linear edge habitat, which is known to support commuting and foraging activity.

Most turbines are sited within improved grassland areas, thereby avoiding significant linear habitat features. However, approximately 0.17 ha of broadleaved woodland, 0.53 km of treeline and 3.21 km of hedgerow and associated stone walls will be removed to allow for turbine foundations, access tracks, TDR accommodation works and overrun area, and ancillary infrastructure. This includes vegetation removed to maintain turbine-to-habitat buffers as detailed in Section 6.1.3 and Appendix 6-4, Section 3.4.1.

To offset this loss of woodland and linear features, approximately 11.5 ha of broadleaved woodland and 4.7 km of linear habitat planting is proposed elsewhere on site. This will result in a net gain of approximately 960m of linear habitat within the site. Planting will incorporate native species appropriate to the local area and will aim to strengthen existing habitat connectivity and ecological function.

While these measures will maintain and enhance ecological corridors in the long term, a short-medium term reduction in connectivity may occur until newly planted or enhanced hedgerow becomes fully established. Final details of this enhancement planting are provided in the Biodiversity Management and Enhancement Plan (BMEP) (Appendix 6-4). The extent of vegetation removal and proposed replanting is shown in Figure 6-1 below. Following the implementation of the replanting plan, as outlined in the BMEP, no significant effects in relation to habitat fragmentation or loss of commuting or foraging habitat for bats is anticipated.

The proposed 110kV substation and associated temporary construction compound are located entirely within improved agricultural grassland (GA1), a habitat of low value to bats. No direct loss of high-value commuting or foraging habitat is anticipated in this area.

As described in Chapter 4, Section 4.5.2 of this EIAR, limited turbine delivery route accommodation works are required at the N63/R332 junction. These include the removal of a section of approximately 145m of immature hedgerow (WL1). Additionally, the TDR overrun area at the site entrance will result in the loss of approximately 108m of treeline. These areas are factored into the habitat loss and replanting calculations above with a net gain of linear habitat features expected. Therefore, no significant effects on bat commuting or foraging habitats are anticipated from the turbine delivery route.

Given the large proportion of the site that will remain undisturbed, and the targeted retention and enhancement of key boundary features, no significant effects on bat commuting or foraging habitat are predicted as a result of the Proposed Project.

5.3 Loss of, or Damage to, Roosts

The Proposed Wind Farm is predominantly located within agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines. The trees within the commercial conifer forestry do not provide suitable roosting habitat for bats due to their species, structure, and management history.

Twelve built structures within the Proposed Wind Farm site were assessed during the 2024 survey season (three of these structures were also assessed during the 2021/2022 survey period). Of these twelve structures, two were confirmed to support active roosts based on dusk emergence results: one structure (No.9) supported a roost of soprano pipistrelle (10 individuals observed in spring 2024, 20 individuals recorded in autumn 2022 and 7 recorded in autumn 2021), and another structure (No.8) supported a single soprano pipistrelle. These confirmed roosts and their associated linear habitat features will be retained and avoided as part of the Proposed Project and therefore a derogation licence is not required.

A structure (No. 6) located near Turbine 5 is scheduled for demolition as part of the Proposed Project and is the only structure that will be removed. As no bats were identified roosting within the structure during emergence surveys carried out in 2021 or 2024, a derogation licence is not considered necessary. However, in line with best practice guidance, a pre-demolition inspection by a suitably qualified ecologist will be undertaken prior to any works. If any bats or signs of bat use are detected, appropriate mitigation – including potential exclusion under NPWS licence and provision of compensatory roosting habitat – will be implemented to ensure compliance with legal protections and avoid significant effects on bat populations. The recommendation of a pre-demolition survey does not present a lacuna in the survey assessment but is fully in line with best practice guidance. The function of this survey is to assess any potential changes in baseline environment since the surveys were undertaken.

The habitats within the proposed substation and temporary construction compounds consist entirely of Improved Agricultural Grassland (GA1). These areas provide no *(None)* roosting potential, and no trees will be felled to accommodate this infrastructure. Similarly, the underground grid connection route will follow existing road corridors and agricultural fields and does not require tree removal. Therefore, no loss of roosting habitat is anticipated along the grid connection.

Eight watercourse crossings occur along the Proposed Grid Connection route. Of the culverts and bridges assessed, seven had no *(None)* roosting potential and one had *Moderate* roosting potential. No bats were identified roosting within the assessed culverts and bridges and no evidence of roosting was found during the surveys. Horizontal Directional Drilling (HDD) is proposed adjacent to WC8 which was assessed as having a *Moderate* roosting potential. HDD at this location is proposed to be setback from the structure and no physical alterations to the structure are required. As such, no loss or damage to potential roosting habitat is anticipated as a result of these works.

The turbine delivery route traverses a range of habitat types, including hedgerows (WL1), treelines (WL2), stone walls (BL1), grassy verges (GS2), and small watercourses (FW1). As described in Chapter 4, Section 4.5.2 of this EIAR, limited accommodation works are required, including the removal of a short section of Improved Agricultural Grassland (GA1) and approximately 145m of low-value immature hedgerow (WL1). This feature was assessed as having no *(None)* roosting potential, and therefore no loss of roosting habitat is anticipated as a result. Approximately 108 m of treeline is proposed for removal as part of the TDR overrun area at the site entrance. These trees were assessed as having no *(None)* roosting potential due to the absence of PRFs.

In accordance with the Biodiversity Enhancement Measures outlined in Appendix 6-4 of this EIAR, and Section 6.1.4 below, additional roosting opportunities will be provided in the form of bat boxes.

Overall, no potential for significant effects with regard to the loss of, or damage to, roosting habitat is anticipated, provided that the mitigation and survey measures described above are implemented in full.

5.4 Displacement of Individuals or Populations

The Proposed Wind Farm is primarily located within agricultural grassland, wet grassland and peatland habitats with smaller areas of woodland, hedgerows, and treelines. These habitats provide varying levels of suitability for foraging, commuting, and roosting bats.

As part of the Proposed Project, a number of treelines and hedgerows located within the bat felling buffers and infrastructure development footprint will require removal or partial clearance. Details of the trees and treelines inspected and to be removed are provided in Section 4.3.2.1.5 above. Although these features contribute to the site's overall connectivity and habitat diversity, the majority of linear features within the site will be retained, and habitat fragmentation has been avoided in the layout design.

Mitigation measures to minimise the potential risk of displacement include targeted retention of linear habitat features, pre-demolition survey, installation of additional new roost features, and implementation of enhancement planting to restore and improve connectivity across the site. A total of 4.7 km of linear habitat planting, as well as 11.5 ha of broadleaved woodland, is proposed across the site to offset any loss associated with infrastructure construction. These measures are detailed further in Section 6.1 and the Biodiversity Management and Enhancement Plan (BMEP) [Appendix 6-4].

No structural works are required for the bridge crossings along the grid connection route. Excavations associated with launch and receiver pits for HDD works will be set back from the bridges. In addition, the crossings are subject to existing traffic conditions. Noise and vibration from HDD drilling are not likely to be out of character with that associated with existing traffic conditions to which any potential roosting bats are likely accustomed. The short-term nature of these works, combined with their spatial separation from potential suitable bat habitats, will ensure that potential noise and vibration disturbance is minimal. Therefore, the works are unlikely to result in significant disturbance to bats.

