APPENDIX 6-2

BAT SURVEY REPORT

Table of Contents

1. INTRODUCTION 1
1.1 Background 1
1.2 Bat Survey and Assessment Guidance 2
1.3 Irish Bats: Legislation, Policy and Status 3
1.4 Statement of Authority 4
2. PROJECT DESCRIPTION 8
3. METHODS 10
3.1 Consultation 10
3.2 Desk Study 10
3.2.1 County Development Plans 10
3.2.2 Previous Baseline Survey (2022) 10
3.2.3 Bat Records 11
3.2.4 Bat Species' Range 11
3.2.5 Designated Sites 11
3.2.6 Landscape Features 11
3.2.6.1 Ordnance Survey Mapping 11
3.2.6.2 Underground Sites 12
3.2.6.3 National Biodiversity Data Centre Bat Landscape Mapping 12
3.2.7 Additional EIAR Projects in the Wider Landscape 12
3.2.8 Multidisciplinary Surveys 12
3.3 Field Surveys 13
3.3.1 Bat Habitat Suitability Appraisal 13
3.3.2 Roost Surveys 14
3.3.3 Manual Surveys 16
3.3.3.1 Manual Transects/ Night-time Bat Walkover 2024 16
3.3.3.2 Manual Transects/ Night-time Bat Walkover 2026 18
3.3.4 Vantage Point Surveys 18
3.3.5 Ground-level Static Surveys 21
3.3.5.1 Proposed Wind Farm – 2024 Surveys 21
3.3.5.2 Proposed Lodge Bog Enhancement Area and Proposed Killina Bog Offsetting Area – 2026 Surveys 24
3.4 Bat Call Analysis 26
3.5 Assessment of Bat Activity Levels 28
3.6 Assessment of Collision Risk 29
3.6.1 Population Risk 29
3.6.2 Site Risk 30
3.6.3 Overall Risk Assessment 30
3.7 Limitations 31
4. SURVEY RESULTS 32
4.1 Consultation 32
4.2 Desk Study 33
4.2.1 County Development Plans 33
4.2.2 Previous Baseline Survey (2022) 33
4.2.3 Bat Records 34
4.2.4 Bat Species Range 41
4.2.5 Designated Sites 41
4.2.6 Landscape Features and Habitat Suitability 41
4.2.7 Additional EIAR Projects in the Wider Landscape 42
4.3 Field Surveys 42
4.3.1 Bat Habitat Suitability Appraisal 42
4.3.1.1 Proposed Wind Farm Infrastructure 42
4.3.1.2 Proposed Lodge Bog Enhancement Area 46
4.3.1.3 Proposed Killina Bog Offsetting Area 47
4.3.1.4 Proposed Grid Connection 48
4.3.1.5 Proposed Turbine Delivery Route Accommodation Works 57
4.3.2 Roost Surveys 59

4.3.2.1 Daytime Roost Inspections 59
4.3.3 Manual Surveys 64
4.3.3.1 Manual Transects/ Night-time Bat Walkover 2024 64
4.3.3.2 Manual Transects/ Night-time Bat Walkover 2026 69
4.3.4 Vantage Point Surveys 73
4.3.5 Ground-level Static Surveys 73
4.3.5.1 Proposed Wind Farm – 2024 Surveys 73
4.3.5.2 Proposed Lodge Bog Enhancement Area and Proposed Killina Bog Offsetting Area – 2026 Surveys 80
4.4 Assessment of Bat Activity Levels 2024 85
4.4.1 Adapted Site-specific Ranges 85
4.5 Importance of Bat Population Recorded at the Project Site 90

5. RISK AND IMPACT ASSESSMENT 91

5.1 Collision Mortality 91
5.1.1 Assessment of Site-Risk 91
5.1.2 Assessment of Collision Risk 92
5.1.2.1 Leisler's bat 92
5.1.2.2 Soprano pipistrelle 93
5.1.2.3 Common pipistrelle 93
5.1.1 Nathusius' pipistrelle 94
5.1.2 Collision Risk Summary 95
5.2 Loss or Damage to Commuting and Foraging Habitat 95
5.3 Loss of, or Damage to, Roosts 97
5.4 Disturbance and Displacement of Individuals or Populations 99

6. BEST PRACTICE AND MITIGATION MEASURES 102

6.1 Standard Best Practice Measures 102
6.1.1 Noise Restrictions 102
6.1.2 Lighting Restrictions 102
6.1.3 Biodiversity Management Plan 103
6.1.4 Collision Risk Mitigation Measures 103
6.1.4.1 Bat Felling Buffers 103
6.1.4.2 Blade Feathering 104
6.2 Post-Construction Bat Monitoring Plan 105
6.2.1 Fatality Monitoring 106
6.2.2 Acoustic Monitoring 106
6.2.3 Mortality Threshold and Adaptive Management 107
6.2.4 Monitoring Duration and Reporting 107
6.3 Residual Effects 108
6.4 Cumulative Effects 108

7. CONCLUSION 111

8. BIBLIOGRAPHY 112

TABLE OF TABLES

Table 1-1 Irish Bat Species Conservation Status and Threats (NPWS, 2025). The influence of Pressures and Threats for bats are ranked from Low to Medium for each species in the 2025 Article 17 report 3

Table 1-2 Project team experience, qualifications and training 5

Table 3-1 Multidisciplinary Survey Effort in 2024 and 2026 13

Table 3-2 Survey Effort - Manual Transects 2024 16

Table 3-3 Survey Effort - Manual Transects 2026 18

Table 3-4 Survey Effort – Vantage point surveys 18

Table 3-5 Ground-level Static Detector Locations 2024 21

Table 3-6 2024 Survey Effort - Ground-level Static Surveys 22

Table 3-7 Ground-level Static Detector Locations on Proposed Lodge Bog Enhancement Area and Proposed Killina Bog Offsetting Area 24

Table 3-8 2026 Survey Effort - Ground-level Static Surveys within Proposed Lodge Bog Enhancement Area and Proposed Killina Bog Offsetting Area 24

Table 3-9 The Project Site-specific activity level categories based on maximum bat passes per hour (bpph) 28

Table 3-10 Site-specific ranked bat activity intensity classes for risk assessment use 29

Table 3-11 Population Vulnerability of Irish Bat Species (Adapted from NatureScot (2021). 30

Table 3-12 Site-risk Level Assessment Matrix (Table 3a, NatureScot (2021). 30

Table 3-13 Overall Risk Assessment Matrix (Table 3b, NatureScot (2021) 31

Table 4-1 National Bat Database of Ireland Records within 10km of the Project Site centre 34

Table 4-2 NBDC Bat Records within 10km of Project Site 40

Table 4-3 Wind farm developments within 15km of the Proposed Turbine locations 42

Table 4-4 Bat Roost Suitability of Bridges/ culverts along the Proposed Grid Connection underground electrical cabling route 51

Table 4-5 Structures and Bridges/Culverts within the Proposed Wind Farm. 60

Table 4-6 –Vantage point observations 73

Table 4-7 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights) 75

Table 4-8 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights) 81

Table 4-9 Median Nightly Bat Activity (bpph) per Species, per Season, per Detector Location 2024 None, Low, Moderate, High. Outliers are highlighted in Orange. 87

Table 5-1 Site-risk Level Determination for the Proposed Project (Adapted from NatureScot, 2021) 91

Table 5-2 Leisler's bat - Overall Risk Assessment 93

Table 5-3 Soprano pipistrelle - Overall Risk Assessment 93

Table 5-4 Common pipistrelle - Overall Risk Assessment 94

Table 5-5 Nathusius' pipistrelle - Overall Risk Assessment 94

Table 5-6 Detector Location Recording High Median Activity in 2024 for High-risk Bat Species 95

TABLE OF PLATES

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). 26

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 27

Plate 4-1 Cutover bog dominated by bare peat, in the early stages of recolonisation in Ballydermot 44

Plate 4-2 Area of Dry meadows and grassy verges (GS2) and Dense bracken (HD1) separating two blocks 44

Plate 4-3 Narrow, vertical-sided Drainage ditch (FW4) on bare peat at the location of Proposed Turbine 10 45

Plate 4-4 Linear areas of Bog woodland (WN7) located in Ballydermot South Bog. 45

Plate 4-5 Area of Reed and large sedge swamp (FS1) at the location of the Proposed Turbine 23 46

Plate 4-6 Area of Dry calcareous and neutral grassland (GS1) growing along a former railway line in Glashabaun North Bog 46

Plate 4-7 Conifer plantation (WD4) within Killina Bog, i.e., within the Proposed Offsetting Area 47

Plate 4-8 – Treeline (WL2) at the entrance to the Proposed Offsite Substation 49

Plate 4-9 Cutover bog (PB4) at the location of the Proposed Onsite Substation, dominated by bare peat with 50

Plate 4-10 - Ivy and understorey vegetation 57
Plate 4-11: Ivy and understorey vegetation 57
Plate 4-12: Scattered mature trees and parkland (WD5) 58
Plate 4-13: Scattered mature trees and parkland (WD5) 58
Plate 4-14 - A boundary treeline (WL2) 58
Plate 4-15 - A boundary treeline (WL2) with ivy cover 58
Plate 4-16 - Scattered mature trees and parkland (WD5) 58
Plate 4-17 - Treeline (WL2) present. 59
Plate 4-18: Treeline (WL2) present. 59
Plate 4-19 – Representative photo of structures within the Project Site– Hand-washing station 62
Plate 4-20 – Representative photos of containers present within the Project Site 62
Plate 4-21 - Representative photos of structures present within the Project Site 62
Plate 4-22 - Representative photos of containers present within the Project Site 62
Plate 4-23 Solid concrete bridge NW of Proposed Turbine T13 62
Plate 4-24 Concrete pipe south of Proposed Turbine T38 62
Plate 4-25 Solid concrete bridge present within the Project Site 63
Plate 4-26 Solid concrete bridge present within the Project Site 63
Plate 4-27 Steal beam bridge with wooden plank surface NE of Proposed Turbine T1 63
Plate 4-28 Steal rail bridge south of Proposed Turbine T38 63
Plate 4-29 Steal beam bridge with wooden plank surface NW of Proposed Turbine T32 63
Plate 4-30 Steel rail bridge NW of Proposed Turbine T32 63
Plate 4-31 Culvert north of Proposed Turbine T29 63
Plate 4-32 Area of downy birch (Betula pubescens)-dominated Scrub (WS1) 64
Plate 4-33 Linear areas of Bog woodland (WN7) located in Ballydermot South Bog 64
Plate 4-34 Short grey willow (Salix cinerea) Hedgerow (WL1) in the west of the Project Site 64
Plate 4-35 Areas of immature conifer plantation - Negligible 64
Plate 4-36 2024 Manual Activity Surveys (Total Species Composition) 65
Plate 4-37 2024 Transect Results – Species Composition Per Survey Period 65
Plate 4-38 2026 Manual Activity Surveys (Total Species Composition) 69
Plate 4-39 2026 Transect Results – Species Composition Per Survey Period 69
Plate 4-40 2024 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes) 74
Plate 4-41 2024 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights). 75
Plate 4-42 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period. 76
Plate 4-43 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale). 77
Plate 4-44 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night 78
Plate 4-45 Static Detector Surveys: Spring Median Bat Pass Rate (bpph) Including Absences, Per Night 79
Plate 4-46 Static Detector Surveys: Summer Median Bat Pass Rate (bpph) Including Absences, Per Night 79
Plate 4-47 Static Detector Surveys: Autumn Median Bat Pass Rate (bpph) Including Absences, Per Night 79
Plate 4-48 2026 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes) 80

Plate 4-49 2026 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights). 81

Plate 4-50 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period. 82

Plate 4-51 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale). 82

Plate 4-52 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night 83

Plate 4-53 Static Detector Surveys: Spring Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability 84

Plate 4-54 Static Detector Surveys: Summer Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability 84

Plate 4-55 Static Detector Surveys: Autumn Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability 85

Plate 6-1 Calculation of buffer distances (NatureScot, 2021). 104

TABLE OF FIGURES

Figure 2-1 Site Location 9

Figure 3-1 Locations of inspected structures. 15

Figure 3-2 Survey Effort 2024 17

Figure 3-3 Survey Effort 2026 to include NBW 2026 and VP's 20

Figure 3-4 Static Detector Locations 2024 23

Figure 3-5 Static Detector Proposed Lodge Bog Enhancement Area and Proposed Killina Bog Offsetting Area 2026 25

Figure 4-1 Spring Manual Transect Results 2024 66

Figure 4-2 Summer Manual Transect Results 2024 67

Figure 4-3 Autumn Manual Transect Results 2024 68

Figure 4-4 Spring Manual Transect Results 2026 70

Figure 4-5 Summer Manual Transect Results 2026 71

Figure 4-6 Autumn Manual Transect Results 2026 72

APPENDICES

Appendix 1 – Bat Habitat Suitability Appraisal

Appendix 2 – Site Risk Assessment

Appendix 3 – Overall Site Risk Assessment

Appendix 4 – 2022 Baseline Bat Surveys

1. INTRODUCTION

MKO was commissioned to complete a comprehensive assessment of the potential effects on bats, as part of an application for planning permission of a renewable energy development located on the border of Co. Offaly and Co. Kildare. This report provides details of the bat surveys undertaken, including survey design, methods and results, and the assessment of potential effects of the proposed Ballydermot Wind Farm, Co. Offaly and Co. Kildare ('the Proposed Project') on bats. Where necessary, mitigation is prescribed to minimise any potential for significant effects.

As detailed in Section 1.1.1 of Chapter 1 Introduction, for the purposes of this EIAR, the various project components are described and assessed using the following references: the **'Proposed Project'**, **'Proposed Enhancement Areas'**, **'Proposed Construction Haul Routes'**, **'Proposed Turbine Delivery Route'**, **'Project Site'**, **'Proposed Wind Farm'**, **'Proposed Turbines'**, **'Proposed Grid Connection'**, **'Proposed Onsite Substation'** and **'Proposed Offsite Substation'**.

Bat surveys carried out in 2024 in accordance with NatureScot (2021) form the core dataset for the assessment of effects of the Proposed Project on bats. These surveys followed relevant industry best practice guidance, primarily NatureScot (2021), and included manual activity surveys and ground level static detector surveys. Further targeted surveys and assessments were undertaken in 2026 within the Proposed Wind Farm and in relation to the Proposed Turbine Delivery Route accommodation works areas, the Proposed Grid Connection and Proposed Enhancement Areas (see Appendix 6-5, Biodiversity Management Plan (BMP)). These included additional walked transect and vantage point surveys within the Proposed Wind Farm site (i.e., the part of the Project Site containing the 14 no. bogs forming part of the Allen Bog Group), targeted walkover surveys and Ground Level Tree Assessments (GLTAs) of structures and trees potentially affected by the proposed works, and ground-level static detector surveys within the Proposed Enhancement Areas. The core dataset is supplemented by data collected during surveys undertaken on the Project Site in 2022, which were designed in accordance with SNH, 2019 and NatureScot, 2021; however, as the 2022 data is over 2 years old, this data is presented as an appendix to this Bat Report to provide additional context to the data collected in 2024 and 2026 that is presented below. The 2022 data is presented in Appendix 4.

The assessment of potential effects and the development of recommended mitigation measures have been undertaken in accordance with NatureScot (2021), with additional consideration given, where relevant, to guidance issued by the Northern Ireland Environment Agency (NIEA) Natural Environment Division (NIEA, 2021, amended 2024). The updated assessment has also had regard to the Bat Conservation Ireland (BCI, 2026) guidance.

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

1.1 Background

Wind energy is a key component of Ireland's renewable energy strategy. However, wind energy developments and their associated infrastructure have the potential to affect bats through collision mortality, habitat loss or fragmentation, disturbance and displacement, including effects associated with artificial lighting and construction and operational noise.

Bats are considered particularly sensitive to wind energy developments due to their flight behaviour and ecological requirements. Global reviews of bat-wind farm interactions have documented bat fatalities at operational wind farms and highlighted the potential for cumulative effects at the population level (Arnett *et al.*, 2016). Many bat species commute and forage along linear landscape features such as hedgerows, treelines and woodland edges, which may overlap with areas proposed for turbines and associated infrastructure. In addition, some bat species are known to fly at heights within the rotor-swept zone, particularly during seasonal movements and mating activity in late summer and autumn (Cryan &

Barclay, 2009; Rydell *et al.*, 2010). These behaviours increase the potential for interaction with wind turbines and may lead to collision mortality or barotrauma. Consequently, wind energy developments require careful assessment of bat activity, habitat use and potential roost features to inform appropriate mitigation measures.

In a European context, a review of studies by Voigt *et al.* (2022) estimated that between approximately 1.5 and 30 bats may be killed per turbine per year. Carcass-search data from the UK indicate mortality rates ranging from 0 to 5.25 bats per turbine per month during the peak bat activity period from July to October, although substantial variation occurs between sites (Mathews *et al.,* 2016). While these figures are not directly transferable to the Irish context, the broadly similar bat assemblages present in Ireland and Britain make them a useful reference when considering potential risks.

Known mechanisms of bat mortality at wind farms include collisions with rotating turbine blades (Horn *et al.,* 2008; Cryan *et al.,* 2014) and barotrauma (Baerwald *et al.,* 2008), whereby rapid changes in air pressure near turbine blades can cause internal injuries. Bats may also be attracted to turbines due to behavioural and environmental factors, including habitat associations, mating activity and weather conditions.

Robust baseline bat surveys are therefore undertaken to establish baseline bat activity and habitat use and to inform the assessment of potential effects associated with the construction, operation and decommissioning of wind energy developments and their associated infrastructure. Survey design and impact assessment were guided by relevant legislation, scientific literature, and current best-practice guidance, with consideration given to spatial, temporal, and behavioural patterns in bat activity.

1.2 Bat Survey and Assessment Guidance

A range of guidance documents exist for surveying bats in the context of onshore wind energy developments across Europe, the UK and Ireland, reflecting a hierarchy of strategic, technical and national best practice guidance.

At a 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 *et al.*, 2015). These provide a structured framework for assessing potential impacts on bats during the planning, construction and operational phases of wind energy developments. While informed by continental European bat assemblages, which differ in some respects from those in Ireland, the guidance provides an important strategic framework and continues to underpin subsequent national and regional guidance.

In the UK, wind farm-specific recommendations were previously included in Chapter 10 of the second edition of *Bat Surveys: Good Practice Guidelines* (Hundt, 2012). These were removed from the third edition (Collins, 2016) due to limitations in the available evidence base at that time. Natural England (2014) subsequently issued interim guidance interpreting EUROBATS advice for the UK context. Further technical discussion and interpretation have been provided through publications by the Chartered Institute of Ecology and Environmental Management (CIEEM), including technical guidance notes and practitioner updates.

The most comprehensive and widely applied technical guidance for onshore wind energy developments is currently '*Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation'* (NatureScot, 2021). This document replaced earlier guidance produced by NatureScot and Natural England and provides detailed, evidence-based recommendations on survey design, impact assessment (including collision risk and displacement), and mitigation, including curtailment.

In Ireland, Bat Conservation Ireland (2012) published '*Bat Survey Guidelines for Wind Turbine/Wind Farm Developments in Ireland'*, which outline surveyor competencies, health and safety considerations, survey methods and reporting standards. These guidelines provide a useful national context but pre-

date the substantial growth in the evidence base relating to bat activity and mortality at wind farms and are therefore now considered to be of limited applicability as a standalone source of technical guidance.

Further guidance relevant to the Irish context has been provided by the Northern Ireland Environment Agency (NIEA) Natural Environment Division (NED) in its guidance on bats and onshore wind energy (NIEA, 2021; amended 2024), which builds on the NatureScot framework and provides additional direction on survey effort, seasonal coverage and mitigation design.