The project layout has been designed to avoid identified bat roosts and high-quality commuting and foraging areas. Confirmed roosts will be retained and avoided, and the overall extent of suitable bat habitat across the site will remain broadly unchanged. Given this, and with the implementation of the mitigation and enhancement measures outlined, no significant displacement of individuals or local bat populations is anticipated.

6. BEST PRACTICE AND MITIGATION MEASURES

This section describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations at Cooloo Wind Farm.

6.1 Standard Best Practice Measures

6.1.1 Noise Restrictions

During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended).

In relation to the Proposed Grid Connection, Horizontal Directional Drilling (HDD) and associated works will be temporary and set-back from features including the disused railway bridge assessed as *Low* roosting potential and the *Moderate* roosting potential stone arch bridge (WC8). The short-term nature of these works, combined with their spatial separation from potential bat habitats, will ensure that potential noise and vibration disturbance is minimised.

6.1.2 Lighting Restrictions

Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges and linear features. Exterior lighting, during construction and post construction, shall be designed to minimize light spillage, reducing the effect on surrounding habitat features and bat activity. Lighting will be directed away from mature trees and treelines around the periphery of the site boundary.

Directional accessories will be used to direct light appropriately, such as light shields (Stone, 2013). All luminaires will be of a type that prevents upward and lateral spillage. The proposed lighting will comply with ILP Guidance Note 08/23 – Bats and Artificial Lighting at Night (ILP, 2023).

The applicant also commits to the Dark Sky Ireland Lighting Recommendations, ensuring that:

- Every light is justified;
- Light is used only when necessary;
- It is directed where needed;
- Light intensity is minimised;
- Spectra are adapted to the environment;
- White light sources will have a “warm” colour temperature (less than 3000K).

With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post-construction monitoring will assess any potential for lighting-related impacts on bats. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.

6.1.3 Bat Felling Buffers

In accordance with NatureScot (2021) and NIEA (2021) guidance, a minimum 50m buffer is applied between turbines and habitat features used by bats (e.g. hedgerows, treelines). Though increased

buffers (100–200m) are recommended by Eurobats No. 6 and NIEA around woodland areas, these are not currently supported by empirical evidence in the UK and Ireland.

A 50m buffer between turbine blade tip and the nearest habitat feature will be implemented, based on a worst-case-scenario turbine dimension of the largest blade with the lowest hub height (blade length 81 m; hub height 99 m; total height 180 m). These buffers were calculated using the Natural England formula (Plate 6-1) and have been applied in the turbine layout.

There will be a requirement to remove areas of conifer plantation and linear vegetation i.e. treelines/hedgerows, to facilitate the required bat buffers at the Proposed Wind Farm. This is outlined in further detail in Section 6.1.4 below. These vegetation-free areas will be maintained during the operational life of the Proposed Project and form part of the overall bat collision risk mitigation strategy.

It is necessary to calculate the distance between the edge of the habitat feature and the centre of the tower (b). Using the formula:

$$b = \sqrt{(50 - bl)^2 - (hh - fh)^2}$$

Where, bl = Blade length, hh = hub height, fh = feature height all in metres. E.g. (below) b = 69.3m (Plate 6-1)

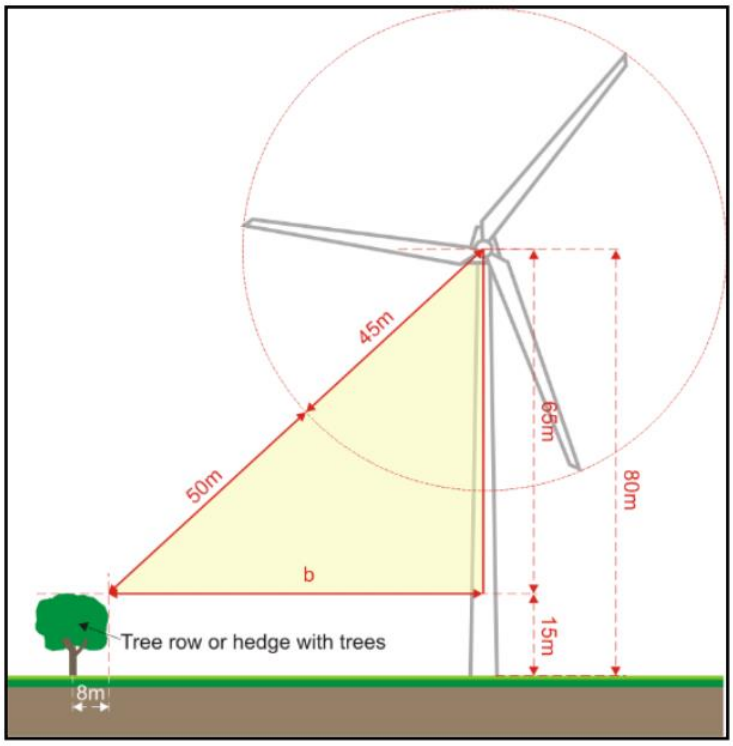


Plate 6-1 Calculation of buffer distances (NatureScot, 2021).

6.1.4 Proposed Habitat Replacement and Enhancement

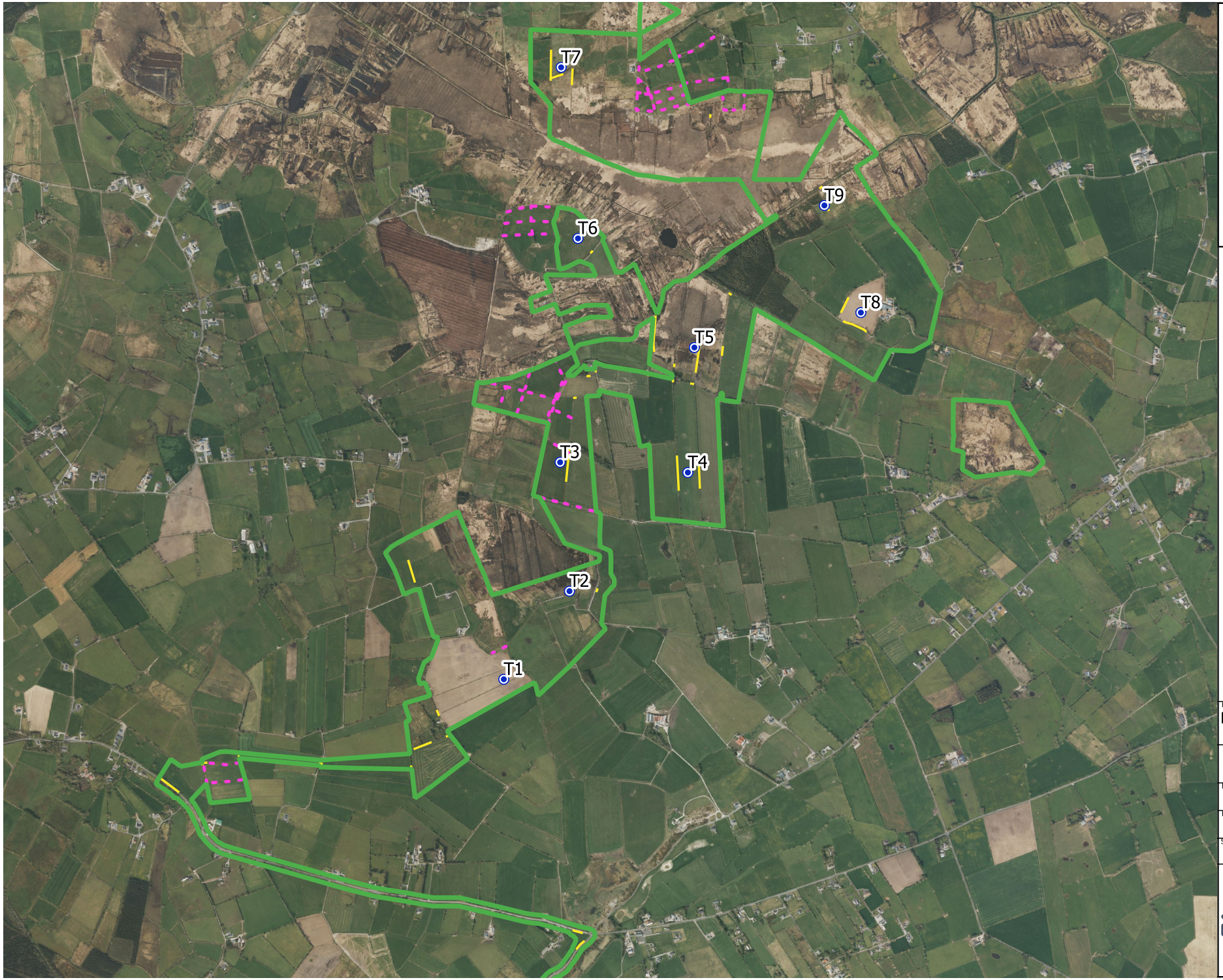
The Proposed Project is predominantly located within agricultural and wet grassland, with smaller areas of peatland, limited woodland, and sparse linear features such as hedgerows and treelines. These areas of hedgerows and treelines have been largely retained or avoided. However, there will be a requirement to remove areas of broadleaved woodland, hedgerow and treelines to facilitate the development (Figure 6-1).

A replanting plan has been curated to provide alternative commuting and foraging opportunities within the Site. Further details are outlined in Chapter 6, BMEP Appendix 6-4. To comply with NatureScot (2021) recommendations in relation to habitat buffering to avoid bat fatalities, approx. 3.7 km of linear vegetation habitat will be removed as a result of the Proposed Project, including the recommended buffers applied for bats. A further approximate 0.17 ha of broadleaved woodland is proposed for removal.

Approximately 4.7 km of replanting with native species will occur within the site to further increase the biodiversity value within the area. Additionally, approximately 11.5 ha of broadleaved woodland will be planted within the Site.

Overall, the proposed planting of new linear habitat, along with broadleaved woodland, will result in a net gain of linear landscape and woodland features within the Site. These measures will enhance both foraging and commuting opportunities for bats that use the area. All planting will consist of species indigenous to the local area. Removal and replanting areas are shown in Figure 6-1 below. Further details are provided in Appendix 6-4, Biodiversity Management and Enhancement Plan (BMEP).

In addition to the replanting proposal, the Proposed Project can also provide new roosting opportunities for bats. Bat boxes will be erected within the site following best practice guidelines (Kelleher & Marnell 2006, NRA 2006). A total of 20 no. bat boxes will be positioned at suitable locations around the site. Bat boxes will have a southerly orientation and be positioned at least 3 m from the ground, away from artificial lighting. Further details on bat box placement are outlined in Appendix 6-4 BMEP.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Linear Habitat Loss
- Proposed Linear Replanting

N

Drawing Title
Linear Vegetation Removal and Replanting

Project Title
Cooloo Wind Farm, Co. Galway

Drawn By	Checked By
MG	CM
Project No.	Drawing No.
240451	Figure 6-1
Scale	Date
1:23,345	2025-09-24

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6.1.5 Blade Feathering

NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to 'feathering' of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021).

In accordance with NIEA Guidelines, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine.

6.2 Bat Monitoring Plan

Overall risk levels for high collision risk bat species were typically *Low,* with the exception of common pipistrelle which was *Medium* in spring. This risk level is reflective of the nature of the Proposed Wind Farm, which is predominantly characterised by agricultural grassland, wet grassland and peatland habitats with smaller areas of woodland, hedgerows, and treelines.

Taking a precautionary approach and given that high collision risk was recorded at median and peak activity levels, an adaptive monitoring and mitigation strategy has been devised for the Proposed Project, in line with the case study example provided in Appendix 5 of NatureScot (2021) and based on the site-specific data.

6.2.1 Operational Monitoring

To assess the effects of the Proposed Project on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision.

The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy. If the monitoring identifies a curtailment requirement (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers.

At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This approach allows for an evidence-based review of the potential for bat fatalities at the Proposed Wind Farm, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally. The effectiveness of any mitigation or curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is incidental), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties.

The below subsections provide additional detail on the proposed survey effort, timing, and mitigation.

6.2.1.1 Monitoring Year 1

Bat activity surveys

The post-construction surveys will be carried out as per the pre-construction survey effort. Static monitoring will take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). Full spectrum recording detectors will be utilised for the same duration

as during pre-application surveys and at the same density (NatureScot, 2021). As described in Section 3.5 above, the assessment of bat activity levels will include the use of 'Ecobat' (or similar alternative), a web-based interface, allowing uploaded activity data to be contrasted with a comparable reference range, allowing objective and robust interpretation. Walked survey transects will also be conducted.

Key weather parameters and other factors that are known to influence collision risk will be monitored and shall include:

- Windspeed in m/s (measured at nacelle height)
- Temperature (ºC)
- Precipitation (mm/hr)

Carcass searches

Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with most recent guidance. This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. Surveys should cover all activity seasons and the use of a trained dog detection team will be carried out to ensure maximum efficiency.

6.2.1.2 Monitoring Years 2 & 3

Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s). The performance of the curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed shall be analysed to confirm it is neither significantly over- nor under- curtailing during different periods of bat activity.

At the end of each year, the efficacy of the mitigation/curtailment programme shall be reviewed, and any identified efficiencies incorporated into the programme. The requirement for continued post-construction monitoring will also be considered. Should no bat fatalities be recorded in Year 1, curtailment (where applicable) in Year 2 and Year 3 could be reduced/re-evaluated or removed with monitoring continuing to inform this strategy.

6.3 Residual Effects

Taking into account the sensitive design of the project and the implementation of best practice and adaptive mitigation measures, no significant long-term residual effects on bats are anticipated with regard to:

1. Collision mortality, barotrauma and other injuries,
2. Loss or damage to roosts, and
3. Displacement of individuals or populations.

However, a temporary residual effect at the local geographic scale is anticipated in relation to the loss of commuting and foraging habitat, due to the removal of treelines and hedgerows required to facilitate construction and bat buffers. While this loss will be offset through a comprehensive woodland and hedgerow enhancement and replanting programme, it will take approximately 3–10 years for new trees to establish and restore full habitat functionality. As such, a minor temporary reduction in ecological connectivity may occur during this period.

6.4 Cumulative Effects

The Proposed Project was considered in combination with other projects and/or plans (existing approved and pending decision), in the surrounding area that could result in cumulative impacts on bats. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects and/or plans considered are detailed in Section 2.8 in Chapter 2 of the EIAR.