A more recent Irish-specific guidance document, '*Bat Survey, Assessment and Mitigation Guidelines for Onshore Wind Turbines in Ireland'* (Bat Conservation Ireland, 2026), was published during the preparation of this report, following completion of the original baseline bat survey programme for the Proposed Project. This document provides a consolidated, Ireland-specific framework for bat survey, assessment and mitigation, drawing together and building upon established guidance including NatureScot (2021), NIEA (2021; amended 2024), National Parks and Wildlife Service (NPWS) (2022), EUROBATS (2014/2015) and '*Bat Surveys for Professional Ecologists: Good Practice Guidelines'* (Collins, 2023). It introduces a more structured and standardised approach in areas such as site risk categorisation, survey effort, quantitative interpretation of bat activity and post-construction monitoring.

The survey programme and impact assessment presented in this report were developed principally with reference to NatureScot (2021), supplemented by NIEA (2021; amended 2024), and Collins (2023). Following its publication, Bat Conservation Ireland (2026) guidance was reviewed and informed supplementary surveys undertaken in 2026. It was also considered in the interpretation of the survey findings and the development of mitigation and post-construction monitoring measures. The report therefore draws on the original NatureScot-based baseline survey programme, supplemented by additional survey information and relevant recommendations from Bat Conservation Ireland (2026).

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 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 2025. 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, 2025). The influence of Pressures and Threats for bats are ranked from Low to Medium for each species in the 2025 Article 17 report.

Bat Species	Conservation Status	Principal Threats
Common pipistrelle *Pipistrellus pipistrellus*	Favourable	**PX04** No pressures or threats
Soprano pipistrelle *Pipistrellus pygmaeus*	Favourable	**PX04** No pressures or threats
Nathusius' pipistrelle *Pipistrellus nathusii*	Unknown	**PD01** Wind, wave and tidal power (including infrastructure) (future threat)

Bat Species	Conservation Status	Principal Threats
Leisler's bat *Nyctalus leisleri*	Favourable	**PD01** Wind, wave and tidal power (Low) **PF02** Construction or modification (e.g. of housing and settlements) in existing built-up areas (L)
Daubenton's bat *Myotis daubentoni*	Favourable	**PA22** Drainage for use as agricultural land (Medium) **PF12** Residential, commercial and industrial activities and structures generating noise, light, heat or other forms of pollution (M)
Natterer's bat *Myotis nattereri*	Favourable	**PA04** Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (L) **PB09** Clear-cutting, removal of all trees (L) **PE01** Roads, paths, railroads and related infrastructure (L) **PF01** Conversion from other land uses to built-up areas (L) **PF02** Construction or modification (e.g. of housing and settlements) in existing built-up areas (L)
Whiskered bat *Myotis mystacinus*	Favourable	**PA04** Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (L) **PB09** Clear-cutting, removal of all trees (L) **PE01** Roads, paths, railroads and related infrastructure (L) **PF01** Conversion from other land uses to built-up areas (L) **PF02** Construction or modification (e.g. of housing and settlements) in existing built-up areas (L)
Brown long-eared bat *Plecotus auritus*	Favourable	**PX04** No pressures or threats
Lesser horseshoe bat *Rhinolophus hipposideros*	Inadequate	**PA04** Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (M) **PB09** Clear-cutting, removal of all trees (M) **PE01** Roads, paths, railroads and related (M)infrastructure (M) **PF01** Conversion from other land uses to built-up areas (M) **PF02** Construction or modification (e.g. of housing and settlements) in existing built-up areas (M) **PA15** Use of other pest control methods in agriculture (excluding tillage) (M) **PF13** Drainage, land reclamation and conversion of wetlands, marshes, bogs, etc. for built-up areas (L) **PH04** Vandalism or arson (incl. human-introduced wildfire) (L) **PJ01** Temperature changes and extremes due to climate change (L) **PM07** Natural processes without direct or indirect influence from human activities or climate change (L)

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.

Survey scoping and project management was overseen by Aoife Joyce (BSc., MSc.). The daytime walkover survey and inspections in 2024 were carried out by Ryan Connors (B.Sc., M.Sc.), Fred Mosley (B.A, M.Sc.), Kate Greaney (BSc., MSc.) and Charlie Meehan (B.A., MSc.). Manual activity surveys were carried out by Ryan Connors, Fred Mosley, Kate Greaney, Charlie Meehan and Laura McEntegart (B.Sc.).

The Bat Habitat Appraisal surveys, and surveys carried out in line with BCI 2026 guidance in 2026 were carried out by Tim Murphy (B.Sc.), Alice Twiss (B.Sc.), Sophie Moore (B.A.) and Saoirse Fitzsimons (B.A., M.Sc.).

Data manual ID were carried out by Ryan Connors, Fred Mosley and Emma Fitzgerald (B.Sc.). This report was prepared by Ryan Connors, Tim Murphy, Emma Fitzgerald and Molly O'Hare (BSc., MSc.) and was reviewed and approved by Aoife Joyce. Staff's roles, relevant ecological experience and training is presented in Table 1-2 below. Further details and experience are outlined in Appendix 6-7 of Chapter 6 of this EIAR.

Table 1-2 Project team experience, qualifications and training

Staff	Role	Training
Aoife Joyce (B.Sc., M.Sc., MCIEEM)	Project Director	BSc (Hons) Environmental Science, University of Galway, Ireland MSc (Hons) Agribioscience, University of Galway, Ireland Full member of Chartered Institute of Ecology and Environmental Management. Over 7 years' experience in Ecological Impact Assessments, Appropriate Assessment Screening Reports, Natura Impact Statements, Advanced Bat Survey Techniques (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). Extensive experience in leading, managing and reviewing bat assessments for wind farm developments, including survey design, impact assessment, mitigation strategy development and technical review of EIAR documentation in line with current guidance.
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. Over 2.5 years' experience in Surveying Trees for Bats (BRTS), 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).
Frederick Mosley (B.A., M.Sc.)	Seasonal Bat Ecologist	B.A. (Hons) Biological and Biomedical Science Mod. Zoology, Trinity College, Dublin (2022)

		M.Sc. Marine Biology, University College Cork (2023) Over 9 months experience in 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)
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 Over 5 months experience in 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, Over 2.5 years experience in 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)
Laura McEntegart (B.Sc.)	Ecologist	B.Sc. (Hons) Botany and Plant Science, National university of Ireland, Galway Over 3 years' experience in Bat Handling Training Course (BCI), Bats: Assessing the Impact of Development on Bats, Mitigation & Enhancement - (CIEEM), 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).
Emma Fitzgerald (B.Sc.)	Bat Ecologist	B.Sc. (Hons) Zoology, University College Galway, Ireland. 2 years' experience in Kaleidoscope Pro Analysis (Wildlife Acoustics), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Introduction to Bats and Using Detectors (BCI), Analysing Kaleidoscope Pro Outputs with RStudio (Advanced) (Wildlife Acoustics)
Tim Murphy (B.Sc)	Project Bat Ecologist	B.Sc. (Hons) Environmental Biology, University College Dublin. Over 2 years' experience in 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), Kaleidoscope Pro Analysis for Birds and Land Animals (Wildlife Acoustics), Bat: Assessing the Impact of Development on Bats Mitigation & Enhancement (CIEEM Webinar)
Molly O'Hare (BSc., MSc.)	Project Bat Ecologist	B.Sc. Ecology and Environmental Biology, University College Cork, Ireland. M.Sc. Marine Biology, University College Cork, Ireland. Over 4 years' experience in Bat Habitat Appraisal (Internal), Manual transect (Internal) Emergence surveys (ABC), Hand netting (ABC), Harp trapping (ABC), Mist netting (ABC). Kaleidoscope Pro Analysis (Wildlife Acoustics), Bat Impacts and Mitigation (CIEEM)
Alice Twiss (B.Sc.)	Seasonal Bat Ecologist	B.Sc. Ecology and Environmental Biology, University College Cork, Ireland. Over 6 months experience in Bat Habitat Appraisal (Internal), Kaleidoscope Pro Analysis (Wildlife acoustics), Emergence and Re-Entry Surveys (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal).
Sophie Moore (B.A.)	Seasonal Bat Ecologist	B.A. Geography and Philosophy, Trinity College Dublin Over 6 months experience in Kaleidoscope Pro Analysis (Internal), Bat Habitat Appraisal (Internal), Endoscope Training (Internal), Emergence and Re- Entry Surveys
Saoirse Fitzsimons (B.A, M.Sc.)	Bat Ecologist	MSc. Coastal and Marine Environments; Physical Processes, Policy & Practice, National University of Ireland Galway BA (Hons) Geography, Sociology and Politics, National University of Ireland, Galway Drone Surveying - A1/A3 and A2 drone licence Over 4 years' experience in Bat Detector and Survey Training (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics), Endoscope Training (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal).

2. PROJECT DESCRIPTION

The Proposed Project includes a wind farm and associated infrastructure, enhancement areas, an onsite substation, an offsite substation and a 13.1km underground 220kV grid connection.

The Proposed Wind Farm, Proposed Onsite Substation, 0.5km of Proposed Grid Connection underground electrical cable route, and Proposed Enhancement Areas are located within part of the Allen Bog Group on the Offaly-Kildare border (i.e., the Proposed Wind Farm site), approximately 2.2km south-southeast of Edenderry, 3.3km west of Allenwood, 2km north of Rathangan and 1.7km east of Clonbullogue. The Proposed Wind Farm site comprises 14 bogs: Ticknevin, Glashabaun North and South, Codd 1 and 2, Ballydermot North and South, Blackriver, Lullymore, Lullybeg, Barnaran, Killina, Derrybrennan and Lodge.

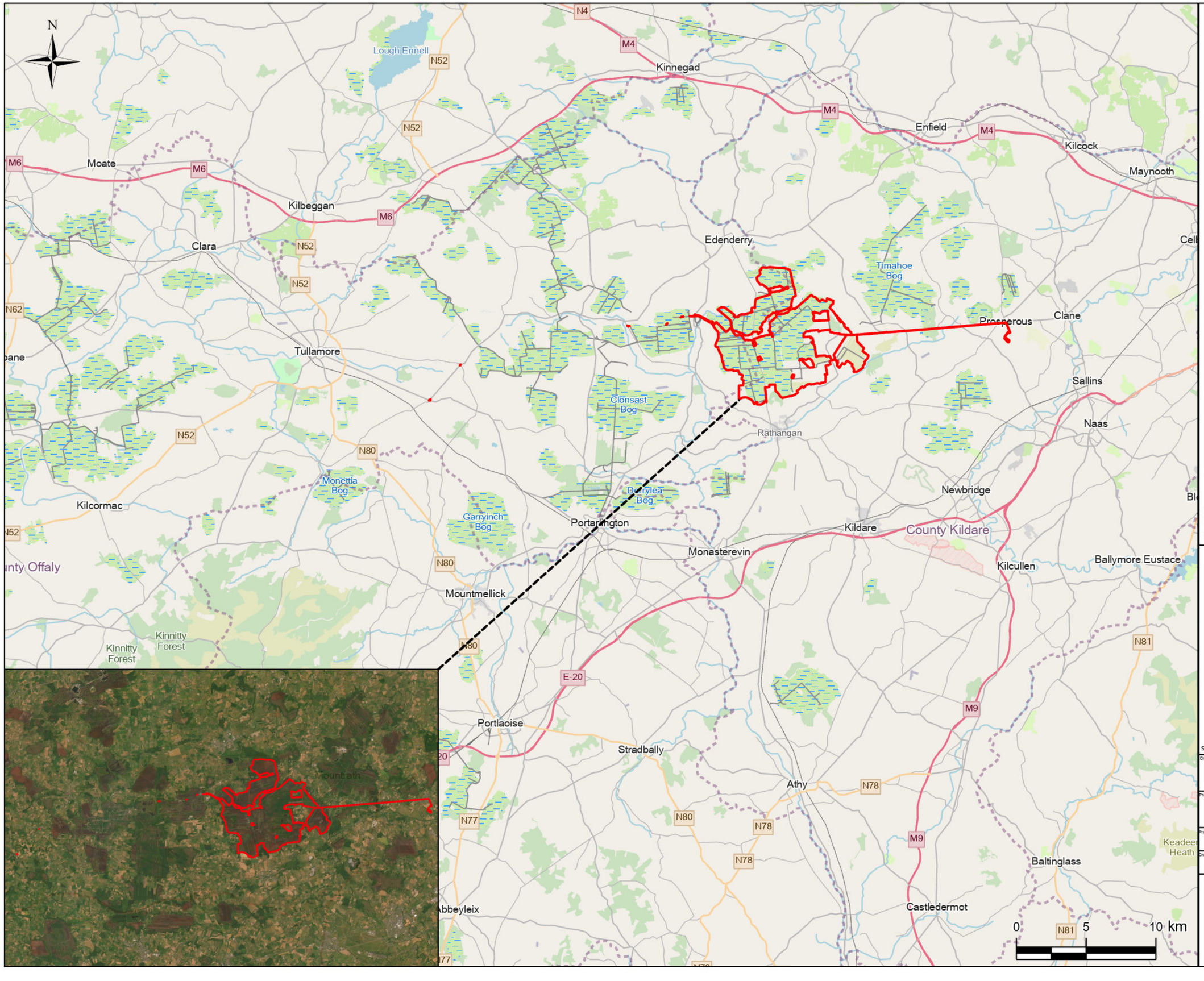
Electricity generated by the Proposed Turbines will be transmitted via underground cables to the Onsite Substation before connecting to the Proposed Offsite Substation through the Proposed Grid Connection. Proposed Grid Connection infrastructure is located within the townlands of Lullymore and Killybegs, Co. Kildare, and adjacent townlands.

The Proposed Turbine Delivery Route will exit the M6 Motorway at Junction 5 (Kilbeggan/Tullamore) and travel via national and regional roads and the internal road network of the existing Cloncreen Wind Farm to access the Proposed Wind Farm.

The Project Site is traversed by a network of existing bog roads and tracks. Access to the Proposed Grid Connection is provided via the surrounding regional and local road network. The Project Site location is shown on Figure 2-1, while a full description of the Proposed Project is provided in Chapter 4 of this EIAR.

Land use within the Project Site comprises natural recolonisation of cutaway and degraded bog, active turbary, scrub, low woodland, remnants of high bog, agricultural grassland, dry meadows and grassy verges, wet grassland, treelines, conifer plantation, public roads and agricultural lands associated with the Proposed Offsite Substation location. The surrounding landscape comprises a mixture of forestry, agricultural land, cutover and cutaway peatland, one-off rural housing, small village settlements, and existing energy infrastructure, including power plants, solar farms, and wind energy developments.

The Proposed Grid Connection underground electrical cabling route extends approximately 13.1km and is located primarily within the public road corridor. Further details of the Proposed Grid Connection are provided in Section 4.4.2 of Chapter 4 and illustrated in Figure 4-3.


N
Lough Ennell
N4
M4
N52
Kinnegad
Enfield
Kilcock
Maynooth
M6
Moate
Kilbeggan
Clara
Edenderry
Timahoe Bog
Prosperous
Clane
Tullamore
N62
N52
N80
Clonsast Bog
Rathangan
Sallins
Naas
Monettia Bog
Kilcormac
Derrylea Bog
Garryinch Bog
Portarlington
Newbridge
Kildare
County Kildare
Monasterevin
Kilcullen
Ballymore Eustace
Mountmellick
Kinnitty Forest
E-20
N81
M9
Portlaoise
Stradbally
Athy
N78
N77
Baltinglass
Castledermot
Abbeyleix
0
5
10 km
Map Legend
Project site
Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator
SITE LOCATION - NOT TO SCALE
Drawing Title
Site Location
Project Title
Ballydermot Wind Farm,
Co. Offaly & Co. Kildare
Project No. 250708
Drawing No. 2-1
Scale 1:250,000
Drawn By BOC
Checked By MOH
Date 11/09/2026
Email: info@mkoireland.ie/ Website: www.mkoireland.ie

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 Proposed Project, was prepared by MKO and circulated to consultees in May 2021 and December 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. A consultation meeting for the Proposed Project was held with An Coimisiún Pleanála on the 12th June 2026, with MKO Bat Ecologists in attendance. Further meetings with An Coimisiún Pleanála were held on 10th March 2026 and 27th August 2026 with MKO Ecologists in attendance. Meetings were also held with the Department of Housing, Local Government and Heritage-Development Applications Unit (NPWS) on 26th May 2026 with MKO Ecologists in attendance. Full consultation and scoping details are outlined in Section 2.8 of Chapter 2 of this EIAR.

Details of consultation responses and meeting topics 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 Project 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 Project and the surrounding region. The results of the desk study including sources of information utilised are provided below.

3.2.1 County Development Plans

The Kildare County Development Plan 2023–2029[1] and Offaly County Development Plan 2021–2027[2] were reviewed to identify any relevant information regarding bats and their conservation within the vicinity of the Proposed Project. The review was undertaken to identify relevant planning policies, objectives and biodiversity considerations relating to the protection of bats and their associated habitats, which may inform the assessment of potential impacts associated with the Proposed Project.

3.2.2 Previous Baseline Survey (2022)

The Proposed Project was previously surveyed by MKO in 2022 to establish baseline bat activity. These baseline surveys comprised a combination of static detector monitoring, manual walked and driven transects, and roost inspections, undertaken in accordance with best-practice guidance available at that time, including SNH, 2019, NatureScot, 2021 and Collins, 2016. 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 and 2026 survey results. Results from the 2022 baseline surveys can be found in Appendix 4 and are summarised in Section 4.2 below.

[1] *Kildare County Development Plan 2023–2029, Available at:* https://kildarecoco.ie/AllServices/Planning/DevelopmentPlans/KildareCountyDevelopmentPlan2023-2029/
[2] *Offaly County Development Plan 2021–2027. Available at:* https://www.offaly.ie/stage-4-final-plan/

3.2.3 Bat Records

Bat Conservation Ireland

On the 15th August a data request was sent to BCI for bat records within a 10 km radius of the Proposed Wind Farm site central point (ITM: X 666166, Y 725624). The 10 km radius is consistent with best-practice guidance for wind farm bat assessments (NatureScot (2021); BCI, 2026). Available bat records were provided by BCI on October 1st, 2026.

National Biodiversity Data Centre

The National Bat Database of Ireland and National Lesser Horseshoe Bat Database of Ireland holds records of bat observations received and maintained by BCI. These records include results of national monitoring schemes, roost records as well as ad-hoc observations. The most recent search on the 30th of September examined bat presence and roost records within a 10km radius of a central point within the Proposed Wind Farm site ((ITM: X 666166, Y 725624) (BCI 2012, Hundt 2012, NatureScot, 2021).

Records from the National Biodiversity Data Centre (NBDC) were also reviewed to identify bat species recorded within the relevant 10 km grid squares (hectads) surrounding the Proposed Wind Farm site.

3.2.4 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 August 2025, Ireland submitted the third assessment of conservation status for Annex-listed habitats and species, including all species of bats (NPWS, 2025).

The 2025 Article 17 Reports were reviewed on the 30th September. They were examined for information on bat species' range and distribution in relation to the location of the Proposed Project. The aim was to identify any high-risk species at the edge of their range (NatureScot, 2021).

3.2.5 Designated Sites

The NPWS map viewer and website provide information on rare and protected species, sites designated for nature conservation and their conservation objectives. On the 30th September a search was undertaken of sites designated for the conservation of bats within a 10km radius of the centre point within Proposed Wind Farm site (BCI 2012, Hundt, 2012, NatureScot, 2021). This included European designated sites, i.e. Special Areas of Conservation (SACs), and nationally designated sites, i.e. Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs).

3.2.6 Landscape Features

3.2.6.1 Ordnance Survey Mapping

Ordnance survey maps (OSI 1:5,000 and 1:50,000) and aerial photographs were reviewed to identify any habitats and features likely to be used by bats. Maps and images of the Proposed Wind Farm site 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.

3.2.6.2 Underground Sites

The Geological Survey Ireland (GSI) online mapping tool and University of Bristol Speleological Society (UBSS) Cave Database for the Republic of Ireland were consulted for any indication of natural subterranean bat sites, such as caves, within 10 km of the centre of the Proposed Wind Farm site (BCI, 2012) (last searched on the 11th of August 2026). Furthermore, the archaeological database of national monuments was reviewed for any evidence of manmade underground structures, e.g. souterrains, that may be used by bats (last searched on the 11th of August 2026).

3.2.6.3 National Biodiversity Data Centre Bat Landscape Mapping

The 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). However, squares highlighted as less favourable may still have local areas of abundance.

The section of the Proposed Wind Farm site was reviewed on the 30th September 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 site. 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 site.

3.2.7 Additional EIAR Projects in the Wider Landscape

A search was conducted to identify permitted, operational and proposed wind energy developments within 15km of the Proposed Turbine locations (BCI, 2026). This search adhered to methodologies outlined in Chapter 2, Section 2.10. The Wind Energy Ireland (WEI) interactive wind map (windenergyireland.com) was reviewed in conjunction with wind farm planning applications from Offaly and Kildare County Councils and An Coimisiún Pleanála. 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 Section 2.10 of Chapter 2 of this EIAR.

3.2.8 Multidisciplinary Surveys

Multidisciplinary walkover surveys were undertaken throughout July and August 2024 and April, May, June, July and August 2026. These comprised systematic site walkovers to ground-truth habitat mapping and inform the baseline ecological assessment of the Project Site.

Habitats were classified in accordance with standard ecological practice, and features of ecological relevance, including watercourses, treelines and structures such as bridges and culverts, were identified. These surveys provided an initial high-level assessment of habitat suitability for fauna, including bats, and informed the design and targeting of dedicated bat surveys.

Dates for multidisciplinary walkover surveys and dedicated bat surveys are provided in Table 3-1.

Table 3-1 Multidisciplinary Survey Effort in 2024 and 2026

Multidisciplinary Survey	Dedicated Bat Survey
16th of July 2024	16th of April 2024
18th of July 2024	1st of May 2024
23rd of July 2024	18th of June 2024
25th of July 2024	16th of July 2024
29th of July 2024	7th of August 2024
13th of August 2024	12th of September 2024
11th of September 2025	23rd September 2024
18th of September 2025	22nd April 2026
17th of December 2025	7th May 2026
13th of May 2026	16th June 2026
14th of May 2026	6th July 2026
19th of May 2026	20th July 2026
20th of May 2026	5th August 2026
26th of May 2026	13th August 2026
27th of May 2026	18th August 2026
6th of July 2026	31st August 2026
1st September	16th September 2026
2nd September	22nd September 2026

3.3 Field Surveys

3.3.1 Bat Habitat Suitability Appraisal

Targeted bat habitat suitability surveys were undertaken throughout 2024 and 2026. These surveys focused on assessing habitats and features within the Project Site for their potential to support roosting, foraging and commuting bats. Surveys were carried out on the Proposed Wind Farm, the Proposed Enhancement Areas (i.e., Lodge Bog Enhancement and Killina Bog Offsetting Area [3] as defined in the BMP (Appendix 6-5)), the Proposed Grid Connection and the Proposed Turbine Delivery Route accommodation areas.

Particular attention was given to features with roost potential, including trees, structures and watercourse crossings, as well as linear features that may function as commuting routes. A precautionary 200m survey buffer, in consideration of Bat Conservation Ireland (BCI, 2026) was applied around all the Proposed Turbines and associated hardstands, internal site access roads, substation infrastructure and sections of the Proposed Turbine Delivery Route, wherever land access was available. While access could not be obtained to some areas of private land, primarily along limited sections of access roads and the Proposed Turbine Delivery Route works, these areas were assessed remotely using recent high-resolution aerial imagery and available site information. Connectivity with the wider landscape was also considered.

Assessment was undertaken in accordance with the criteria set out in Collins (2023), which provides a standardised approach to classifying bat roost potential and the suitability of habitats for foraging and commuting. Habitats were assigned to one of the following categories *High*, *Moderate*, *Low*, *Negligible* or *None*, as described in **Appendix 1**.

[3] *The Lodge Bog Enhancement and Golden Plover Offsetting Area in Killina underwent dedicated bat detector surveys as there are no Proposed Turbines in these locations. All other Proposed Enhancement Areas have been sufficiently covered following the deployment of bat detectors for the Proposed Wind Farm site.*

3.3.2 Roost Surveys

Daytime Roost Inspections

A search for roosts was undertaken within 200 m plus the rotor radius (i.e. 85 m) of the Proposed Turbines, giving a total search radius of 285 m (NatureScot, 2021). A 200m precautionary search area was also applied around all Proposed Project infrastructure, wherever land access was available. The aim was to determine the potential presence of roosting bats and the need for further survey work or mitigation. The Project Site was visited in April, May, June, July, August and September 2024, along with visits in April, May, June, July, August and September 2026. 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 1** for roost assessment criteria).

Watercourse, drain and culvert crossing infrastructure along the Proposed Grid Connection underground electrical cabling route was also assessed for any suitability to host roosting bats. Surveys were carried out on the 15th of July 2024, 20th July and 22nd September 2026 and comprised a detailed inspection of existing infrastructure to look for evidence of bat use.

Any potential tree roosts within 285m of the Proposed Turbines, within or adjacent to the Proposed Enhancement Areas (i.e., Lodge Bog Enhancement area and Killina Bog Offsetting Area), proposed internal site access roads, the Proposed Onsite Substation, and Proposed Offsite Substation were examined for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

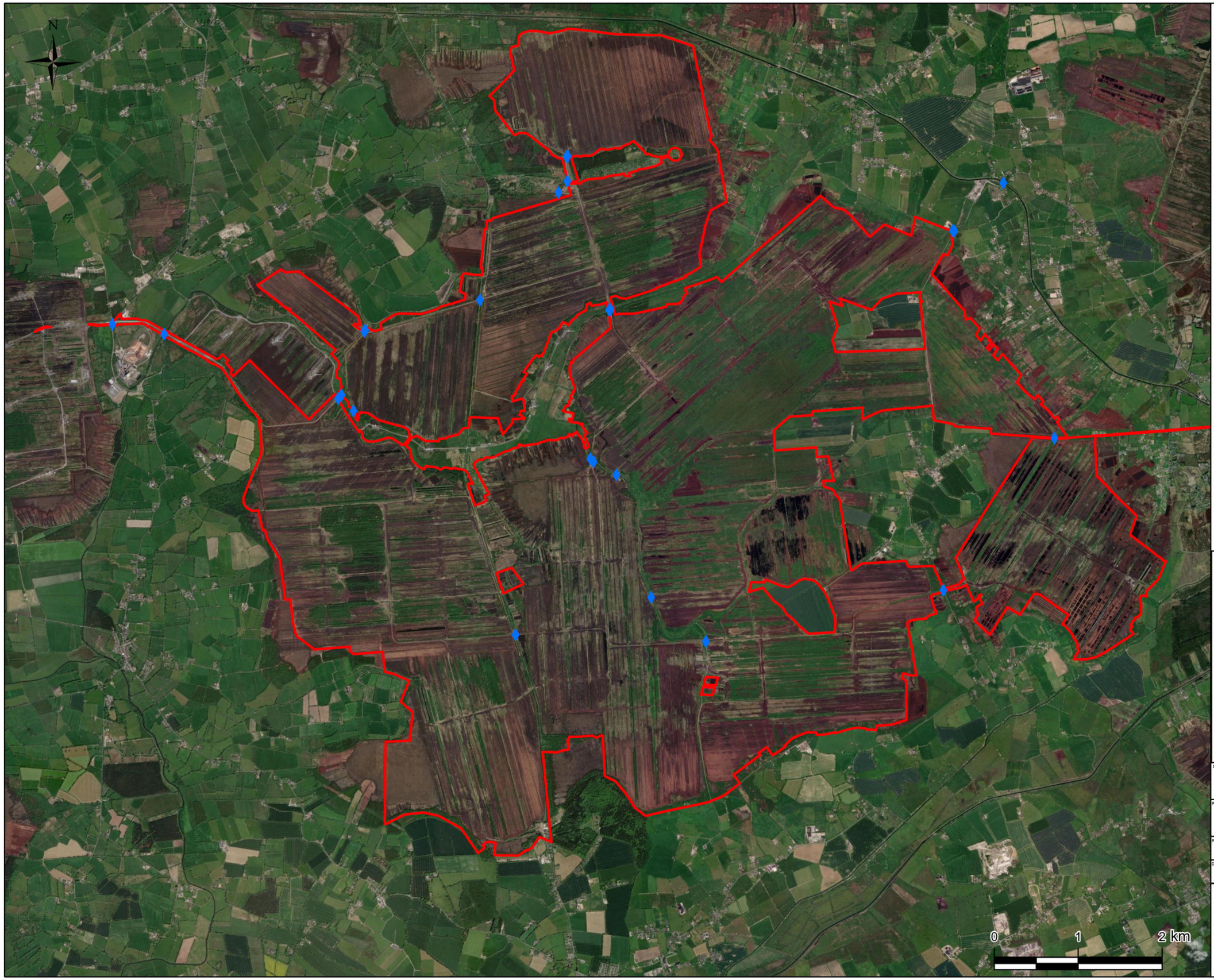
There were 35 structures identified within the Proposed Wind Farm site. Of these, no structures were identified within 285m turbine roost-search buffer. The structures identified within the Proposed Wind Farm site were subject to a daytime roost assessment comprising a detailed inspection of their interiors and exteriors for evidence of bat use, including live or dead bats, droppings, feeding remains, urine splashes, fur-oil staining and audible bat sounds. Structures inspected are presented in Figure 3-1

Targeted GLTAs were undertaken of trees potentially affected by the Proposed Project, including trees within or adjacent to the Proposed Wind Farm, Proposed Grid Connection, Proposed Turbine Delivery Route accommodation works areas and Proposed Enhancement Areas (i.e., Lodge Bog Enhancement area and Killina Bog Offsetting Area). Particular emphasis was placed on trees requiring felling, pruning or other works.

All other trees scheduled for felling, pruning or trimming were systematically inspected for rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and other PRFs, in accordance with Collins (2023) and informed by Andrews (2018).

Inspections were undertaken from ground level using a high-output torch, thermal imaging camera and endoscope, with ladder access used where required to facilitate closer inspection of features at height. No tree climbing or aerial inspection by an arborist was undertaken as all features were considered to be accessible and adequately assessed from ground level.

Structures and trees were assessed for their roosting potential during the survey period. None were assessed as having roosting suitability or potential roosting features suitable to support roosting or hibernating bats: therefore, no emergence/re-entry surveys or targeted hibernation surveys were needed and were not carried out.



Map Legend

Project Site

PRF Structures

Bridges

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

PRF Structure Locations

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	3-1	1:42,000
Drawn By	Checked By	Date
BOC	MOH	28/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

3.3.3 Manual Surveys

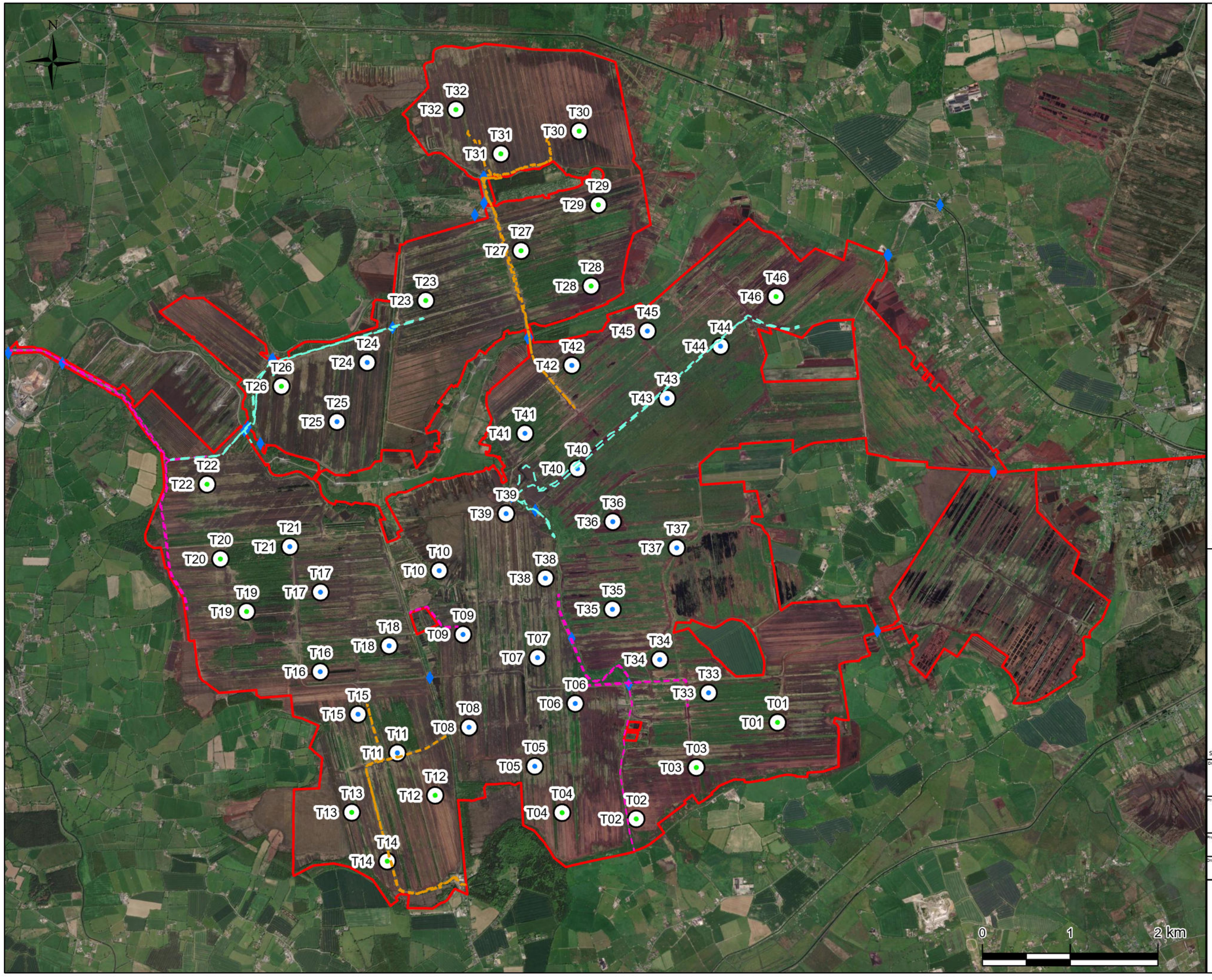
3.3.3.1 Manual Transects/ Night-time Bat Walkover 2024

Manual activity surveys carried out in 2024 comprised walked transects after dusk (night-time bat walkover). A series of representative transect routes were selected throughout the Proposed Wind Farm. The aim of these surveys was to identify bat species using the Proposed Wind Farm and gather any information on bat behaviour and important features used by bats. Transect routes were prepared with reference to the Proposed Wind Farm 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 3-2.

Transects were walked in two groups of two surveyors each, recording bats in real time. Transects 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 3-2 summarises survey effort in relation to manual transects.

Table 3-2 Survey Effort - Manual Transects 2024

Date	Surveyors	Sunrise/ Sunset	Survey Type	Time	Weather	Transect (km) – approx.
16th April 2024	Kate Greaney & Fred Mosley	20:31	Walked Transect	20:31 – 23:31	7-8˚C, dry, calm, 50 % visible, 0% cloud cover	12.1 km
16th April 2024	Ryan Connors & Charlie Meehan	20:31	Walked Transect	20:31 – 23:31	7-8˚C, dry, calm, 50 % visible, 0% cloud cover	8.8 km
18th June 2024	Kate Greaney & Ryan Connors	21:59	Walked Transect	21:59 – 00:59	15-11˚C, Dry, Calm, Moon not visible, 80-90% Cloud	14.4 km
18th June 2024	Fred Mosley & Charlie Meehan	21:59	Walked Transect	21:59 – 00:59	13-11˚C, Dry, Calm, 90% visible, 70-40% cloud	12.1 km
12th September 2024	Kate Greaney & Ryan Connors	19:50	Walked Transect	19:50 – 22:50	13-7 ˚C, Calm-Light Breeze, 60% Moon, 10-5% Cloud	11.3 km
12th September 2024	Fred Mosley & Laura McEntegart	19:50	Walked Transect	19:50 – 22:50	13-7 ˚C, Calm-Light Breeze, 60% Moon, 10-5% Cloud	13.9 km



Map Legend

- Project Site
- Turbine Layout
  - 220
  - 200
- Spring Transect Routes - 2024
- Autumn Transect Route - 2024
- Summer Transect Route - 2024
- PRF Structures
  - Bridges

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title
Survey Effort 2024

Project Title
Ballydermot Wind Farm,
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	3-2	1:40,000
Drawn By	Checked By	Date
BOC	MOH	11/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

3.3.3.2 Manual Transects/ Night-time Bat Walkover 2026

Targeted manual activity surveys carried out in 2026 comprised walked transects after dusk (night-time bat walkover). A series of representative transect routes were selected throughout the Proposed Wind Farm site. The aim of these surveys was to identify bat species using the Proposed Wind Farm site and gather any information on bat behaviour and important features used by bats. Transect routes were prepared with reference to the Proposed Wind Farm 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 2026 are presented in Figure 3-3.

Transects were carried out by two surveyors, recording bats in real time. Transects 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 2026. Table 3-3 summarises survey effort in relation to manual transects.