Following the detailed assessment provided in the preceding sections, it is concluded that, the Proposed Project will not result in any residual adverse effects on bats, when considered on its own. There are no other wind farm sites located within 5 km of the Site; however, two existing or proposed wind farms are located within 10 km of the Proposed Project. There are 13 further EIA/ACP projects within 10 km. No potential for the Proposed Project to contribute to any cumulative adverse effects on any bat populations is anticipated when considered in-combination with other plans and projects.

In the review of the projects that was undertaken, no connection, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Proposed Project.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified regarding bats.

7. CONCLUSION

This report presents a comprehensive assessment of the potential impacts of the Proposed Project on local bat populations, based on the results of baseline surveys and in accordance with current best practice guidance, including that published by NatureScot (2021).

All potential impacts, including collision risk, roost loss, displacement, and habitat fragmentation, have been assessed in detail. Appropriate design measures and targeted mitigation have been integrated into the project to avoid or reduce impacts. These include the implementation of bat buffers, habitat replacement, confirmatory pre-demolition survey, and an adaptive post-construction monitoring and mitigation programme.

Provided that the Proposed Project is constructed and operated in accordance with the design, best practice and mitigation that is described within this report, the Proposed Project is not expected to result in significant effects on bats at any geographic scale.

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APPENDIX 1

2021/2022 BAT SURVEYS

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1. INTRODUCTION

This appendix provides supplementary data from bat surveys undertaken at the Cooloo Wind Farm site during 2021 and 2022. These surveys were designed and implemented in accordance with Scottish Natural Heritage (SNH) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation* (2019), which was the relevant guidance at the time.

Surveys completed included:

- Bat habitat suitability appraisal;
- Manual transect and emergence surveys; and
- Ground-level static detector surveys.

The results presented here supplement the 2024 survey dataset and have been considered together with those more recent surveys in the EIAR impact assessment.

2. METHODS

2.1 Multidisciplinary Surveys

Multidisciplinary walkover surveys were undertaken in 2021 and 2022 to classify habitats, assess bat roost potential, and identify features of value for foraging and commuting bats. Surveys were undertaken systematically across the proposed development footprint (Table 2-1).

Table 2-1 Multidisciplinary Survey Effort (2021/2022)

Multidisciplinary Survey	Dedicated Bat Survey
14th October 2021	24th May 2021
9th November 2021	14th July 2021
7th July 2022	5th October 2021
18th November 2022	13th April 2022
	5th May 2022
	19th July 2022
	22nd September 2022

2.2 Bat Habitat Suitability Appraisal

Bat habitat suitability appraisal was carried out during multidisciplinary walkover surveys undertaken in 2021 and 2022 to classify habitats, assess bat roost potential, and identify features of value for foraging and commuting bats.

A search for roosts was undertaken within 200m plus the rotor radius (i.e. 86.5m) of the Proposed turbine locations. The aim was to determine the presence of roosting bats and the need for further survey work or mitigation. The site was visited in May, July and October 2021 and April, July and September 2022.

Any potential roost sites were subject to a roost assessment. This comprised a detailed inspection of the exterior and interior (if accessible) to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises.

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 PRFs identified by Andrews (2018).

2.3 Manual Activity Surveys

Manual surveys included both emergence surveys at potential roosting features identified and transect surveys.

Emergence Surveys

Two derelict structures were identified as potential roosts within the EIAR Study Area in 2021 (Grid Ref: M 56150 50498 and M 56163 48993). Another structure was identified within the EIAR Study Area in 2022 (Grid Ref: M 57200 49346). These structures were subject to an emergence survey to confirm potential presence/absence of roosting bats.

Manual Transects

Representative transects were walked or driven by two surveyors in spring, summer, and autumn 2022 (Table 2-2). Routes were aligned with existing tracks and access roads, designed to capture habitat variation and overlap with proposed turbine locations. Surveys began within 30 minutes before sunset and lasted up to three hours post-sunset. Full-spectrum detectors (Batlogger M, Elekon AG, Switzerland) were used, with all calls recorded for later verification.

Table 2-2 Manual Transect Survey Effort (2022)

Date	Surveyors	Sunset	Start-End	Weather	Transect (km)
13th April 2022	Kate Greaney and Keith Costello	20:31	20:30 – 00:00	15˚; dry; calm; approx. 30% cloud cover	19.1
19th July 2022	Kate Greaney and Neil Campbell	21:52	21:22 – 00:52	17˚; dry; calm; approx. 95% cloud cover	17.8
22nd September 2022	Keith Costello and Neil Campbell	20:57	19:20 – 21:35	16˚; dry; light air. 20% Cloud cover	5.7
Total 2022 Survey Effort					**42.6**

2.4 Ground-level Static Activity Surveys

Static detectors (Song Meter SM4BAT, Wildlife Acoustics, USA) were deployed in 2022 at 10 locations for at least 10 suitable nights per season and placement followed SNH (2019) requirements. Detectors were programmed to record from 30 minutes before sunset until 30 minutes after sunrise, using automated GPS-calculated timing.

Detector locations (Table 2-3) were positioned near proposed turbines within representative habitats and linear features.

Table 2-3 Ground-level Static Detector Locations (2022)

ID	Location (ITM)	Habitat	Linear Feature within 50m	Corresponding/ Nearest Turbine
D01	556371 748793	Improved agricultural grassland (GA1)	Hedgerow (WL1)/ stream	T05
D02	555683 749752	Improved agricultural grassland (GA1)	N/A	T06
D03	555608 748726	Improved agricultural grassland (GA1)	Hedgerow (WL1)	T03(a)
D04	555476 748331	Hedgerow (WL1)	Hedgerow (WL1)	T03 (b)

ID	Location (ITM)	Habitat	Linear Feature within 50m	Corresponding/ Nearest Turbine
D05	556230 748530	Improved agricultural grassland (GA1)	Hedgerow (WL1)	T04
D06	557111 749420	Improved agricultural grassland (GA1)	Treeline (WL2)/ Hedgerow (WL1)	T08
D07	555014 750858	Improved agricultural grassland (GA1)	N/A	T09
D08	554858 750784	Cutover Bog (PB4)	N/A	T07
D09	555145 747961	Treeline (WL2)	Treeline (WL2)	T02
D10	555301 747373	Hedgerow (WL1)	Hedgerow (WL1)	T01

Onsite weather monitoring was undertaken concurrently with static detector deployments. One Vantage Pro 2 (Davis Instruments, CA, UCS) was deployed each season and night-time hourly data was tracked remotely to ensure a sufficient number of nights (i.e. minimum 10 no.) with appropriate weather conditions were captured (i.e. dusk temperatures above 8˚, wind speeds less than 5m/s and no or only very light rainfall). Tables 2-4 summarises survey effort achieved for each of the detector locations in 2022.

Table 2-4 Static Detector Survey Effort (2022)

Season	Survey Period	Total Survey Nights per detector location	Nights with Appropriate Weather
Spring	27th May – 9th June 2022	13	12
Summer	19th July – 8th August 2022	21	19
Autumn	22nd September – 5th October 2022	13	10
Total Survey Effort		**47**	**41**

2.5 Bat Call Analysis

All recordings from 2022 were later analysed using bat call analysis software Kaleidoscope Pro v.5.1.9 (Wildlife Acoustics, MA, USA). The aim of this was to identify, to a species or genus level, what bats were present at the Wind Farm Site. Bat species were identified using established call parameters (Russ, 1999). All identifications were manually verified.