Table 3-3 Survey Effort - Manual Transects 2026

Date	Surveyors	Sunrise/ Sunset	Survey Type	Time	Weather	Transect (km) – approx.
22nd April 2026	Tim Murphy & Saoirse Fitzsimons	20:40	Night-time Bat Walkover	20:40 – 22:45	10-12 °C, Calm, 30% Moon, 50% Cloud	6.74km
5th August 2026	Amy Moriarty & Saoirse Fitzsimons	21:16	Night-time Bat Walkover	21:28 – 23:46	12-17 °C, Calm – Light Breeze, Moon Not Visible, 50-80% Cloud	6.19km
31st August 2026	Alice Twiss & Sophie Moore	20:49	Night-time Bat Walkover	20:49 – 22:49	17-19 °C, Light Drizzle, Calm, Moon Not Visible, 100% Cloud	5.19km

3.3.4 Vantage Point Surveys

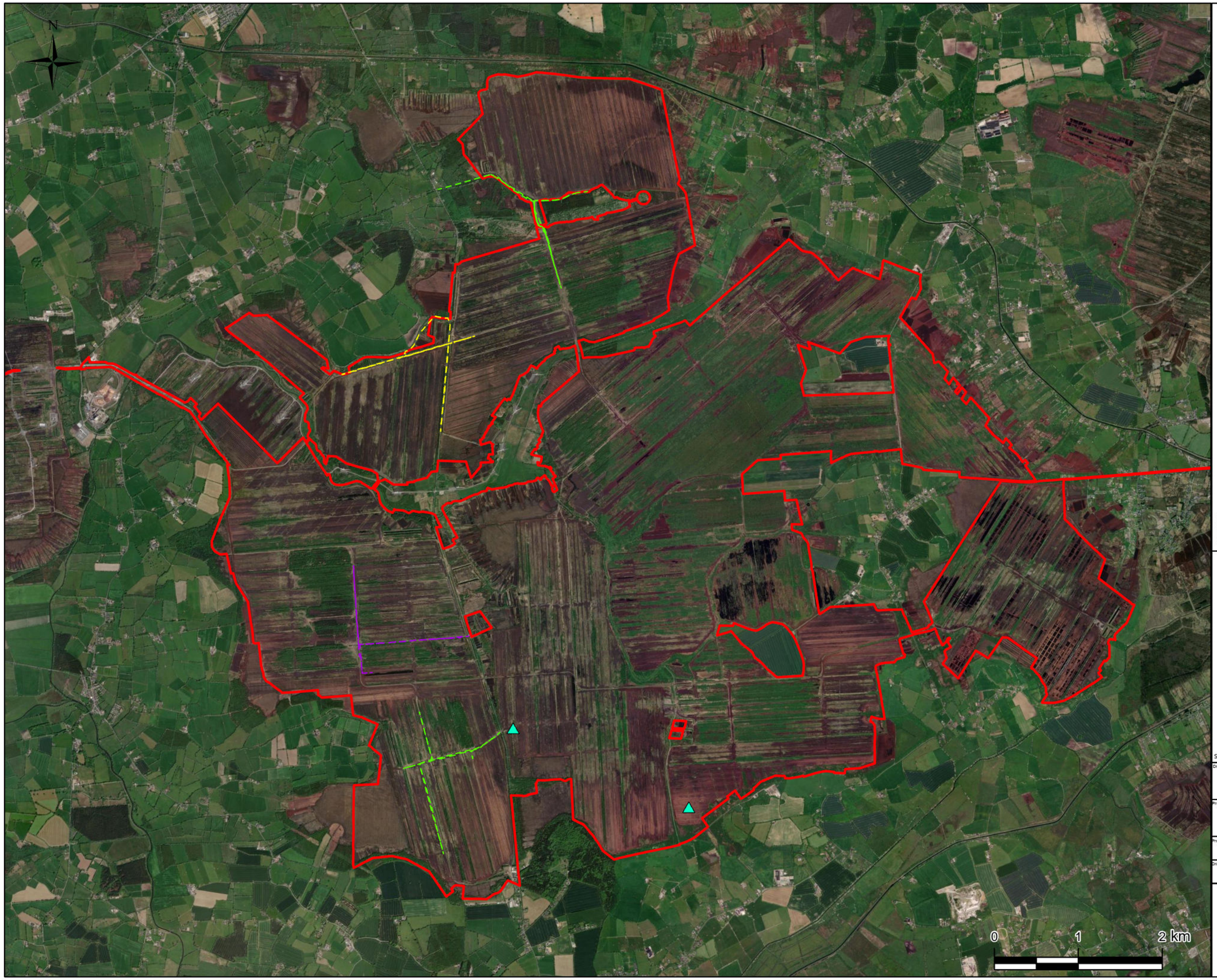
Stationary vantage point surveys (VP's) were carried out in the summer and autumn seasons of 2026. These surveys were carried out specifically to observe the high-altitude flight behaviour of Leisler's bat.

Due to the uniformity of the topography and habitats present across the proposed project site, VP survey locations were randomly selected, and surveys were carried out to obtain sample of flight heights and a sample data set of the bat species recorded. VPs were carried out in areas with an unobstructed view of the selected proposed turbine airspace. Each survey lasted a minimum of 2 hours covering the peak bat emergence period after sunset. Surveyors were equipped with active full spectrum bat detectors, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland), and Pixfra Arc – PFI A613 Night Vision Aids (NVA's) during the surveys. Recorded bat activity was analysed alongside thermal recordings to confirm species identifications and to identify individual bat flight behaviours, patterns and heights (BCI, 2026). Table 3-4 summarises survey effort in relation to vantage point surveys.

Table 3-4 Survey Effort – Vantage point surveys

Date	Surveyors	IG Reference	Time	Weather	Turbine View Shed
5th August 2026	Tim Murphy & Sophie Moore	N 68089 22341	21:16 – 23:16	12-17 °C, Calm – Light Breeze, Moon Not Visible, 50-80% Cloud	T2

31st August 2026	Tim Murphy & Amy Moriarty	N 66010 23310	20:49 – 22:49	17-19 °C, Light Drizzle, Calm, Moon Not Visible, 100% Cloud	T8



Map Legend

- Project Site
- Vantage Point Surveys
- Spring Transect Route
- Autumn Transect Route
- Summer Transect Route

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

Survey Effort 2026

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	3-3	1:42,000
Drawn By	Checked By	Date
BOC	MOH	28/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

3.3.5 Ground-level Static Surveys

3.3.5.1 Proposed Wind Farm – 2024 Surveys

The ground-level static surveys methodology followed the most recent recognised industry best practice i.e. NatureScot's '*Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation'* (NatureScot, 2021). This allowed for a robust approach to the surveys and assessment undertaken in the bat impact assessment. Where developments have less than 10 turbines, NatureScot requires 1 detector per turbine (up to 10 plus 1 detector for every 3 additional turbines). As 46 no. turbines are proposed, 22 detectors were deployed to ensure compliance with NatureScot guidance. Automated bat detectors were deployed for at least 10 nights in spring (April-May), 20 nights of summer (June-August) and 10 nights of autumn (mid-September - end September) (NatureScot, 2021/NIEA, 2021). Detector locations were based on indicative turbine locations. Figure 3-4 presents static detector locations in relation to the final proposed layout. Static detector locations are described in Table 3-5. The static detector locations achieved a good spatial spread in relation to the proposed turbines and sampled the range of available habitats.

With regard to the DAU response (see Section 4.1 below) highlighting that '*it is more appropriate to use 30-day survey periods with static automated detectors*'; this information is based on an online webinar '*Patterns of Bat Activity at Upland Windfarms: Implications for Sampling and Mitigation*' (CIEEM, 2020). 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 the optimum efficiency is*'. The information presented has not been published and the speaker states that '*there have been meetings to review the guidance*' (i.e. SNH, 2019/NatureScot, 2021). 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*'.

Following the release of NatureScot 2021 guidance, the minimum ground level static survey requirement is 30 nights of surveys in optimal weather conditions spread across the spring, summer and autumn period. Alternative guidance from NIEA NED builds on this and sets minimum site requirements based on perceived site risk:

- Low Risk Site - 30 Nights
- Medium Risk Site - 30 Nights + 10 extra in summer and other peak periods.
- High Risk Site - 30 Nights + 20 extra in summer and other peak periods.

The surveys undertaken at the Project Site are fully in line with the industry best practice (NatureScot, 2021) and a comprehensive assessment was achieved. Overall, 53 nights of surveying was carried out, 51 of which were in suitable weather conditions (Table 3-6).

Table 3-5 Ground-level Static Detector Locations 2024

ID	Location (IG Ref)	Habitat	Linear Feature within 50m	Corresponding/ Nearest Proposed Turbine(s)
D01	N 66018 30399	Cutover bog (PB4), Scrub (WS1)	Scrubby hedgerow and drainage ditch	T46
D02	N 67354 30115	Cutover bog (PB4)	Drainage ditch	T45
D03	N 67507 28373	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	T42
D04	N 65605 28222	Cutover bog (PB4)	None	T41
D05	N 64078 25467	Cutover bog (PB4)	Scrub to the SW, immature treeline to north, drainage ditch	T2

D06	N 63887 27343	Cutover bog (PB4), Scrub (WS1)	Scrub/small hedgerow to East, drainage ditches	T38
D07	N 63059 26166	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	T1
D08	N 63570 24646	Cutover bog (PB4)	Edge of woodland	T4
D09	N 64360 24053	Scrub (WS1)	Immature treeline, small hedgerow and drainage	T6
D10	N 66066 24404	Cutover bog (PB4)	Drainage ditches	T20
D11	N 65309 23028	Cutover bog (PB4), Scrub (WS1)	Edge of woodland	T9
D12	N 65172 21805	Cutover bog (PB4)	Treeline and scrub, drainage ditch	T12
D13	N 68509 25390	Conifer plantation (WD4), Bog woodland (WN7)	Drainage, cutover bog	T24
D14	N 69624 23386	Cutover bog (PB4)	Drainage, scrub, small hedgerow	T15
D15	N 68292 24111	Cutover bog (PB4)	Drainage, scrub	T26
D16	N 68010 22324	Cutover bog (PB4)	Cutover bog, treeline, artificial road surface	T17
D17	N 66819 22894	Cutover bog (PB4)	Treeline and scrub, drainage ditch	T19
D18	N 66983 25035	Cutover bog (PB4)	Drainage ditch, scrubby hedgerow to West	T22
D19	N 67341 26284	Eroding blanket bog (PB5)	Scrub to East and SE, drainage ditches	T30
D20	N 67260 27509	Treelines (WL2), Bog woodland (WN7)	Cutover bog, drainage, scrub	T32
D21	N 68967 27677	Cutover bog (PB4)	Immature woodland/scrub, drainage	T35
D22	N 70423 28418	Cutover bog (PB4)	Scrub and drainage ditches	T37

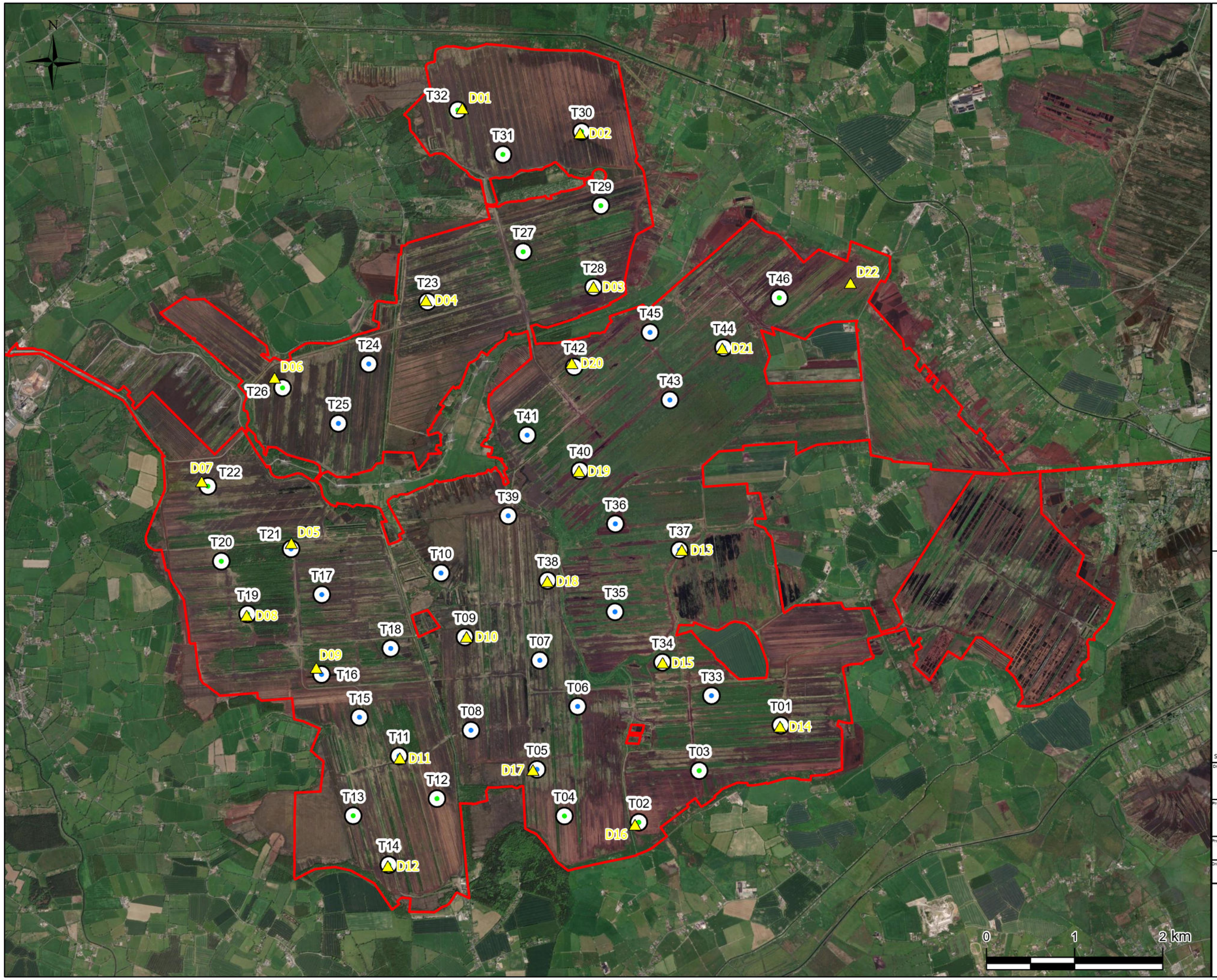
Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were employed using settings recommended for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset 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 5m/s and no or only very light rainfall). Table 3-4 summarises survey effort achieved in 2024 for each of the detector locations.

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

Season	Survey Period	Total Survey Nights per Detector Location	Nights with Appropriate Weather
Spring 2024	16th April – 30st April 2024	15	14
Summer 2024*	18th June – 14th July 2024	27	26
Autumn 2024	12th September – 22nd October 2024	11	11
Total Survey Effort		**53**	**51**

**In the Summer of 2024, D06 was redeployed from the 16th July until the 7th August (21 nights, all of which had appropriate weather)*



Map Legend

- Project Site
- Turbine Layout
  - 220
  - 200
- Static Detector Locations 2024

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title
Static Detector Locations 2024

Project Title
Ballydermot Wind Farm,
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	3-4	1:40,000
Drawn By	Checked By	Date
BOC	MOH	11/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

3.3.5.2 Proposed Enhancement Area – Lodge Bog Enhancement and Killina Bog Offsetting Area– 2026 Surveys

Two automated bat detectors were deployed within the Lodge Bog Enhancement area and two automated bat detectors were deployed within the Killina Bog Offsetting Area in 2026 for at least 10 nights in spring (April-May), 20 nights of summer (June-August) and 10 nights of autumn (mid-September - end September) (NatureScot, 2021/NIEA, 2021). Detector locations were selected to achieve appropriate spatial coverage of the Areas. Static detector locations are described in Table 3-7. The static detector locations achieved a good spatial spread in relation to the Lodge Bog Enhancement area and the Killina Bog Offsetting Area and sampled the range of available habitats.

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.

Table 3-7 Ground-level Static Detector Locations on the Lodge Bog Enhancement area and the Killina Bog Offsetting Area in Killina Bog

ID	Location (IG Ref)	Habitat	Linear Feature within 50m	Bog Location
D01	N 71657 26670	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	Killina Bog
D02	N 71027 27324	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	Killina Bog
D03	N 71937 25635	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	Lodge Bog
D04	N 72281 25000	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	Lodge Bog

Table 3-8 2026 Survey Effort - Ground-level Static Surveys within the Lodge Bog Enhancement area and the Killina Bog Offsetting Area in Killina Bog

Season	Survey Period	Total Survey Nights per Detector Location	Nights with Appropriate Weather
Spring 2026	22nd April – 7th May 2026	15	15
Summer 2026	16th June – 6th July 2026	20	20
Autumn 2026	18th August – 31st August 2026	13	10
Total Survey Effort		**48**	**45**

665000

670000

730000

725000

N

T32 D01
T30 D02
T31
T29
T27
T28 D03
T23 D04
T46 D22
T45
T44
D21
T42 D20
T24
T26 D06
T25
T43
ADD D02
T41
ADD D01
T40 D19
T22 D07
T39
T36
T37 D13
ADD D03
T20
T21 D05
T10
T38 D18
T17
T35
ADD D04
T19
WEATHER STATION
T18
T09 D10
T07
T34 D15
T16 D09
T33
T06
T15
T08
T01
T11 D11
T05 D17
T03
T12
T13
T04
T02 D16
T14 D12

0 1 2 km

665000

670000

Map Legend

Project Site

Turbine Layout

220

200

Static Detector Locations 2026

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

N

SITE LOCATION - NOT TO SCALE

Drawing Title
Static Detectors Locations 2026

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	3-5	1:40,000
Drawn By	Checked By	Date
BOC	MOH	15/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

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 Project Site. 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, 2012) to manually verify species identification. All recordings were manually reviewed in Kaleidoscope to determine the final species identification.

Myotis species potentially including Daubenton's bat (*Myotis daubentonii*), whiskered bat (*Myotis mystacinus*) and Natterer's bat (*Myotis nattereri*) were classified as a single *Myotis* spp. group, due to the recognised difficulty in reliably distinguishing these species based on echolocation parameters alone (Russ, 2012). The echolocation calls of soprano pipistrelle (*Pipistrellus pygmaeus*) and common pipistrelle (*Pipistrellus pipistrellus*) are more readily distinguished based on peak frequency of maximum energy in search-phase calls (approximately 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 SM4BAT static bioacoustics recording device. The recordings are illustrated using Wildlife Acoustics Kaleidoscope software.

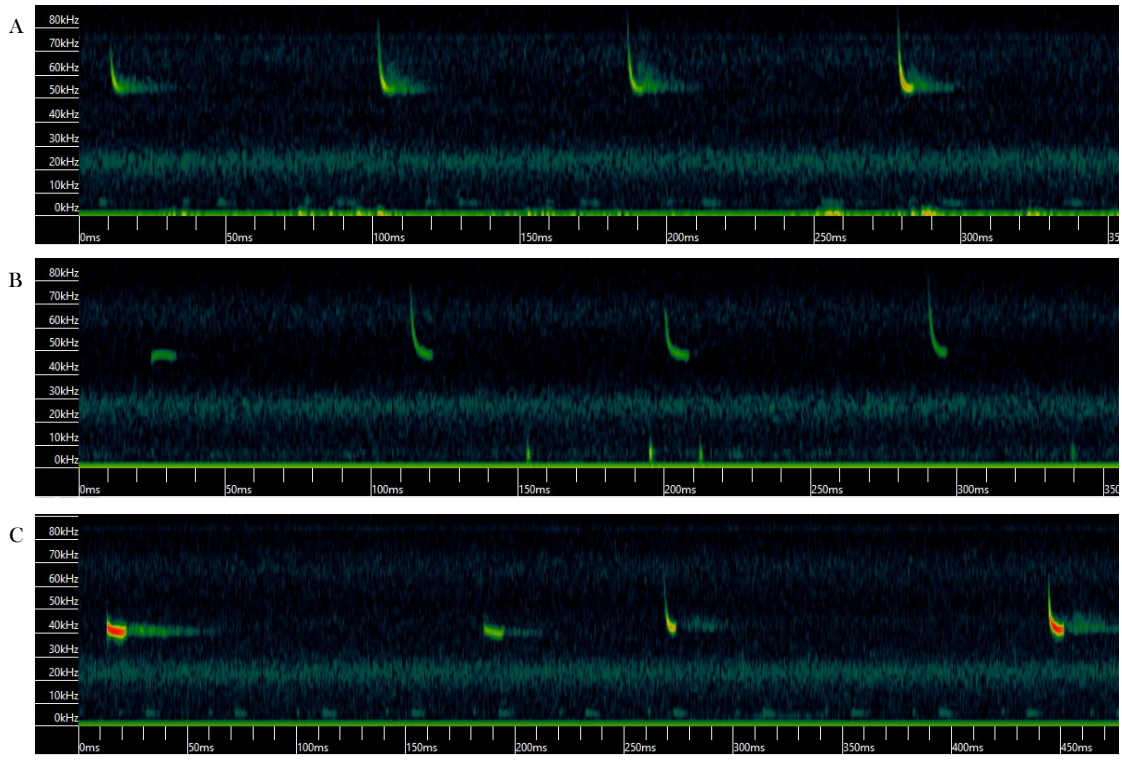


Plate 3-1 Spectrogram of echolocation pulses of (A) Soprano pipistrelle (Peak Frequency 55kHz), (B) Common pipistrelle (Peak Frequency 45kHz) and (C) Nathusius' pipistrelle (Peak Frequency 39kHz).