2.6 Assessment of Bat Activity Levels

Activity was standardised as *bat passes per hour (bpph)* to account for variable night length. The median nightly bpph was used to represent typical levels of activity (Lintott & Mathews, 2018).

Ecobat (mammal.org.uk) is the recommended tool for benchmarking activity levels (NatureScot, 2021). However, the platform was unavailable for 2022 cross-site analysis due to maintenance. Therefore, activity levels were assessed using site-specific thresholds adapted from Mathews et al. (2016), with categories defined by quartiles of maximum nightly pass rates (Table 2-5).

Table 2-5 Site-specific Activity Thresholds Bat Passes per Hour (bpph)

Assessment Level	Activity Threshold as Bat Passes per Hour (bpph) for Bat Species				
	Myotis spp.	*Nyctalus spp.*	*Nathusius' pipistrelle*	*Pipistrellus spp.*	*Brown long-eared bat*
Low	<2.40	<0.80	<2.03	<6.29	<0.43
Moderate	2.40 - 7.20	0.80 - 2.39	2.03 - 6.08	6.29 - 18.86	0.43 - 1.28
High	>7.20	>2.39	>6.08	>18.86	>1.28

3. RESULTS

3.1 Emergence Surveys

Two derelict structures were identified as potential roosts within the EIAR Study Area in 2021 (Grid Ref: M 56150 50498 and M 56163 48993). Another structure was identified within the EIAR Study Area in 2022 (Grid Ref: M 57200 49346).

Emergence surveys were conducted at these structures, and one roost was confirmed during the 2022 survey season (Grid Ref: M 57200 49346) which lies within 275m of T08. The roost structure is a 2-storey, uninhabited concrete block dwelling with concrete block chimneys and a tile roof. There was no sign of structural decay or damage, and there were no gaps or breaks in the roof tiles. There was no obvious loose tiles or damage around the chimneys of the dwelling. Possible bat entry points include broken gutters, gaps at the base of the chimneys and open windows in the house (Plates 3-1: 3-4).

Surveys were conducted in autumn 2022 where approximately 20 soprano pipistrelle bats were observed emerging from a broken gutter at the north-western face of the building and underneath fascia on the north-eastern side of the building.

Plate 3-1 Southern Face of the Dwelling

Plate 3-2 Western Face of the Dwelling

Plate 3-3 Northwestern Face of the Dwelling

Plate 3-4 North-western face of the dwelling with gutter and soffit exit points in view

3.2 Manual Transect Surveys

Manual bat activity surveys were undertaken in spring, summer and autumn 2022. Bat activity was recorded on all surveys and a total of 636 bat passes were recorded. The total composition is shown below in Plate 3-5. Common pipistrelle was the most frequently recorded species, followed by soprano pipistrelle, Leisler's bat and brown long-eared bats.

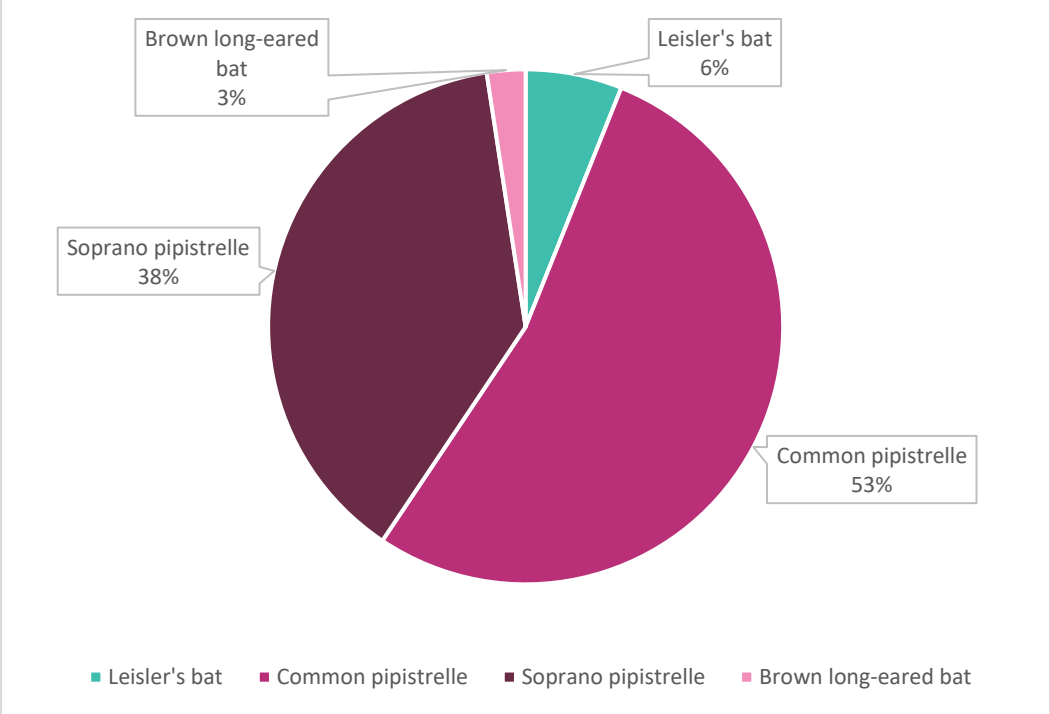

Plate 3-5: Total species composition across 2022 survey period

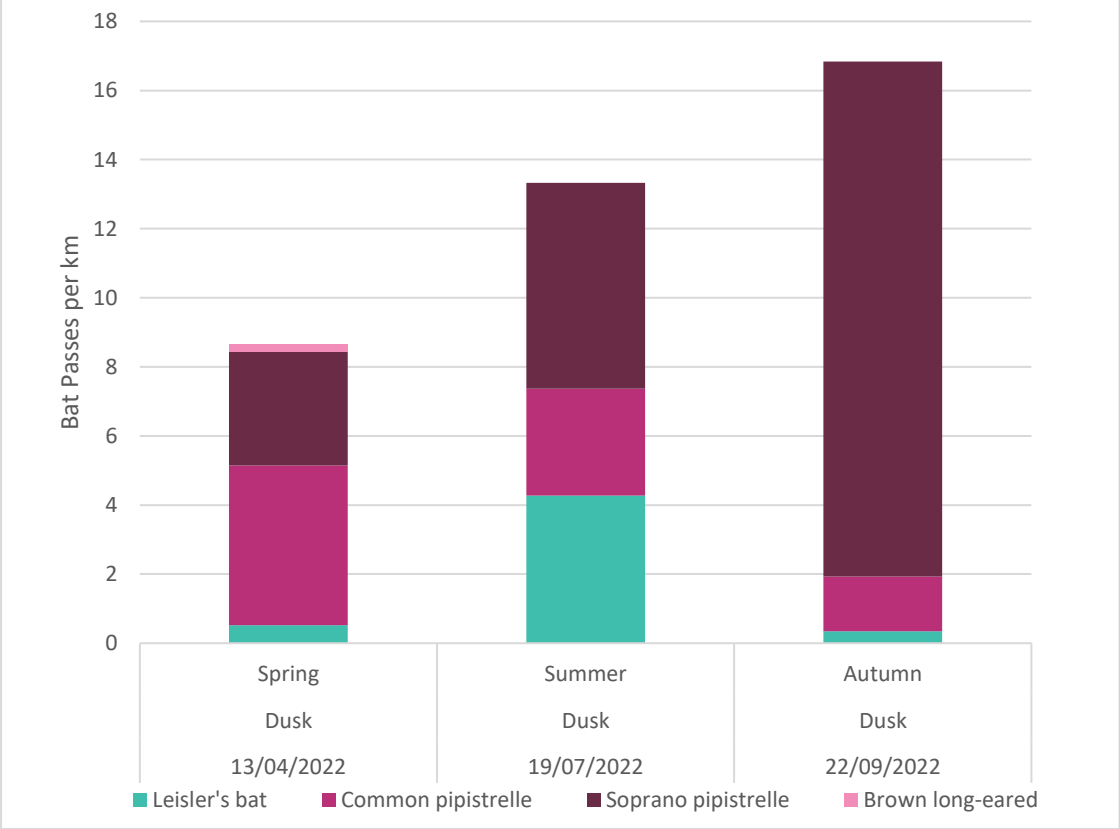

Plate 3-6 2022 Manual Transects - Species Composition Per Survey Period

Species composition and activity levels varied significantly between surveys (Plate 3-6). Transect survey results were calculated as bat passes per km surveyed (to account for differences in survey effort). Common pipistrelles dominated the recordings in spring, Leisler's bat dominated during summer, while soprano pipistrelles become more frequent in autumn. Manual activity surveys showed an increase in bat activity levels from spring to summer and autumn.

3.3 Ground-level Static Surveys

In total, 59,516 bat passes were recorded across all deployments. In general, common pipistrelle (n=29,005) and soprano pipistrelle (n=25,429) occurred most frequently, while, Leisler's bat (n=3,029), *Myotis* spp. (n=1,458), brown long-eared bat (n=351), Nathusius' pipistrelle (n=242) and lesser horseshoe bat (n=1) were significantly less. Plate 3-7 presents species composition across all ground-level static detectors.

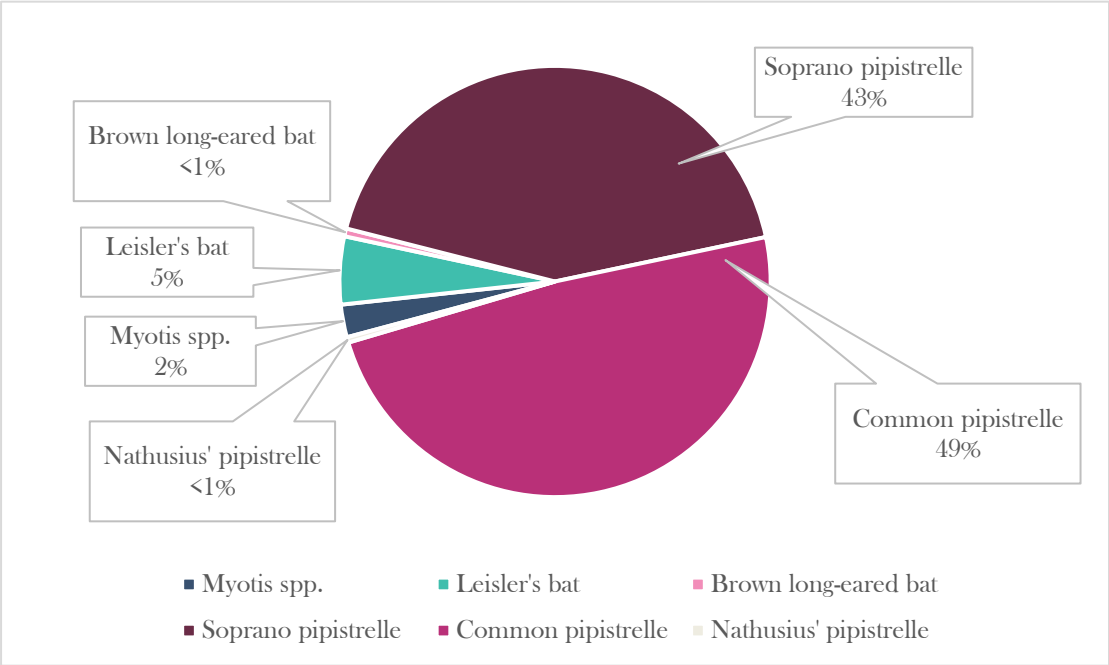

Plate 3-7 Static Detector Surveys: Species Composition Across All Deployments 2022 (Total Bat Passes)

Bat activity was calculated as total bat passes per hour (bpph) per season to account for any bias in survey effort, resulting from varying night lengths between seasons. Plate 3-8 and Table 3-1 presents these results for each species. No significant variability in species composition was recorded between seasons however higher activity was recorded in spring than during the rest of the year. Activity was dominated by common and soprano pipistrelles.

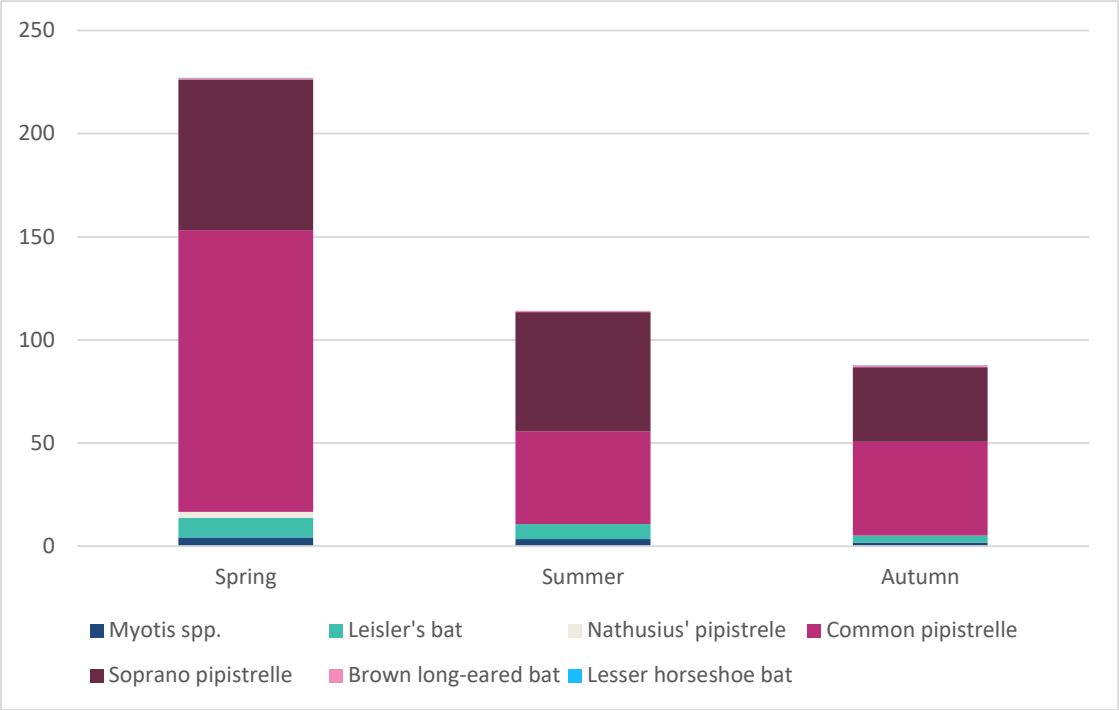

Plate 3-8 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

Table 3-1 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

Species	Spring	Summer	Autumn
Myotis spp.	4.25	3.47	1.82
Leisler's bat	9.50	7.25	3.37
Nathusius' pipistrelle	2.90	0.02	0.00
Common pipistrelle	136.46	44.94	45.37
Soprano pipistrelle	73.18	57.78	36.27
Brown long-eared bat	0.60	0.65	0.92
Lesser horseshoe bat	-	-	0.01
Total survey hours	**81.7**	**236.8**	**159.1**

The Nightly Pass Rate (i.e. total bat passes per hour, per night) was used to determine typical bat activity at the proposed site. Activity is often variable between survey nights. Therefore, the median Nightly Pass Rate was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018).