Echolocation calls produced by brown long-eared bats (*Plecotus auritus*) are intrinsically low in amplitude and therefore more difficult to detect using static acoustic equipment, while calls produced by lesser horseshoe bats (*Rhinolophus hipposideros*) are highly directional and may be missed by detectors, particularly during manual surveys. To reduce the potential for under-recording of the latter species, MKO deploys omni-directional microphones as part of the acoustic survey methodology.

Manual verification of recorded data also included the review of files classified by Kaleidoscope as 'Noise' and 'No ID'. This approach ensures that calls from quieter or more difficult-to-detect species are not overlooked during automated processing. Despite this additional level of scrutiny, some degree of underrepresentation is still expected for these species, and this limitation has been taken into account in the interpretation of activity levels and subsequent assessment.

Plate 3-2 illustrates typical spectrograms of echolocation pulses for *Myotis* spp., brown long-eared bat and Leisler's bat, as well as an example of a non-bat noise file, all recorded using an SM4BAT static bioacoustics recording device and displayed within Wildlife Acoustics Kaleidoscope software.

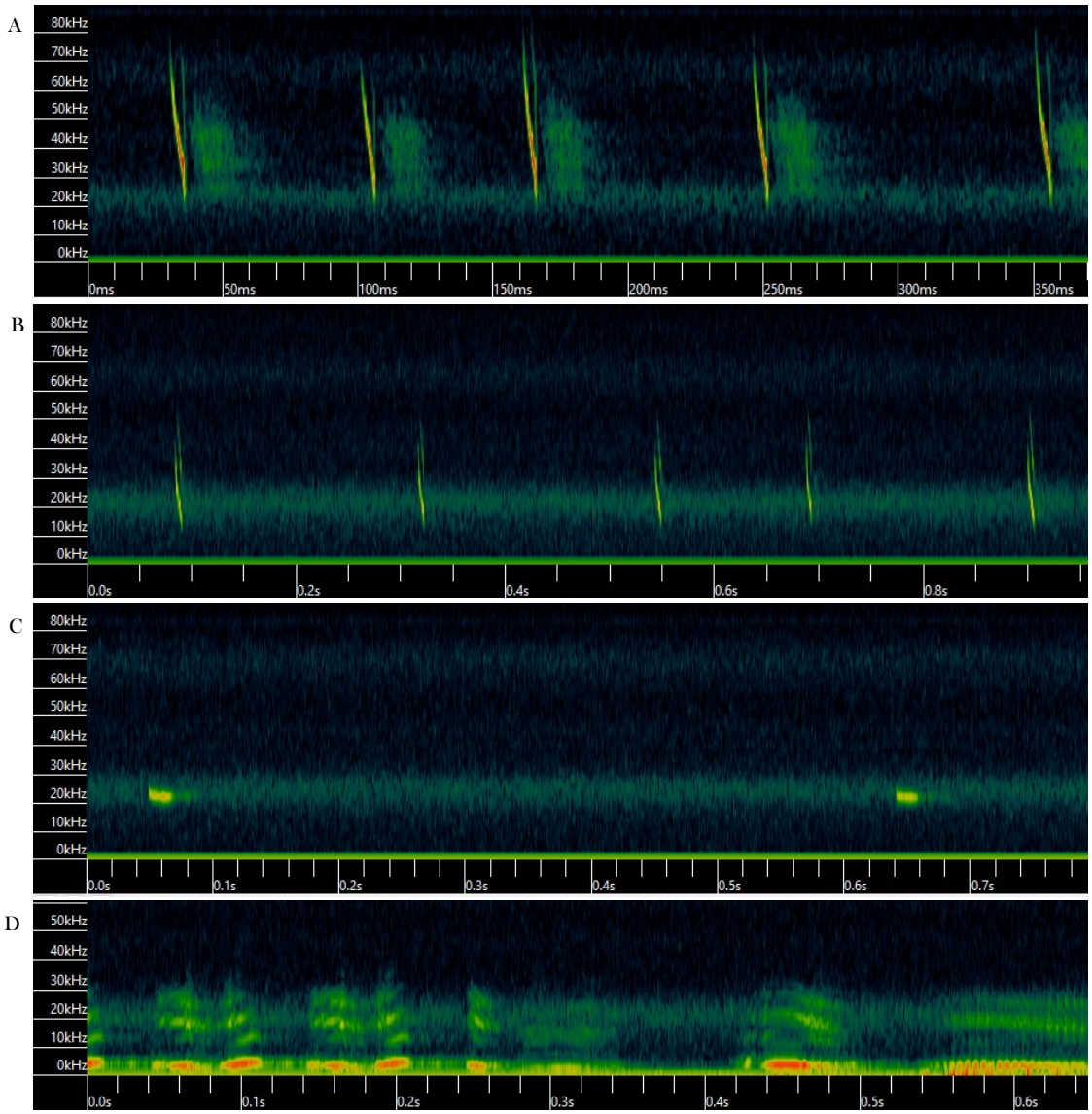


Plate 3-2 Spectrogram of typical echolocation pulses of (A) Myotis spp., *(B) Brown long-eared bat, (C) Leisler's bat and (D) typical non-bat sounds.*

Individual bats of the same species cannot be distinguished using echolocation alone; therefore, 'bat passes' were used as a measure of activity (Collins, 2023). A bat pass was defined as a recording of an individual species or species group's echolocation sequence containing at least two pulses and of a maximum duration of 15 seconds. All bat passes recorded during the surveys were classified in accordance with these criteria, allowing consistent comparison across survey periods and locations.

In some instances, more than one bat pass occurred within a single recording file. In such cases, the final species classification assigned to the file was based on the rarer or more difficult-to-detect species

present. This precautionary approach minimises the risk of under-representing less frequently encountered taxa within multi-pass recordings. This conservative treatment ensures that activity levels are not biased towards more common, highly detectable species and supports a precautionary interpretation of potential impacts within the Environmental Impact Assessment Report.

3.5 Assessment of Bat Activity Levels

Data Processing and Standardisation

Following automated classification and full manual verification using Kaleidoscope Pro, statistical analysis and data visualisation were undertaken using RStudio (version 2025.05.0+496) and R (version 4.4.2). RStudio, an integrated development environment for the R programming language, was employed for data cleaning, standardisation, exploration and visualisation. Bat activity was standardised to bat passes per hour (bpph), calculated as the total number of bat passes per night divided by the duration of each recording period, to account for seasonal variation in night length (Matthews *et al.*, 2016). As bat activity is inherently variable between survey nights, the median nightly bpph was used as the primary measure of activity at each detector location (Lintott & Mathews, 2018), with maximum nightly values used to characterise peak activity. During all calculations, values were rounded to three decimal places. When visualising seasonal activity patterns, survey effort was defined as total detector hours (i.e. the cumulative recorded hours across all detectors within a season) to account for any variation in deployment effort.

Derivation of Site-Specific Activity Thresholds

The methodology used to assess activity levels across the Proposed Wind Farm 2024 ground level static survey data was adapted from Matthews *et al.* (2016). For widespread species (*Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*, *Nyctalus leisleri*), activity ranges were determined using the average of the maximum nightly bat pass rate (bpph) across all detectors, divided into quartiles. For all other species groups (*Myotis* spp., *Plecotus auritus* and *Pipistrellus nathusii*), the maximum nightly bat pass rate (bpph) recorded across all detectors, divided into quartiles, was used.

Median and maximum nightly activity (bpph) at each detector location were categorised as Low, Moderate or High for each recorded season. Figures below 25% of the maximum or mean maximum nightly pass rate were classified as Low activity, while values above 75% were classified as High activity. Values falling between these two quartiles were defined as Moderate activity. To avoid distortion of thresholds, statistical outliers were identified using box-and-whisker plots and excluded prior to final threshold calculation. The resulting site-specific activity thresholds for each species group are presented in Table 3-9.

Table 3-9 The 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.	*Nyctalus leisleri*	*Nathusius' pipistrelle*	*Pipistrellus spp.*	*Brown long-eared bat*
Low	< 0.70	< 1.95	< 0.40	< 3.50	< 0.18
Medium	0.70 – 2.10	1.95 – 5.86	0.40 – 1.20	3.50 – 10.49	0.18 – 0.53
High	> 2.10	> 5.86	> 1.20	> 10.49	> 0.53

Site-Specific Ranked Activity Scoring (1–5 Risk Scale)

A weighted site-specific activity score was also calculated for each detector and season. This method integrates the relative contribution of Low, Moderate and High activity records using a weighted mean approach, where numeric weights of 1 (Low), 2 (Moderate) and 3 (High), were applied to the number of records falling within each activity class. The weighted mean score was then rescaled and converted

into a five-tier ranked activity scale, as shown in Table 3-10. This approach ensures that detectors with a higher proportion of moderate and high activity records receive proportionately higher ranked scores, rather than relying solely on maximum values. This ranked system provides a five-class site-specific activity framework aligned in terminology with commonly used bat activity classifications but is derived entirely from absolute site-specific bpph values rather than from regional percentile comparison. These ranked scores are applied within the subsequent collision risk and impact assessment to provide a consistent and transparent basis for comparative risk evaluation across detector locations and seasons.

Table 3-10 Site-specific ranked bat activity intensity classes for risk assessment use

Ranked Score	Bat Activity Class
1	Low
2	Low – Moderate
3	Moderate
4	Moderate – High
5	High

A site-specific activity threshold approach was adopted for this assessment in preference to reliance on third-party percentile-based tools, as it allows full transparency, reproducibility and long-term comparability of results. While regional benchmarking tools provide useful contextual summaries, they do not provide access to the underlying comparator datasets, thereby limiting independent interrogation and re-analysis of results. In contrast, the use of absolute bat pass rates (bpph), median and maximum values, together with weighted activity scoring and graphical outputs, enables clear spatial and species-specific interpretation of activity patterns in direct relation to detector locations, habitats and turbine layout.

This approach also ensures that the current baseline dataset remains fully future-proofed and directly comparable with any future post-construction or long-term monitoring datasets, independent of changes in third-party platforms, reference databases or classification algorithms. For these reasons, the site-specific approach is considered the most robust and appropriate method for informing turbine-scale impact assessment and mitigation design for the Proposed Project.

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 3-11, 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 2025 Article 17 reports (NPWS, 2025). Feeding and commuting behaviours, and habitat preferences for bat species in Ireland were also considered.

Table 3-11 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 proposed 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 3-12) i.e. Table 3a (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 Project Site. All site assessment levels, as per NatureScot (2021) are presented in **Appendix 2**.

Table 3-12 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 assessment of risk was made by combining the Project Site risk level (i.e. Medium) and the population risk (i.e. Ecobat bat activity outputs), as shown in the overall risk assessment matrix table (Table 3-13) i.e. Table 3b (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 3**).

Table 3-13 Overall Risk Assessment Matrix (Table 3b, NatureScot (2021).

	Ecobat activity category					
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 3-11 above).

3.7 Limitations

A comprehensive suite of bat surveys has been undertaken at the Project Site in 2024 and 2026 with additional supplementary surveys carried out in 2022. The surveys undertaken at the Project Site are in accordance with NatureScot Guidance and provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Project on bats receptors.

The information provided in this report accurately and comprehensively describes the baseline environment; provides an accurate prediction of the likely potential 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

A scoping consultation exercise was undertaken in May 2021 and in December 2025 to inform ecological survey requirements and the assessment of potential impacts associated with the Proposed Project.

Bat Conservation Ireland

BCI was invited to provide feedback on the potential impacts of the Proposed Project on bats. In their response, received on 2nd February 2021, BCI stated that they do not have the administrative capacity to comment on individual planning proposals. However, they emphasised that all bat surveys should adhere to best practice guidelines for surveying, mitigation, and monitoring. They also highlighted the importance of acquiring bat records, in line with the methodology outlined in Section 3.2.1. No response was received from the scoping exercise carried out in 2025.

Department of Housing, Local Government and Heritage – Development Applications Unit (DAU)

The DAU were also invited to provide any feedback, comments or suggestions they might have relating to the Proposed Project. The full details of the scoping and consultation exercise are described in Chapter 2 of the main EIAR. A response was received from the Department of Housing, Local Government and Heritage on the 4th of August 2021, which included the following recommendations relating to bats:

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

1. *During the desk study include a search of records from the NBDC, for both common and rare species which occur in the area.*
2. *Include a month-long, static bat detector deployment during the month of August, following the findings of Scottish Power research into bat usage on their windfarms.*
3. *Examine the effects of any necessary lighting on wildlife during construction as well as operation phases and include mitigation to reduce or eliminate it.*

Recommendations outlined by the DAU were fully considered in this assessment. A further response was received on the 21st of January 2026. This response did not include any additional recommendations relating to bats.

National Parks and Wildlife Service

Representatives of the Project Team met with representatives of the NPWS on 26th of May 2026 to discuss the Proposed Project and the ecological assessments undertaken for the EIAR. The discussion focused primarily on peatland habitats, habitat assessment methodologies and ecological mitigation measures associated with the Proposed Project. The level of bat activity and the proposed mitigation measures were queried during the discussion and it was confirmed that the level of bat activity was being assessed and that mitigation measures in line with best practice would be recommended and once the bat impact assessment was finalised any necessary additional mitigation measures would be included in the reporting process. No additional comments or recommendations relating to bats were raised during this meeting.

An Coimisiún Pleanála (ACP)

A number of pre-application meetings were held with An Coimisiún Pleanála. A consultation meeting for the Proposed Project was held with An Coimisiún Pleanála on the 12th June 2026 with MKO Bat Ecologists in attendance. Further meetings with An Coimisiún Pleanála were held on 10th March 2026 and 27th August 2026 with MKO Ecologists in attendance. The design team gave an overview of the Proposed Project in the form of a PowerPoint presentation and no specific comments or recommendations relating to bats were raised during this consultation.

4.2 Desk Study

4.2.1 County Development Plans

The Kildare County Development Plan 2023–2029 and Offaly County Development Plan 2021–2027 were reviewed to identify any relevant information regarding bats and their conservation within the vicinity of the Project Site.

Both plans recognise the importance of protecting biodiversity and species afforded legal protection under the Wildlife Acts and EU Habitats Directive.

The Kildare County Development Plan specifically recognises bats as Annex IV species and includes objectives requiring development proposals to avoid significant adverse effects on rare and threatened species, including legally protected species, while also recognising the requirement for bat surveys where appropriate in association with the restoration or reuse of traditional structures.

The Offaly County Development Plan similarly promotes the protection and enhancement of ecological features and connectivity, including the retention of trees and hedgerows, and identifies the potential sensitivity of areas supporting bats to development-related impacts such as artificial lighting and collision risk.

No specific information relating to bat roosts, important bat populations or areas of particular bat sensitivity within the vicinity of the Project Site was identified within either County Development Plan. The policies and objectives contained within the plans have therefore been considered primarily as relevant local planning policy and conservation context for the assessment.

4.2.2 Previous Baseline Survey (2022)

Baseline bat surveys undertaken in 2022 comprised a desk study, bat habitat suitability appraisal, roost inspections, manual transects, and ground-level static detector surveys.

No roosts were identified within the Proposed Project infrastructure footprint or within 200m plus to rotor radius of any proposed turbines. A wider search revealed three structures within the Project Site; however, following inspections no roosting suitability was identified. Additionally, no trees within the Proposed Project infrastructure footprint were identified as having potential roost features that could support roosting bats.

Static detector surveys in 2022 recorded approximately 65,420 bat passes, dominated by common pipistrelle and soprano pipistrelle, with smaller proportions of Leisler's bat, *Myotis* spp., Nathusius' pipistrelle and brown long-eared bat.

A full summary of methods and results from the 2022 survey period is provided in **Appendix 4**.

4.2.3 Bat Records

Bat Conservation Ireland

A data request was sent to Bat Conservation Ireland for records (BCI) of bat activity and roosts within a 10km radius of an approximate central point within the Proposed Wind Farm site (ITM: X 666166, Y 725624).

Available bat records were provided by BCI on the 1st of October 2026. The search included roosts, transects and ad-hoc observations, with seven roosts, nine transects and one hundred and twelve ad-hoc observations. Based on these previous bat records eight of Ireland's nine resident bat species were recorded within 10km of the Proposed Wind Farm site. The results of the database search are provided in Table 4-1.

Table 4-1 National Bat Database of Ireland Records within 10km of the Proposed Wind Farm site centre

Survey Type	Species	Irish Grid reference	Date	Location
Roost	Unidentified bat	N7415	N/A	Private
	Plecotus auritus	N6834	N/A	Private
	Unidentified bat	N633328	N/A	Disused Church Rahan
	Unidentified bat	N5934	N/A	Private
	Pipistrellus pygmaeus	N5634	N/A	Private
	Unidentified bat	N7316	N/A	Private
	Plecotus auritus	N6734	N/A	Private
Transect	Myotis daubentonii,Unidentified bat	N7535124196	N/A	Ballyteige Bridge Transect
	Myotis daubentonii,Unidentified bat	N7160029400	N/A	Bord na Mona Factory Bridge Lullymore
	Myotis daubentonii,Unidentified bat,Pipistrellus spp. (45kHz/55kHz),Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)	N6725919354	N/A	Bridge Street Rathangan Transect
	Myotis daubentonii	N598324	N/A	Cartland Bridge Transect
	Unidentified bat,Myotis daubentonii	N6091923513	N/A	Clonbullogue Village Transect
	Unidentified bat	N7252023539	N/A	Drumsru Townland Rathangan Transect
	Myotis daubentonii,Nyctalus leisleri	N747210	N/A	Pluckerstown Bridge Towpath Transect
	Myotis daubentonii,Unidentified bat,Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz)	N6740019300	N/A	Rathangan Bridge Transect
	Myotis daubentonii,Unidentified bat, Nyctalus leisleri	N668189	N/A	Spencer Bridge

Ad-Hoc	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii	N7625	21/05/2008	Bat Conservation Ireland Bat Walks
	Pipistrellus pipistrellus (45kHz)	N7143529355	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7181429499	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7157431325	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7161731370	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7168831379	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7284531473	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7237631473	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7607232539	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7596032572	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7588532595	17/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6510725804	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6485925844	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6088827631	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6085327751	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6106827829	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N5719227838	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6201527921	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N5784829080	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7135729347	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N5923430099	18/05/2019	Consultancy Surveys
	Nyctalus leisleri	N6157728368	18/05/2019	Consultancy Surveys
	Myotis spp.	N7222331455	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7136929347	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7138729355	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7136729362	17/05/2019	Consultancy Surveys

	Pipistrellus pygmaeus	N7136429363	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7131629363	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7153629372	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7234131472	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7255731482	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7276431487	17/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N6443226066	18/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N6300627600	18/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N6242427672	18/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N6159728047	18/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N6043528784	18/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N6041928849	18/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7228234572	25/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7233434665	25/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7239034360	25/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7262835266	25/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7279535581	26/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7284635447	26/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri	N7302535336	25/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7307935360	26/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7321133909	25/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7324535341	25/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7324535376	25/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7336535341	25/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N7448834980	25/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N7464734491	25/05/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N7474535513	25/05/2019	Consultancy Surveys

	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri	N7475135157	25/05/2019	Consultancy Surveys
	Nyctalus leisleri	N7450035316	25/05/2019	Consultancy Surveys
	Nyctalus leisleri	N7481234714	25/05/2019	Consultancy Surveys
	Myotis spp.,Myotis natterreri	N7481434983	25/05/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7246034891	25/08/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7254135143	25/08/2019	Consultancy Surveys
	Pipistrellus pygmaeus	N7278535475	25/08/2019	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N7060032600	18/05/2006	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis natterreri,Myotis daubentonii	N712217	07/06/2017	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz)	N6601122351	27/07/2008	BATLAS 2010
	Plecotus auritus,Pipistrellus pipistrellus (45kHz)	N6508225898	27/07/2008	BATLAS 2010
	Myotis daubentonii	N6377330502	27/07/2008	BATLAS 2010
	Pipistrellus pipistrellus (45kHz)	N6355330354	27/07/2008	BATLAS 2010
	Pipistrellus pygmaeus	N6222030468	27/07/2008	BATLAS 2010
	Pipistrellus pygmaeus,Myotis daubentonii	N6105626811	27/07/2008	BATLAS 2010
	Pipistrellus spp. (45kHz/55kHz)	N577227	21/10/2008	BATLAS 2010
	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Unidentified bat	N676175	07/05/2009	BATLAS 2010
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N674174	07/05/2009	BATLAS 2010
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii,Myotis natterreri,Plecotus auritus	N589325	18/05/2009	BATLAS 2010
	Pipistrellus pygmaeus	N6167016040	10/10/2015	BATLAS 2020
	Nyctalus leisleri	N6258016810	07/06/2016	BATLAS 2020
	Pipistrellus pygmaeus	N6249016980	13/10/2015	BATLAS 2020
	Nyctalus leisleri	N6249016980	07/06/2016	BATLAS 2020
	Myotis daubentonii	N6524017290	16/09/2015	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus	N6740017400	16/09/2015	BATLAS 2020

	pygmaeus,Nyctalus leisleri,Myotis spp.			
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii	N7600517445	22/10/2015	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri	N6760017500	16/09/2015	BATLAS 2020
	Pipistrellus pygmaeus,Nyctalus leisleri	N5946917881	05/09/2018	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Myotis daubentonii	N7570117892	20/10/2015	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri	N7468719281	22/10/2015	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N5760222877	12/07/2018	BATLAS 2020
	Pipistrellus pygmaeus	N6501525884	12/07/2018	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri	N6106526816	12/07/2018	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis daubentonii	N6965330343	26/05/2017	BATLAS 2020
	Myotis daubentonii	N7000430135	08/09/2018	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii	N6874430709	27/05/2017	BATLAS 2020
	Myotis daubentonii	N6163631561	27/05/2017	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Nyctalus leisleri,Myotis daubentonii	N5789432496	12/07/2018	BATLAS 2020
	Pipistrellus pipistrellus (45kHz)	N6692535493	26/05/2017	BATLAS 2020
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N6930034500	18/09/2006	Consultancy Surveys
	Pipistrellus pipistrellus (45kHz),Myotis daubentonii	N604240	12/07/2017	National Biodiversity Data Centre Bat Records
	Pipistrellus spp. (45kHz/55kHz)	N708314	08/11/2021	National Biodiversity Data Centre Bat Records
	Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N673311	19/04/2019	National Biodiversity Data Centre Bat Records

	Pipistrellus pygmaeus	N705259	25/05/2020	National Biodiversity Data Centre Bat Records
	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus nathusii,Myotis daubentonii,Plecotus auritus,Pipistrellus spp. (45kHz/55kHz)	N6686119402	14/08/2022	Neighbourhood Bats 2022
	Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus,Pipistrellus spp. (45kHz/55kHz),Myotis natterreri,Myotis daubentonii	N6686119402	15/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis natterreri,Myotis spp.,Myotis daubentonii	N6686119402	16/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Plecotus auritus,Nyctalus leisleri,Myotis natterreri,Myotis daubentonii,Myotis mystacinus	N6686119402	17/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii,Nyctalus leisleri,Plecotus auritus,Myotis mystacinus	N6686119402	18/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Myotis natterreri,Nyctalus leisleri,Pipistrellus spp. (45kHz/55kHz),Plecotus auritus,Myotis daubentonii	N6686119402	19/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis daubentonii,Pipistrellus spp. (45kHz/55kHz),Myotis spp.,Plecotus auritus,Myotis natterreri	N6686119402	20/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Plecotus auritus,Myotis daubentonii,Pipistrellus spp. (45kHz/55kHz),Unidentified bat	N6686119402	21/08/2022	Neighbourhood Bats 2022
	Unidentified bat,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Pipistrellus pygmaeus,Pipistrellus spp.	N6686119402	22/08/2022	Neighbourhood Bats 2022

	(45kHz/55kHz),Myotis daubentonii,Plecotus auritus			
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis daubentonii,Pipistrellus spp. (45kHz/55kHz),Unidentified bat,Pipistrellus nathusii	N6686119402	23/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Unidentified bat,Pipistrellus spp. (45kHz/55kHz),Myotis natterreri,Nyctalus leisleri,Myotis daubentonii,Plecotus auritus	N6686119402	24/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Unidentified bat,Pipistrellus spp. (45kHz/55kHz),Myotis daubentonii	N6686119402	25/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Pipistrellus pipistrellus (45kHz),Nyctalus leisleri,Myotis natterreri,Pipistrellus spp. (45kHz/55kHz),Plecotus auritus,Myotis spp.	N6686119402	26/08/2022	Neighbourhood Bats 2022
	Pipistrellus pygmaeus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Myotis natterreri,Pipistrellus spp. (45kHz/55kHz),Plecotus auritus,Unidentified bat	N6686119402	27/08/2022	Neighbourhood Bats 2022
	Myotis mystacinus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N6662821876	14/07/2017	Pilot Woodland Monitoring Scheme 2016-2017
	Myotis mystacinus,Nyctalus leisleri,Pipistrellus pipistrellus (45kHz),Pipistrellus pygmaeus	N6662821876	29/08/2017	Pilot Woodland Monitoring Scheme 2016-2017

National Bat Database of Ireland

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 10km radius of the Proposed Wind Farm site centre (last search 19th January 2026). Hectads N52, N61, N62, N63 and N72 lie within 10km of the Proposed Wind Farm site. Seven of Ireland's nine resident bat species were recorded within 10km of the Proposed Wind Farm site works. The results of the database search are provided in Table 4-2.

Table 4-2 NBDC Bat Records within 10km of Proposed Wind Farm site

Hectad	Species	Database	Designation
N52, N61, N62, N63, N72	Common pipistrelle (*Pipistrellus pipistrellus*)	National Bat Database of Ireland	HD Annex IV, WA

Hectad	Species	Database	Designation
N52, N61, N62, N63, N72	Soprano pipistrelle (*Pipistrellus pygmaeus*)	National Bat Database of Ireland	HD Annex IV, WA
N61, N62, N63, N72	Daubenton's bat (*Myotis daubentonii*)	National Bat Database of Ireland	HD Annex IV, WA
N52, N61, N62, N63, N72	Leisler's bat (*Nyctalus leisleri*)	National Bat Database of Ireland	HD Annex IV, WA
N61, N62, N63, N72	Brown Long-eared Bat (*Plecotus auritus)*	National Bat Database of Ireland	HD Annex IV, WA
N61, N72	Natterer's Bat (*Myotis nattereri*)	National Bat Database of Ireland	HD Annex IV, WA
N61, N62, N63	Whiskered Bat (*Myotis mystacinus*)	National Bat Database of Ireland	HD Annex IV, WA

4.2.4 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 2025 Article 17 Reports (NWPS, 2025) were reviewed in relation to the location of the Proposed Wind Farm site.

The Project Site is located outside the current known range for Lesser horseshoe bat and Nathusius' pipistrelle and is within the range of all other species.

4.2.5 Designated Sites

Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of SACs. The Project Site is located outside the current known range of this species (NPWS, 2025) and is approximately 99km away from the nearest designated SAC for the lesser horseshoe bat (Lough Corrib SAC).

NHAs and pNHAs may be designated for any bat species. A search of NHAs and pNHAs within a 10km radius of the Proposed Wind Farm site centre found 3 no. pNHAs and 1 no. NHA, however none of these sites are designated for the conservation of bats.

4.2.6 Landscape Features and Habitat Suitability

A review of mapping and photographs provided insight into the habitats and landscape features present at the Project Site. In summary, the primary land use within the Proposed Wind Farm site comprises bare cutaway peat, re-vegetation of bare peat, degraded blanket bog, scrub, bog woodland, remnants of high bog and areas of forestry. The primary land use within the Proposed Enhancement Areas includes natural recolonisation of cutaway and degraded bog and forestry.

A review of the GSI online karst landscape mapper did not indicate the possible presence of any subterranean sites within the Project Site and a search of the National Monuments Database did not reveal the presence of any manmade subterranean sites within the Project Site.

A search of the UBSS Cave Database for the Republic of Ireland found no caves within the Project Site and none within 10km of the nearest Proposed Turbine location.

A review of the NBDC bat landscape map provided a habitat suitability index of 21 (Green) to 31.89 (Orange). This indicates that the Project Site has *Low to Moderate* habitat suitability for bat species.

4.2.7 Additional EIAR Projects in the Wider Landscape

Table 4-3 provides an overview of existing, permitted, and proposed wind farms located within 15km of the Proposed Turbine locations. An assessment of large-scale non wind farm projects can be found in Section 6.5 Chapter 6.

Table 4-3 Wind farm developments within 15km of the Proposed Turbine locations

Wind Farm	Status	No. of Turbines
Within < 15 km		
Cushaling Wind Farm	Existing	9
Cloncreen Wind Farm	Existing	21
Drehid Wind Farm	Proposed	11
Ballinla Wind Farm	Proposed	7
Derrynadarragh Wind Farm	Proposed	9
Cushine Wind Farm	Pre-application	11
Mount Lucas Wind Farm	Existing	28
Yellow River Wind Farm	Existing	29
Clonarrow Wind Farm	Permitted	4
Moanvane Wind Farm	Existing	12

4.3 Field Surveys

4.3.1 Bat Habitat Suitability Appraisal

4.3.1.1 Proposed Wind Farm Infrastructure

The following habitats were recorded within the Proposed Wind Farm site including:

- Cutover bog (PB4)
- Calluna-dominated communities on Cutover bog
- Raised bog (PB1)
- Scrub (WS1)
- Bog woodland (WN7)
- Poor fen and flush (PF2)
- Reed and large sedge swamps (FS1)
- Other artificial lakes and ponds (FL8)
- Drainage ditches (FW4)
- Lowland depositing rivers (FW2)
- Dry calcareous and neutral grassland (GS1)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Amenity grassland (GA2)
- Dense bracken (HD1)
- Conifer plantation (WD4)
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Hedgerow (WL1)
- Treeline (WL2)

Further details on habitats within the Proposed Wind Farm site can be found in Section 6.3.2 of Chapter 6 of this EIAR. The area within the Proposed Wind Farm site containing the Proposed Turbines is dominated by Cutover bog (PB4) characterized by bare peat. Areas that have been out of

commercial peat production for a significant period of time (>20 years) have largely revegetated, primarily by Calluna-dominated communities on Cutover bog , birch dominated scrub and bog woodland, poor fen communities and small areas of grassland. In addition to the habitats of cutover bog, there are also a number of small areas of remnant uncut raised bog at various locations throughout the part of the Proposed Wind Farm site containing the Proposed Turbines, predominantly but not exclusively at the edge.

Results from the desktop review and walkover surveys were used to assess habitats for their suitability to support foraging and commuting bats, and roosting bats, according to Collins (2023). Suitability categories, divided into *High, Moderate, Low*, *Negligible* and *None*, are described fully in **Appendix 1.**

With regard to foraging and commuting bats, exposed areas of cutover and raised bog habitats associated with revegetation outlined above and buildings and artificial surfaces were considered *Low* suitability, i.e. habitat that could be used by small numbers of commuting bats such as gappy hedgerow or unvegetated stream, but isolated (Collins, 2023). Areas of scrub, bog woodland, conifer plantation, reed and large sedge swamps, other artificial lakes and ponds and drainage ditches provide connectivity via linear features to the surrounding landscape. As such, they were assessed as having *Low* to *Moderate* suitability i.e. habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water (Collins, 2023). Due to their varying levels of maturity and connectivity, treelines and hedgerows were assessed as having *Moderate* to *High* suitability, while lowland depositing rivers were assessed as having *High* suitability, i.e. continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. (Collins, 2023). All other habitats referenced above were assessed as having *Negligible* suitability for commuting and foraging bats i.e. 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 (Collins, 2023).

Trees present within the part of the Proposed Wind Farm site containing the Proposed Turbines comprise conifer plantation, treelines, scrub and bog woodland. With regard to roosting bats, no trees within 200m plus the rotor radius (i.e. 85m) of the Proposed Turbine locations were found to have roosting potential. These were all assessed as *Negligible* and are outlined in further detail in Section 4.3.2 below. These trees lacked the size, age, or features required to provide suitable roosting opportunities for bats.

With regard to Buildings and artificial surfaces, no structures assessed as having suitability for roosting bats were identified within the roost search buffer (285m). Three complexes containing several buildings were identified within the part of the Proposed Wind Farm site containing the Proposed Turbines. All other habitats present within the part of the Proposed Wind Farm site containing the Proposed Turbines were assigned a *Negligible* value for roosting bats. Details of the inspected structures are presented in Section 4.3.2.



Plate 4-1 Cutover bog dominated by bare peat, in the early stages of recolonisation in Ballydermot South Bog.



Plate 4-2 Area of Dry meadows and grassy verges (GS2) and Dense bracken (HD1) separating two blocks of Bog woodland (WN7) in Barnaran Bog.



Plate 4-3 Narrow, vertical-sided Drainage ditch (FW4) on bare peat at the location of Proposed Turbine 10



Plate 4-4 Linear areas of Bog woodland (WN7) located in Ballydermot South Bog.



Plate 4-5 Area of Reed and large sedge swamp (FS1) at the location of the Proposed Turbine 23



Plate 4-6 Area of Dry calcareous and neutral grassland (GS1) growing along a former railway line in Glashabaun North Bog

4.3.1.2 Lodge Bog Enhancement

The Lodge Bog Enhancement area currently comprises a mosaic of habitats including open water, bare cutover peat, scrub and bog woodland. The habitat present within this area is consistent with the Proposed Wind Farm site. It is dominated by Cutover bog (PB4) characterized by bare peat. Areas that have been out of commercial peat production for a significant period (>20 years) have largely revegetated, primarily by Calluna-dominated communities on Cutover bog, birch dominated scrub and bog woodland, poor fen communities and small areas of grassland.

With regard to foraging and commuting bats exposed areas of cutover and raised bog habitats associated with revegetation outlined above were considered *Low* suitability, i.e. habitat that could be used by small numbers of commuting bats such as gappy hedgerow or unvegetated stream, but isolated (Collins, 2023). Areas of scrub, bog woodland and poor fen provide connectivity via linear features to the surrounding landscape. As such, they were assessed as having *Moderate* suitability i.e. habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water (Collins, 2023). Due to their varying levels of maturity and connectivity, the Calluna-dominated

communities on Cutover bog , scrub and bog woodland were assessed as having *Moderate* to *High* suitability, i.e. continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. (Collins, 2023). All other habitats referenced above were assessed as having *Negligible* suitability for commuting and foraging bats i.e. 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 (Collins, 2023).

Trees present within the Lodge Bog Enhancement area comprise treelines, consisting of downy birch (Betula pubescens) and grey willow (Salix cinerea), scrub and bog woodland. With regard to roosting bats, no trees within this area were found to have roosting potential. These were all assessed as *Negligible* and are outlined in further detail in Section 4.3.2 below. These trees lacked the size, age, or features required to provide suitable roosting opportunities for bats.

4.3.1.3 Killina Bog Offsetting Area

The Killina Bog Offsetting Area is predominately commercial forestry, bare cutover peat and scrub with smaller areas of broadleaf woodland.

With regard to foraging and commuting bats, conifer plantation (WD4) and bare cutover peat are considered to have *Low* suitability, i.e. habitat that could be used by small numbers of commuting bats such as gappy hedgerow or unvegetated stream, but isolated (Collins, 2023). Areas of broad-leaved woodland and scrub provide connectivity via linear features to the surrounding landscape. As such, it was assessed as having *Moderate* suitability i.e. habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water (Collins, 2023).

With regard to roosting bats, no trees within this area were found to have roosting potential. These were all assessed as *Negligible* and are outlined in further detail in Section 4.3.2 below. These trees lacked the size, age, or features required to provide suitable roosting opportunities for bats.



Plate 4-7 Conifer plantation (WD4) within Killina Bog, i.e., within the Proposed Offsetting Area

4.3.1.4 Proposed Grid Connection

The Proposed Grid Connection will facilitate the connection of the Proposed Wind Farm to the national grid. The Proposed Grid Connection is comprised of the Proposed Onsite Substation, Proposed Offsite Substation, the 13.1km underground cabling connection from the Proposed Onsite Substation to the Proposed Offsite Substation, and 0.12km of overhead line (OHL) connecting to the existing Maynooth-Dunstown 220kV OHL, and all ancillary works and apparatus.

The following habitats were recorded within the Proposed Grid Connection infrastructure footprint:

- Cutover bog (PB4)
- Poor fen (PF2)
- Scrub (WS1)
- Buildings and artificial surfaces (BL3)
- Depositing/lowland river (FW2)
- Canal (FW3)
- Improved agricultural grasslands (GA1)
- Treelines (WL2)
- Hedgerows (WL1)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Conifer plantation (WD4)

The Proposed Onsite Substation is located in the north of Lodge Bog, Co. Kildare. The habitats in this location are dominated by Cutover bog (PB4), Poor fen (PF2), and Scrub (WS1).

It is proposed that the Proposed Grid Connection underground electrical cabling route will be laid predominantly within the existing road, along with sections within Lodge Bog and improved agricultural grasslands. It will cross 7 no. EPA mapped water crossing structures, 1 no. crossing under the Grand Canal and an additional 3 no. crossings over non-EPA mapped watercourses. The habitats along this route include Buildings and artificial surfaces (BL3), Depositing/lowland river (FW2), Canal (FW3), Improved agricultural grasslands (GA1), Arable crops (BC1) and sections of woodlands and Conifer plantation (WD4), bordered by Treelines (WL2) and Hedgerows (WL1).

The Proposed Offsite Substation is located within Improved agricultural grassland (GA1), Dry meadows and grassy verges (GS2), Wet grassland (GS4) and Treeline (WL2).

Treeline (WL2) at the entrance to the Proposed Offsite Substation assessed as *Moderate* suitability for commuting and foraging bats, due to their connectivity with the wider landscape and the presence of linear vegetation providing navigational structure and shelter. With regard to roosting bats, the trees present have ivy cover throughout, however no Potential Roosting Features were identified.



Plate 4-8 – Treeline (WL2) at the entrance to the Proposed Offsite Substation

Further details of habitats along the Proposed Grid Connection infrastructure footprint are outlined in Chapter 6, Section 6.3.2.1.7.

Habitats along surroundings of the Proposed Grid Connection underground electrical cabling route, including cutover bog (PB4), Poor fen (PF2), and Scrub (WS1).

Buildings and artificial surfaces (BL3), dry meadows and grassy verges (GS2), wet grassland (GS4) and improved agricultural grassland (GA1) associated with the Proposed Grid Connection infrastructure footprint, were assessed as offering *Negligible to Low* suitability for commuting and foraging bats due to their generally open nature and limited structural connectivity.

Linear features along the Proposed Grid Connection underground electrical cabling route including Conifer plantation (WD4) edges, Hedgerows (WL1), Treelines (WL2), Depositing/lowland river (FW2), Canal (FW3) were assessed as offering *Moderate* suitability for commuting and foraging bats, due to their connectivity with the wider landscape and the presence of linear vegetation providing navigational structure and shelter. However, these features are not directly impacted by the Proposed Grid Connection underground electrical cabling route.

With regard to roosting bats, habitat features along the Proposed Grid Connection underground electrical cabling route, the Proposed Onsite Substation and Proposed Offsite Substation no buildings, trees or other features capable of supporting bat roosts were identified and these areas were therefore assessed as having no *(None)* roosting potential.