Plates 3-9 and 3-10 illustrate the Median Nightly Pass Rate per species per deployment in 2022, with and without a varied axis scale. Zero data, when a species was not detected on a night, was also included.

Plate 3-9 2022 Static Detector Surveys: Median Nightly Pass Rate (Bat Passes Per Hour) Including Absences, Per Detector Per Survey Period.

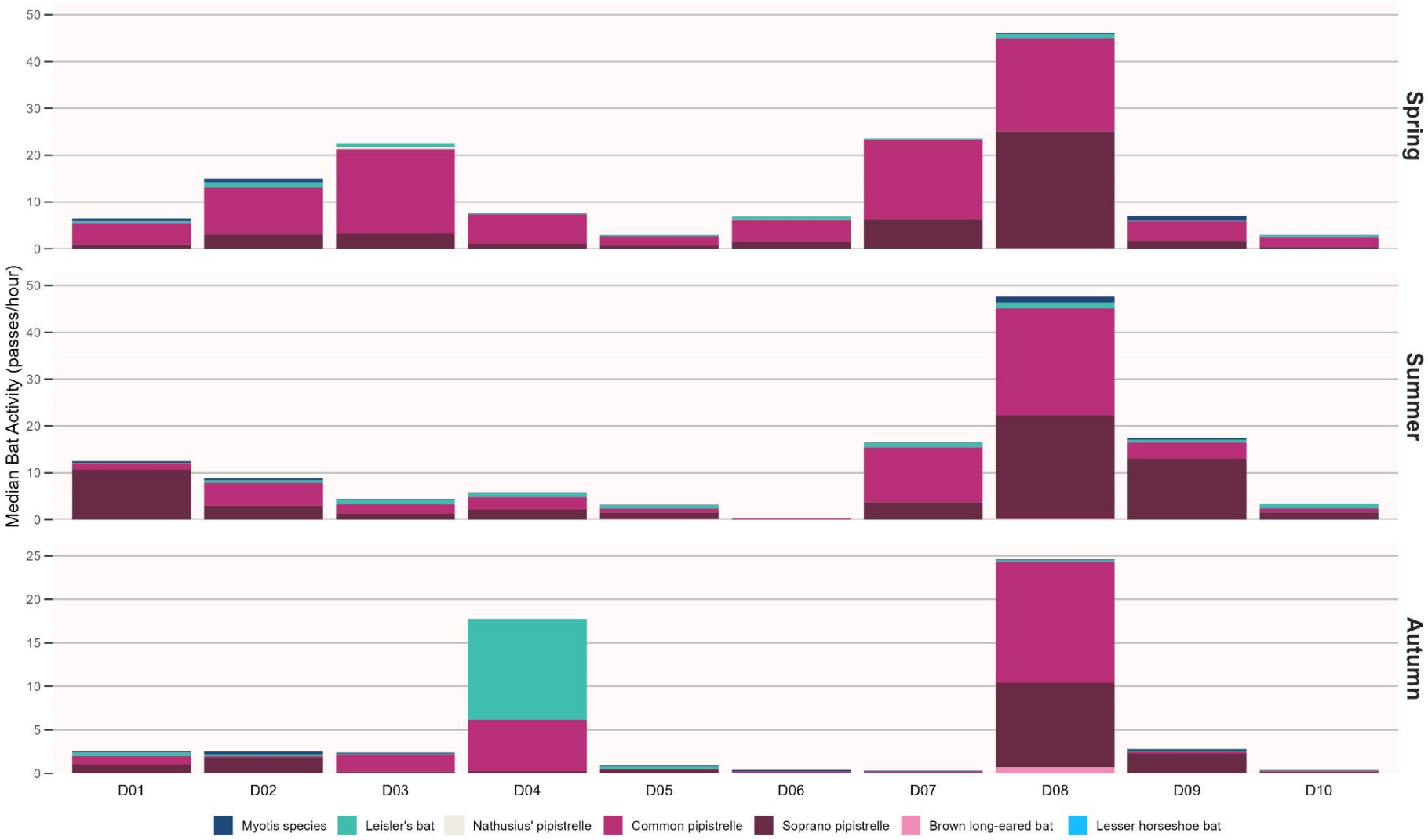

Plate 3-10 2022 Static Detector Surveys: Median Nightly Pass Rate (Bat Passes Per Hour) Including Absences, Per Detector Per Survey Period. (Varied Axis Scale).

Detector D08, located within cutover bog, consistently recorded the highest overall bat activity across all seasons, with summer yielding the highest levels of activity, largely dominated by common and soprano pipistrelles. The results also show an evident peak in Leisler's bat activity at D04 in autumn. Overall, autumn recorded the lowest levels of bat activity with the exception of elevated Leisler's activity at D04.

Nathusius' pipistrelle was most frequently recorded at D03 in spring (n=136), but activity at this location declined sharply to a single record in summer and was absent in autumn.

Median activity levels were highest for common and soprano pipistrelle, which peaked during spring and summer (*High*) and declined in autumn (*Moderate*). Leisler's median activity ranged from *Low* to *Moderate* in spring and summer and peaked in autumn at D04 (*High*). Brown long-eared bat remained at *Low* levels in spring and summer but reached *Moderate* at D08 in autumn.

Table 3-2 Median Nightly Bat Activity (bpph) per Species, per Season, per Detector Location 2022 Low, Moderate, High