Plate 4-9 Cutover bog (PB4) at the location of the Proposed Onsite Substation, dominated by bare peat with some early colonisation.

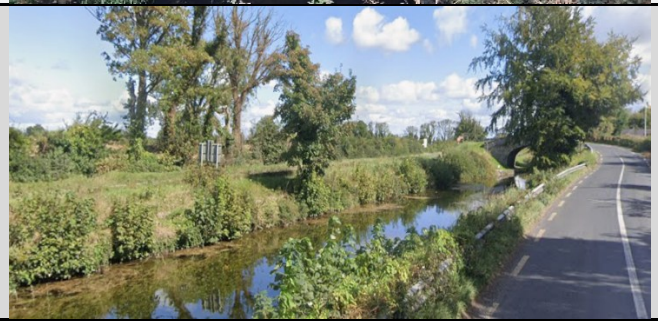
Proposed Grid Connection underground electrical cabling route Watercourse Crossings

The Proposed Grid Connection underground electrical cabling route will involve 11 no. crossings over watercourses (7 no. crossings over EPA mapped watercourses, 1 no. crossing under the Grand Canal and 3 no. crossings over unmapped watercourses). No in-stream works are required along the Proposed Grid Connection underground electrical cabling route. Watercourse crossing methodologies are detailed in Section 4.9.2.4 of Chapter 4 of this EIAR and listed in Table 4-4 below, starting with the water crossing closest to the Proposed Onsite Substation.

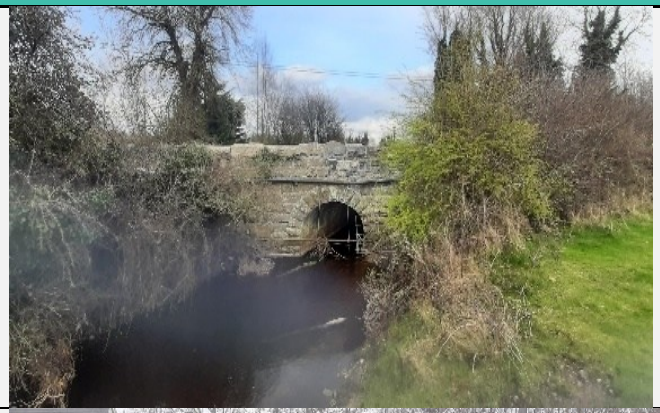
The structures at the existing 7 no. EPA mapped watercourse crossings and 3 no. unmapped EPA watercourse crossings were inspected for signs of bat roosts and were assessed for bat roost potential on the 13th of August 2024, 20th July 2026 and 22nd September 2026. No evidence of bat roosts was found at any of the structures during the inspections; there is no structure present at the crossing of the Grand Canal that could be used by roosting bats. The findings are summarized in Table 4-4 below. The locations of the watercourse crossings are shown in Section 4.9.2.7 of Chapter 4.

No other features within the Proposed Grid Connection infrastructure footprint were assessed as having potential for roosting bats, and no loss of PRFs is anticipated as part of the Proposed Grid Connection underground electrical cabling works. Further details on the Proposed Grid Connection can be found in Chapter 4, Section 4.4.2.

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

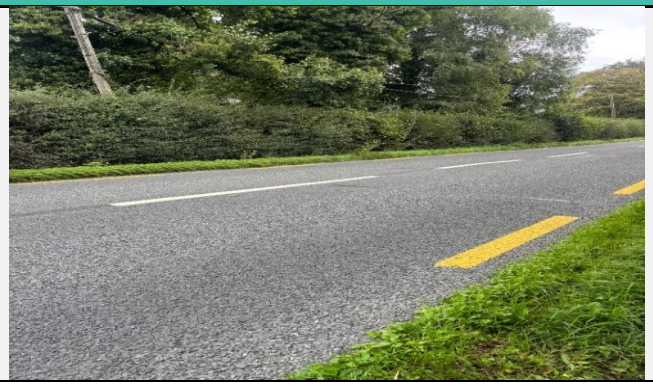
Crossing ID	Irish Grid Ref	Culvert type	Photo	Bat Roost Potential	Crossing Type Description
PGCWC 1 (EPA Mapped WC)	N 73457 26338	Stone arch bridge		No evidence of bats found. Small crevices on the bridge structure that could be used opportunistically by roosting bats. Underside of bridge arch is smooth concrete. *Low* bat roost potential.	Flatbed Formation (under) or Flatbed Formation (over)
PGCWC 2 (pNHA crossing)	N 74612 26446	Under the Grand Canal		No structure present that could be used by roosting bats. No (none) bat roost potential	Horizontal Directional Drilling

Crossing ID	Irish Grid Ref	Culvert type	Photo	Bat Roost Potential	Crossing Type Description
PGCWC 3 (EPA Mapped WC)	N 76287 26562	Concrete culvert		No evidence of bats found. Solid concrete with no obvious features likely to be used by roosting bats. *Negligible* roosting potential	Flatbed Formation (under) or Flatbed Formation (over)
PGCWC 4 (non-EPA Mapped WC)	N 76999 26618	Underground crossing		No structure present that could be used by roosting bats. No (none) bat roost potential	Flatbed Formation (under) or Flatbed Formation (over)

Crossing ID	Irish Grid Ref	Culvert type	Photo	Bat Roost Potential	Crossing Type Description
PGCWC 5 (EPA Mapped WC)	N 78861 26769	Stone Arch Bridge		No evidence of bats found. Small crevices on the bridge structure that could be used opportunistically by roosting bats. Underside of bridge arch is smooth concrete. *Low* bat roost potential.	Flatbed Formation (under) or Flatbed Formation (over)
PGCWC 6 (EPA Mapped WC)	N 79436 26814	Underground crossing		No structure present that could be used by roosting bats. No (none) bat roost potential	Flatbed Formation (under) or Flatbed Formation (over)

Crossing ID	Irish Grid Ref	Culvert type	Photo	Bat Roost Potential	Crossing Type Description
PGCWC 7 (non-EPA Mapped WC)	N 79545 26831	Underground crossing		No structure present that could be used by roosting bats. No (none) bat roost potential	Flatbed Formation (under) or Flatbed Formation (over)
PGCWC 8 (EPA Mapped WC)	N 79668 26832	Underground crossing		No structure present that could be used by roosting bats. *None* bat roost potential.	Flatbed Formation (under) or Flatbed Formation (over)

Crossing ID	Irish Grid Ref	Culvert type	Photo	Bat Roost Potential	Crossing Type Description
PGCWC 9 (EPA Mapped WC)	N 80078 26869	Underground crossing		No structure present that could be used by roosting bats. No (none) bat roost potential	Flatbed Formation (under) or Flatbed Formation (over)
PGCWC 10 (EPA Mapped WC)	N 82707 27085	Underground crossing		No structure present that could be used by roosting bats. No (none) bat roost potential	Flatbed Formation (under) or Flatbed Formation (over)

Crossing ID	Irish Grid Ref	Culvert type	Photo	Bat Roost Potential	Crossing Type Description
WC 11 (non-EPA Mapped WC)	N 80696 26925	Underground crossing		No structure present that could be used by roosting bats. No (none) bat roost potential	Flatbed Formation (under) or Flatbed Formation (over)

4.3.1.5 Proposed Turbine Delivery Route Accommodation Areas

As described in Chapter 4, Section 4.5.2.3 of this EIAR, turbine delivery route accommodation works are required at 6 locations along the Proposed Turbine Delivery Route to facilitate the delivery of turbine components during the construction phase. These works include temporary measures such as localised road widening, overruns of roundabout islands and relocation of signage and street furniture.

Vegetation removal or trimming is only required at a subset of these locations. The bat habitat suitability assessment below focuses on those locations where vegetation with potential ecological value for bats is present. The assessment of the vegetation along the Proposed Turbine Delivery Route accommodation areas was carried out on the 16th September 2026.

R402 at Ballinagar Village West -N 44151 24108

This accommodation area is located in the west of Ballinagar village along the R402 Regional Road and comprises a landscaped amenity area containing amenity grassland (GA2) and a boundary treeline (WL2)). This treeline will require removal as part of the Proposed Turbine Delivery Route accommodation areas. The tree cover includes silver birch, elder and non-native cypress and poplar trees. The amenity grassland provides limited opportunities for bats; however, the mature trees and boundary vegetation provide sheltered habitat that may be used by commuting and foraging bats. Overall, the area is considered to provide *Moderate* suitability for commuting and foraging bats.

No Potential Roost Features (PRFs) were identified in the trees assessed, which were therefore considered to have no (*None*) suitability for roosting bats (Plate 4-9 – Plate 4-15).



Plate 4-10 - Ivy and understorey vegetation



Plate 4-11: Ivy and understorey vegetation



Plate 4-12: Scattered mature trees and parkland (WD5)



Plate 4-13: Scattered mature trees and parkland (WD5)



Plate 4-14 - A boundary treeline (WL2)



Plate 4-15 - A boundary treeline (WL2) with ivy cover



Plate 4-16 - Scattered mature trees and amenity grassland (GA2)

R402/R420 Junction - N 41968 21578

This accommodation area is located at the junction of the R402 and R420 Regional Roads. This area comprises a gravelled area classified as Recolonising bare ground (ED3). A Treeline (WL2) of ash, hazel, blackthorn, hawthorn and hornbeam is also present at this location on the north side of the R420. Areas of artificial hardstanding (BL3) are also present adjacent to the vegetation.

The mature treeline forms a sheltered linear feature that may be used by bats for commuting and foraging. The area is therefore considered to provide *Moderate* suitability for commuting and foraging bats. No Potential Roost Features (PRFs) were identified in the trees assessed, which were consequently considered to have no (*None*) suitability for roosting bats (Plate 4-16 to 4-17).



Plate 4-17 - Treeline (WL2) present.



Plate 4-18: Treeline (WL2) present.

4.3.2 Roost Surveys

4.3.2.1 Daytime Roost Inspections

A detailed daytime bat roost inspection was undertaken within the Proposed Wind Farm site during the 2024 and 2026 bat activity seasons to identify structures and features with the potential to support roosting bats. No structures containing suitable bat roosting features were identified within 285m (200 m plus rotor radius) of any Proposed Turbine location. As identified in Section 4.3.1 above, there are no structures along the Proposed Grid Connection underground electrical cabling route that have suitable habitat for bats. Therefore, daytime roost surveys were not required at any Proposed Grid Connection underground electrical cabling route crossings. No existing structures are present at the Proposed Onsite Substation or Proposed Offsite Substation locations.

A total of 13 structures were identified within the Proposed Wind Farm site and assessed for bat roosting potential (Table 4-5). Representative photographs of these structures are provided in Plates 4-1 to 4-4. Within the Proposed Wind Farm site, there are a total of 15 no. watercourse crossing locations over natural watercourses (rivers and streams). Of these 15 water course crossings, 12 of the water course crossings had associated infrastructure that were assessed for roosting potential. These comprised solid concrete bridges, steel rail bridges, flatbed bridges and concrete pipe culverts (Plates 4-1 to 4-8).

All structures were assessed in accordance with the bat roost suitability classification system described by Collins (2023). Each structure was systematically inspected using a high-powered torch, thermal scope and/or endoscope to identify potential roosting features, including cracks, crevices, cavities and voids. All watercourse crossings were assessed as having *Negligible* bat roost suitability. These structures were predominantly constructed of solid concrete or smooth pipe culverts and lacked cracks, crevices, voids or other features capable of supporting roosting bats. Similarly, steel rail bridges had tightly sealed joints and offered no suitable roosting opportunities. No evidence of bat use, such as droppings, feeding remains, staining or bat carcasses, was recorded during any inspection. Representative examples of the watercourse crossing infrastructure are shown in Plates 4-18 to 4-31.

No confirmed bat roosts or evidence of bat occupation were recorded within any inspected structure. Furthermore, no structures with bat roosting potential were identified within 285m of the Proposed Turbine locations. One building complex located within the Proposed Wind Farm site was assessed as having *Low* bat roost suitability due to the presence of a limited number of features that could potentially support individual roosting bats. This complex consists of the structures at the Ballydermot Works (IG Ref: N 66025 21597).

This complex is located approximately 862 m from the nearest Proposed Turbine (T14). The buildings comprise a small group of low-rise structures located within an established developed area. The principal building consists of a single-storey, elongated structure with rendered walls, a shallow-pitched corrugated roof. A larger structure to the north comprises a metal-framed building with a curved, corrugated roof. The buildings are surrounded by hardstanding, boundary walls and areas of mature vegetation, including trees and hedgerows.

A visual inspection of the accessible external areas of the buildings was undertaken to assess their suitability for roosting bats. No evidence of bats or bat roosting activity, including droppings, staining, feeding remains or other signs indicative of a bat roost, was identified during the inspection. The structures are generally well-maintained and exposed, with no obvious accessible gaps, crevices or other features considered suitable for use by roosting bats identified during the survey. On this basis, the buildings were assessed as having **Low bat roost potential**.

Table 4-5 Structures and Bridges/Culverts within the Proposed Wind Farm site.

Approx Location	Structure or Watercourse Crossing/Culvert	Description	Number of Structures	Roosting Potential	Evidence of Bat Roosting
53.259102, -6.983305	Structure	20-foot Container	4	None	*None*
53.259102, -6.983305	Structure	20-foot Container	1	None	*None*
53.265494, -7.040192	Structure	40-foot Container	1	None	*None*
53.265396, -7.040117	Structure	40-foot Container	1	None	*None*
53.265401, -7.040350	Structure	20-foot container	1	None	*None*
53.265366, -7.040413	Structure	3 m x 3 m container	1	None	*None*
53.264905, -7.042585	Structure	20-foot container	1	None	*None*
53.309725, -7.006241	Structure	20-foot container	2	None	*None*
53.310341, -7.005984	Structure	40-foot Container	1	None	*None*
53.300216, -7.021264	Structure	3 m x 3 m container	1	None	*None*

Approx Location	Structure or Watercourse Crossing/Culvert	Description	Number of Structures	Roosting Potential	Evidence of Bat Roosting
53.307238, -7.004834	Structure	20-foot container	1	None	*None*
53.270850, -7.010265	Structure	3 m x 3 m container	1	None	*None*
53.289123, -6.989822	Structure	20-foot container	1	None	*None*
53.290313, -6.992693	Structure	20-foot container	1	None	*None*
53.297211, -6.960214	Structure	20-foot container	1	None	*None*
53.310479, -7.006048	Structure	2 m long x 1.5 m wide Hand-washing station	1	None	*None*
53.310587, -7.006090	Structure	1.5 x 1.5 toilet cubicle	1	None	*None*
53.310578, -7.006138	Structure	A concrete blocked rectangular tank approx. 4m long X 1.5m wide X 2.5m deep.	1	None	*None*
53.295934, -6.942998	Structure	Welfare Facility	1	None	*None*
53.296828, -6.943161	Structure	Shed with rail tracks	1	None	*None*
53.295265, -6.942943	Structure	Bunded 46,000 Liter Fuel Tank Tank: Length 7.5m, Diameter 2.8m Bunded Wall: Length 8.5m, Width 6m	1	None	*None*
53.282153, -7.035793	Structure	Shed	1	None	*None*
53.240878, -7.011684	Structure	Ballydermot Works	6	Low	*None*
53.296210, -6.999618	Watercourse Crossing/Culvert	Steel beam with steal deck	1	None	*None*
53.296210, -6.999618	Watercourse Crossing/Culvert	Steel beam with timber deck	1	None	*None*
53.304179, -6.937102	Watercourse Crossing/Culvert	Concrete beam	1	None	*None*
53.304177, -6.937103	Watercourse Crossing/Culvert	Concrete beam	1	None	*None*
53.295434, -7.087841	Watercourse Crossing/Culvert	Concrete beam	1	None	*None*
53.294351, -7.078558	Watercourse Crossing/Culvert	Steel beam	1	None	*None*
53.294467, -7.078430	Watercourse Crossing/Culvert	Concrete beam	1	None	*None*
53.285831, -7.044933	Watercourse Crossing/Culvert	Steel beam	1	None	*None*
53.287157, -7.047645	Watercourse Crossing/Culvert	Concrete pipe	1	None	*None*
53.287533, -7.047023	Watercourse Crossing/Culvert	Steel beam	1	None	*None*

Approx Location	Structure or Watercourse Crossing/Culvert	Description	Number of Structures	Roosting Potential	Evidence of Bat Roosting
53.294355, -7.042838	Watercourse Crossing/Culvert	Concrete pipe	1	None	*None*
53.261623, -7.016527	Watercourse Crossing/Culvert	Concrete beam	1	None	*None*



Plate 4-19 – Representative photo of structures within the Project Site– Hand-washing station



Plate 4-20 – Representative photos of containers present within the Project Site



Plate 4-21 - Representative photos of structures present within the Project Site



Plate 4-22 - Representative photos of containers present within the Project Site



Plate 4-23 Solid concrete bridge NW of Proposed Turbine T13



Plate 4-24 Concrete pipe south of Proposed Turbine T38



Plate 4-25 Solid concrete bridge present within the Project Site



Plate 4-26 Solid concrete bridge present within the Project Site



Plate 4-27 Steal beam bridge with wooden plank surface NE of Proposed Turbine T1



Plate 4-28 Steal rail bridge south of Proposed Turbine T38



Plate 4-29 Steal beam bridge with wooden plank surface NW of Proposed Turbine T32



Plate 4-30 Steel rail bridge NW of Proposed Turbine T32



Plate 4-31 Culvert north of Proposed Turbine T29

4.3.2.1.1 Ground-Level Tree Assessments

Ground-level inspections of trees and treelines within the Project Site were undertaken throughout the 2024 and 2026 surveys to assess their potential to support roosting bats. Surveys focused on areas where tree removal is required for Proposed Wind Farm infrastructure, including turbine bases and associated bat felling buffers, turbine hardstands, access roads, Proposed Enhancement Areas (i.e., the Lodge Bog Enhancement area and the Killina Bog Offsetting Area), the Proposed Grid Connection, and the Proposed Turbine Delivery Route accommodation areas. These trees were assessed for their potential to support roosting bats according to Collins (2023) (see **Appendix 1** for roost assessment criteria).

No confirmed bat roosts, evidence of bat occupation, or PRFs were identified within the Project Site during the 2024 or 2026 surveys. Representative examples of trees assessed are shown in Plates 4-32 to 4-35.



Plate 4-32 Area of downy birch (Betula pubescens)-dominated Scrub (WS1)



Plate 4-33 Linear areas of Bog woodland (WN7) located in Ballydermot South Bog



Plate 4-34 Short grey willow (Salix cinerea) Hedgerow (WL1) in the west of the Project Site



Plate 4-35 Areas of immature conifer plantation - Negligible

4.3.3 Manual Surveys

4.3.3.1 Manual Transects/ Night-time Bat Walkover 2024

Manual transects were undertaken in spring, summer and autumn 2024. Bat activity was recorded in all seasons. A total of 406 bat passes were recorded. In general, common pipistrelle (n=184) was recorded most frequently, followed by soprano pipistrelle (n=161) and Leisler's bat (n=59). *Myotis spp.* (n=1) and brown long-eared bat (n=1) were recorded less frequently (Plate 4-36).

To account for differences in survey effort, activity levels were standardised as bat passes per kilometre (passes/km) surveyed. Species composition and activity levels varied between survey periods (Plate 4-37), with the spatial distribution of activity shown in Figures 4-2 to 4-4. Soprano pipistrelle exhibited the highest activity levels overall, particularly during spring (2.1 passes/km) and summer (3.8 passes/km), with activity concentrated in the vicinity of Proposed Turbines T1, T35 and T36 and declining in autumn (0.6 passes/km). Common pipistrelle activity peaked during summer (6.3 passes/km), compared to considerably lower levels in spring (0.7 passes/km) and autumn (0.04 passes/km). Leisler's bat activity was also highest in summer (1.7 passes/km), with lower levels recorded during spring (0.4 passes/km) and autumn (0.2 passes/km). Activity by Myotis spp. and brown long-eared bat was negligible across all survey periods.