2022 Season	Detector	Myotis spp.		Leisler's bat		Nathusius' pipistrelle		Common pipistrelle		Soprano pipistrelle		Brown long-eared bat	
		Median	Max	Median	Max	Median	Max	Median	Max	Median	Max	Median	Max
Spring	D01	0.6	1.1	0.4	1.2	0.0	0.3	4.6	17.1	0.9	6.6	0.0	0.3
	D02	0.8	2.7	1.1	5.9	0.0	1.1	9.9	55.1	3.2	21.7	0.0	0.4
	D03	0.0	0.1	0.8	5.4	0.5	8.1	18.0	75.1	3.3	26.5	0.0	0.1
	D04	0.0	0.1	0.3	2.5	0.0	0.3	6.3	33.8	1.1	6.4	0.0	0.3
	D05	0.0	0.5	0.4	1.8	0.0	1.1	2.0	12.0	0.7	3.0	0.0	0.1
	D06	0.0	0.1	0.7	11.1	0.1	1.5	4.6	91.9	1.5	13.4	0.0	0.1
	D07	0.0	1.4	0.3	3.3	0.0	0.7	17.0	52.8	6.3	39.2	0.0	0.8
	D08	0.1	0.4	1.1	5.5	0.0	0.1	19.8	60.9	25.0	77.7	0.1	0.5
	D09	1.0	7.1	0.1	1.1	0.0	1.0	4.2	27.0	1.7	4.4	0.0	1.1
	D10	0.1	0.6	0.5	1.4	0.0	0.4	2.2	21.6	0.3	0.6	0.0	0.0
Summer	D01	0.4	5.3	0.1	1.1	0.0	0.0	1.4	26.5	10.7	89.6	0.0	0.1
	D02	0.5	1.4	0.6	4.7	0.0	0.0	4.9	15.4	3.0	13.6	0.0	0.4
	D03	0.2	0.7	1.0	2.7	0.0	0.1	2.0	14.8	1.4	10.4	0.0	0.9
	D04	0.1	0.5	0.9	7.8	0.0	0.1	2.6	36.7	2.2	12.8	0.0	0.3
	D05	0.1	0.5	0.7	3.9	0.0	0.1	0.9	6.7	1.4	4.8	0.1	0.6
	D06	0.0	0.7	0.0	1.0	0.0	0.0	0.2	3.4	0.1	3.9	0.0	0.1
	D07	0.1	1.0	1.0	3.6	0.0	0.0	11.8	44.0	3.7	54.3	0.0	0.6
	D08	1.3	9.6	1.2	8.1	0.0	0.0	22.9	60.6	22.1	74.3	0.2	0.9
	D09	0.4	1.3	0.6	3.8	0.0	0.1	3.5	17.7	13.0	77.8	0.0	0.5
	D10	0.1	0.3	1.0	2.9	0.0	0.0	0.9	2.5	1.6	4.6	0.0	0.5
Autumn	D01	0.1	0.3	0.4	1.6	0.0	0.0	1.0	13.3	1.0	3.9	0.0	0.2
	D02	0.3	0.9	0.2	0.6	0.0	0.0	0.2	2.2	1.8	28.9	0.0	0.2
	D03	0.1	0.3	0.1	0.5	0.0	0.0	2.0	31.1	0.2	1.2	0.0	0.1
	D04	0.1	0.1	11.6	11.7	0.0	0.0	5.9	9.5	0.3	0.3	0.0	0.0
	D05	0.1	0.4	0.3	0.8	0.0	0.0	0.1	1.3	0.4	3.9	0.0	0.1
	D06	0.2	0.4	0.0	0.1	0.0	0.0	0.1	0.3	0.1	0.2	0.0	0.1
	D07	0.1	0.3	0.0	0.1	0.0	0.0	0.1	4.5	0.1	3.8	0.0	0.2
	D08	0.1	2.3	0.2	0.7	0.0	0.0	13.9	98.5	9.7	66.8	0.7	1.7
	D09	0.2	1.5	0.1	0.3	0.0	0.0	0.2	1.3	2.3	7.8	0.0	0.2
	D10	0.0	0.3	0.1	0.4	0.0	0.0	0.1	2.4	0.2	6.7	0.0	0.1

4. SUMMARY OF RESULTS

Surveys in 2021 and 2022 were undertaken in line with SNH (2019) standards for medium-risk sites. The site supported a soprano pipistrelle roost near T08 and provided suitable commuting and foraging habitat, particularly along treelines and hedgerows.

Static detectors confirmed pipistrelle species as dominant across the site, with localised seasonal peaks for Leisler's bat (autumn, D04) and Nathusius' pipistrelle (spring, D03). Brown long-eared bat and Myotis spp. were recorded occasionally, with lesser horseshoe bat detected only twice.

Overall, the 2021/2022 surveys indicate that bat activity at Cooloo is characterised by widespread pipistrelle use, with limited but notable records of higher-risk or rarer species. These results complement the 2024 survey data presented in the EIAR and have been considered in combination to inform the impact assessment and mitigation design.

APPENDIX 2

BAT HABITAT SUITABILITY APPRAISAL

Updated guidelines for assessing the potential suitability of a site for bats, based on the presence of habitat features (taken from Collins, 2023)

Potential Suitability	Description	
	Roosting Habitats in Structures	**Potential Flight- Paths and Foraging Habitats**
None	No habitat features on site likely to be used by any roosting bats at any time of the year. (i.e. a complete absence of crevices/ suitable shelter at all ground/ underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines or generate/shelter insect populations available to foraging bats).
Negligible[a]	Negligible habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[b] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats, i.e. unlikely to be suitable for maternity and not a classic cool/stable hibernation site but could be used by individual hibernating bats[c].	Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[b] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation - the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure with one or potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[b], and surrounding habitat. These structures have the potential to support high conservation status which is established after presence is confirmed.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

a) Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

b) For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

c) Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2016 and Jansen et al., 2022). Common pipistrelle swarming has been observed in the UK (Bell, 2022 and Tomlinson, 2020) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland (National Trust, 2018). This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.

BCT Protocol for categorising the suitability of trees for bats (Collins, 2023).

Assessment	Description
NONE	Either no PRFs in the tree or highly unlikely to be any
FAR	Further assessment required to establish if PRFs are present in the tree
PRF	A tree with at least one PRF present

BCT Guidance for categorising suitability of PRFs for bats (Collins, 2023).

Assessment	Description
PRF-I	PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
PRF-M	PRF is suitable for multiple bats and may therefore be used by a maternity colony

APPENDIX 3

SITE RISK ASSESSMENT

Table 3a: *Stage 1 - Initial site risk assessment*

Site Risk Level (1-5)*	**Project Size**			
		Small	**Medium**	**Large**
Habitat Risk	**Low**	1	2	3
	Moderate	2	3	4
	High	3	4	5

Key: Green (1-2) - low/lowest site risk; Amber (3) - medium site risk; Red (4-5) - high/highest site risk.

* Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

Habitat Risk	**Description**
Low	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway. Close to key roost and/or swarming site.

Project Size	**Description**
Small	Small scale development (≤10 turbines). No other wind energy developments within 10km. Comprising turbines <50m in height.
Medium	Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. Comprising turbines 50-100m in height.
Large	Largest developments (>40 turbines) with other wind energy developments within 5km. Comprising turbines >100m in height.

APPENDIX 4

OVERALL SITE RISK

Table 3b: *Stage 2 - Overall risk assessment*

Site risk level (from Table 3a)	Ecobat activity category (or equivalent justified categorisation)					
	Nil (0)	Low (1)	Low-moderate (2)	Moderate (3)	Moderate-high (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Med (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	18
Highest (5)	0	5	10	15	20	25

The scores in the table are a product of multiplying site risk level and the Ecobat activity category (or equivalent). The activity categories equate to those given in Table 1 for high collision risk species. Nil (0) means no bat activity was recorded across the whole site, but caution is needed here, because although the values given in this column are "0", at sites where pre-construction surveys found no bat activity, there remains the possibility that new turbines could attract some bat species, thereby altering the level of risk that applies in reality.

Overall assessment:

Low (green)	0-4
Medium (amber)	5-12
High (red)	15-25

It is important to have an understanding of both "typical" and unusually high levels of bat activity at a site so that potentially important peaks in activity are not overlooked. It is therefore recommended that both the highest Ecobat activity category and the most frequent activity category (i.e. the median) are assessed separately in Table 3b and presented in the overall risk assessment. A judgement can then be made on which is the most relevant. It should be noted that presenting mean activity levels can be highly misleading where the data are highly skewed, as is frequently the case with bat activity at wind turbines (Lintott & Mathews, 2018).