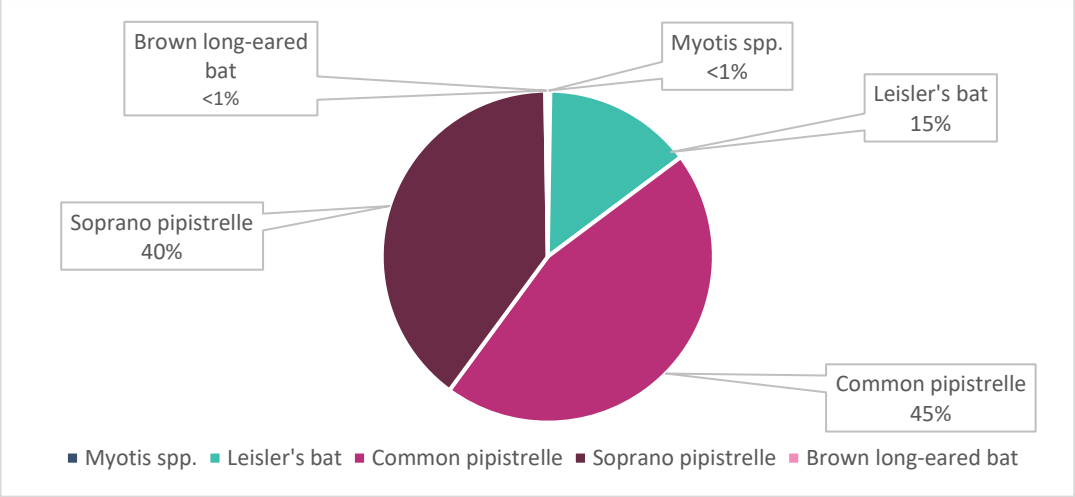


Plate 4-36 2024 Manual Activity Surveys (Total Species Composition)

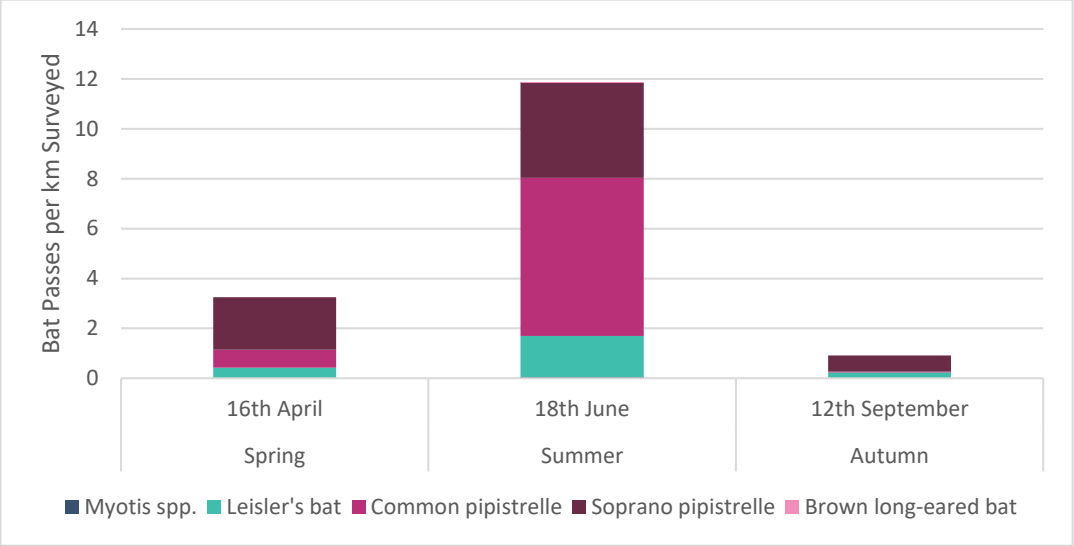
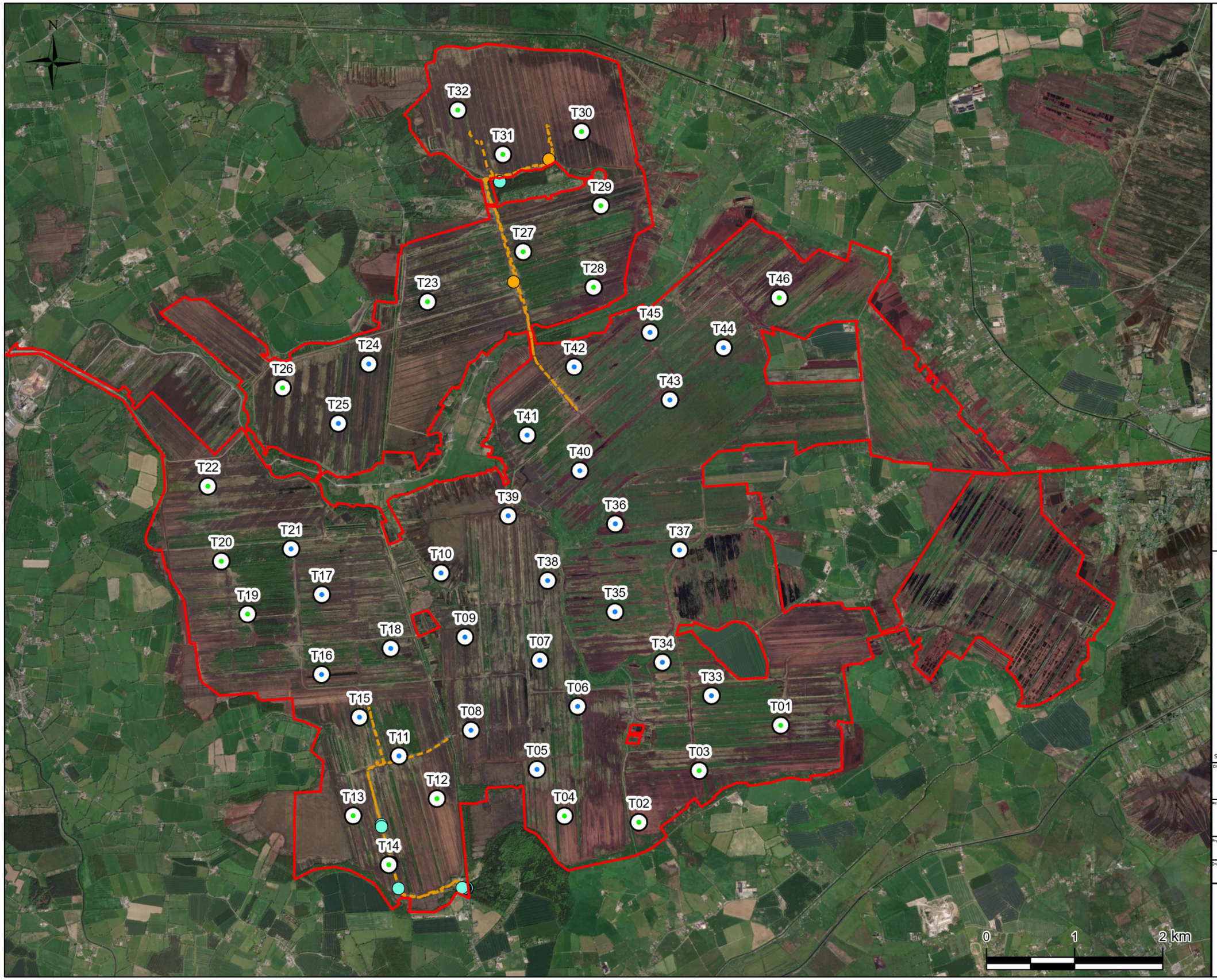


Plate 4-37 2024 Transect Results – Species Composition Per Survey Period



Map Legend

- Project Site
- Turbine Layout
  - 220
  - 200
- Spring Transect Routes - 2024

Spring Manual Transect Results

- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



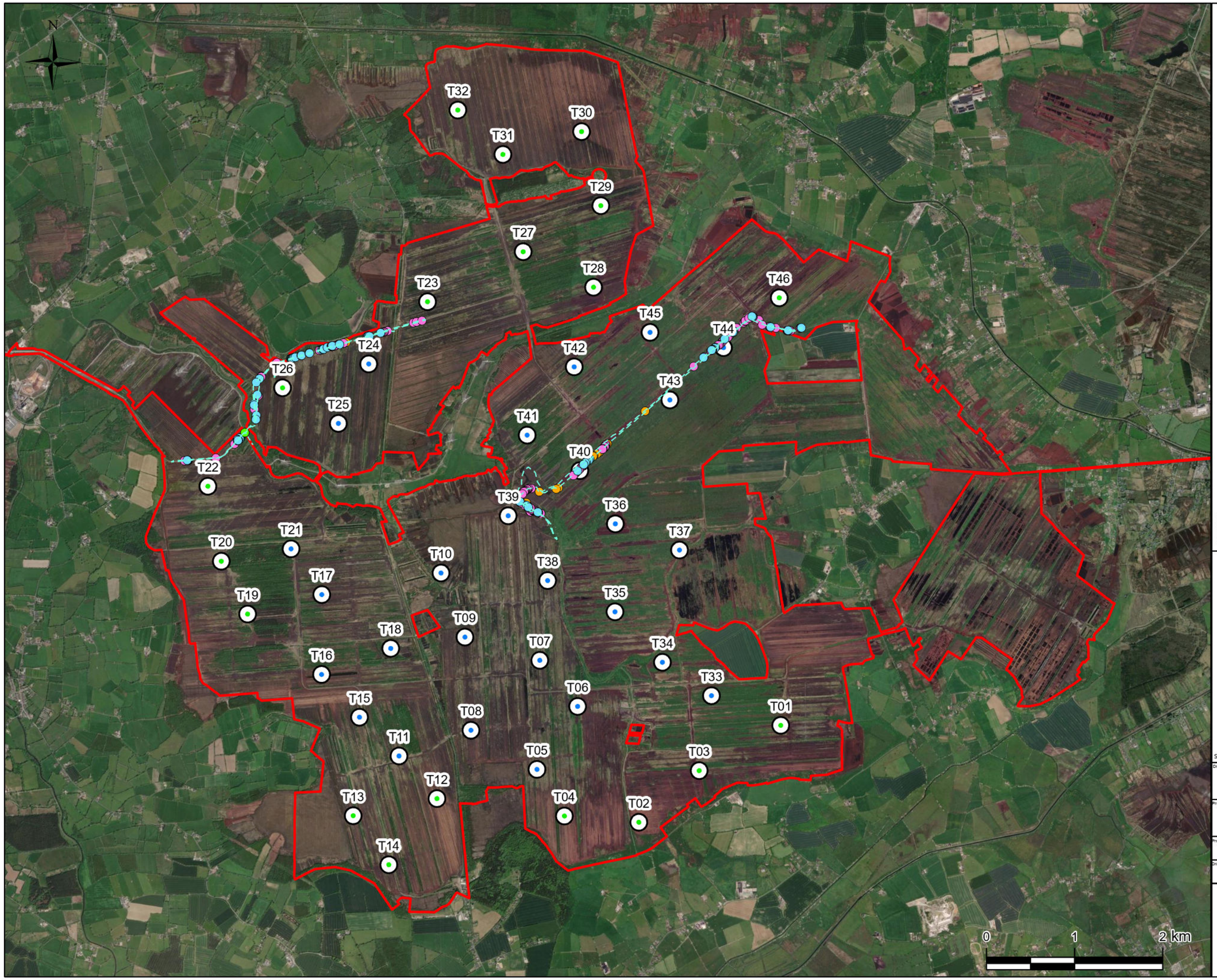
SITE LOCATION - NOT TO SCALE

Drawing Title
Spring Manual Results 2024

Project Title
Ballydermot Wind Farm,
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	4-1	1:40,000
Drawn By	Checked By	Date
BOC	MOH	11/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie



Map Legend

- Project Site

Turbine Layout

- 220
- 200
- Summer Transect Route - 2024

Summer Manual Transect Results

- Myotis spp.
- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle
- Brown long-eared bat

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



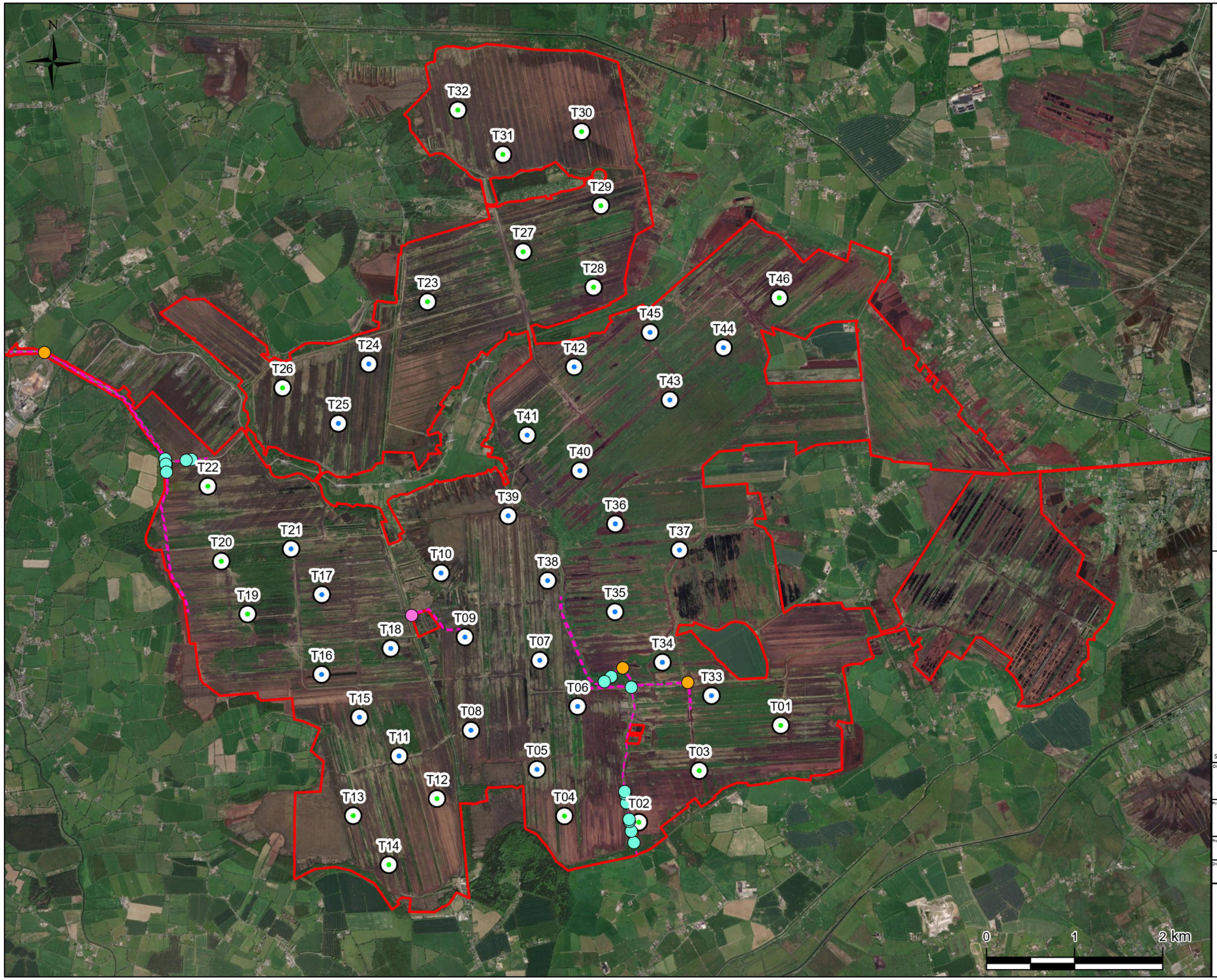
SITE LOCATION - NOT TO SCALE

Drawing Title
Summer Manual Results 2024

Project Title
Ballydermot Wind Farm,
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	4-2	1:40,000
Drawn By	Checked By	Date
BOC	MOH	11/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie



Map Legend

- Project Site

Turbine Layout

- 220
- 200
- Autumn Transect Route - 2024

Autumn Manual Transect Results

- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

Autumn Manual Results 2024

Project Title

Ballydermot Wind Farm,
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	4-3	1:40,000
Drawn By	Checked By	Date
BOC	MOH	11/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

4.3.3.2 Manual Transects/ Night-time Bat Walkover 2026

Targeted manual transects were undertaken in spring, summer and autumn 2026. Bat activity was recorded in all seasons. A total of 230 bat passes were recorded. In general, common pipistrelle (n=134) was recorded most frequently, followed by soprano pipistrelle (n=73) and Leisler's bat (n=23). The species composition is presented in plate 4-38 with the spatial distribution of activity shown in Figures 4-4 to 4-6.

To account for differences in survey effort, activity levels were standardised as bat passes per kilometre (passes/km) surveyed. Activity levels varied between survey periods (Plate 4-39). Soprano pipistrelle exhibited the highest activity levels overall, particularly during summer (8.94 passes/km) and autumn (7.54 passes/km). Common pipistrelle activity peaked during summer (11.47 passes/km), compared to considerably lower levels in spring (1.47 passes/km) and autumn (0.88 passes/km). Leisler's bat activity was highest in autumn (3.15 passes/km), with lower levels recorded during spring (1.05 passes/km) and summer (0.65 passes/km).

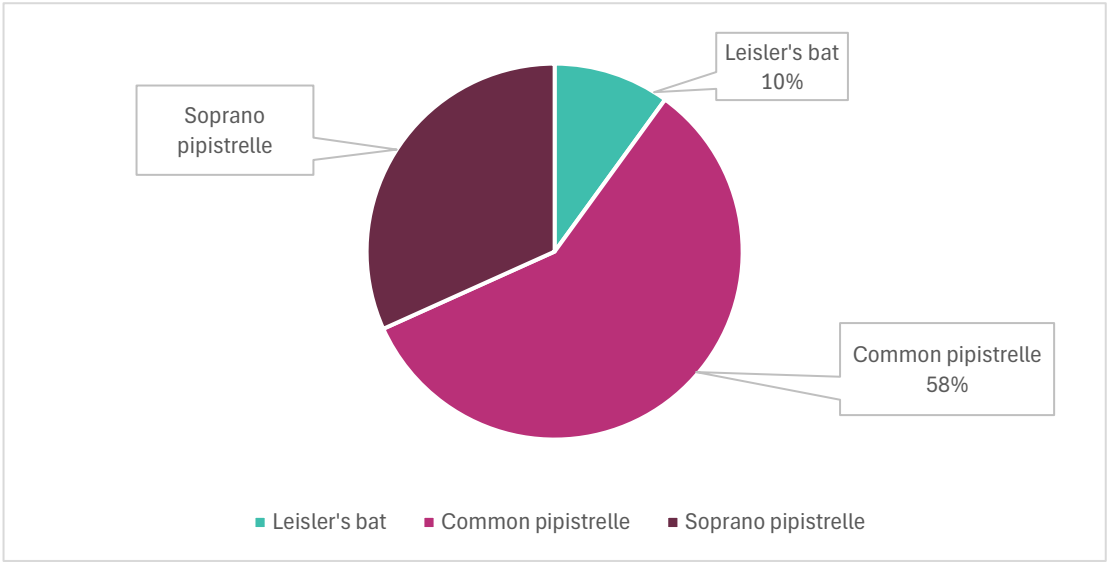


Plate 4-38 2026 Manual Activity Surveys (Total Species Composition)

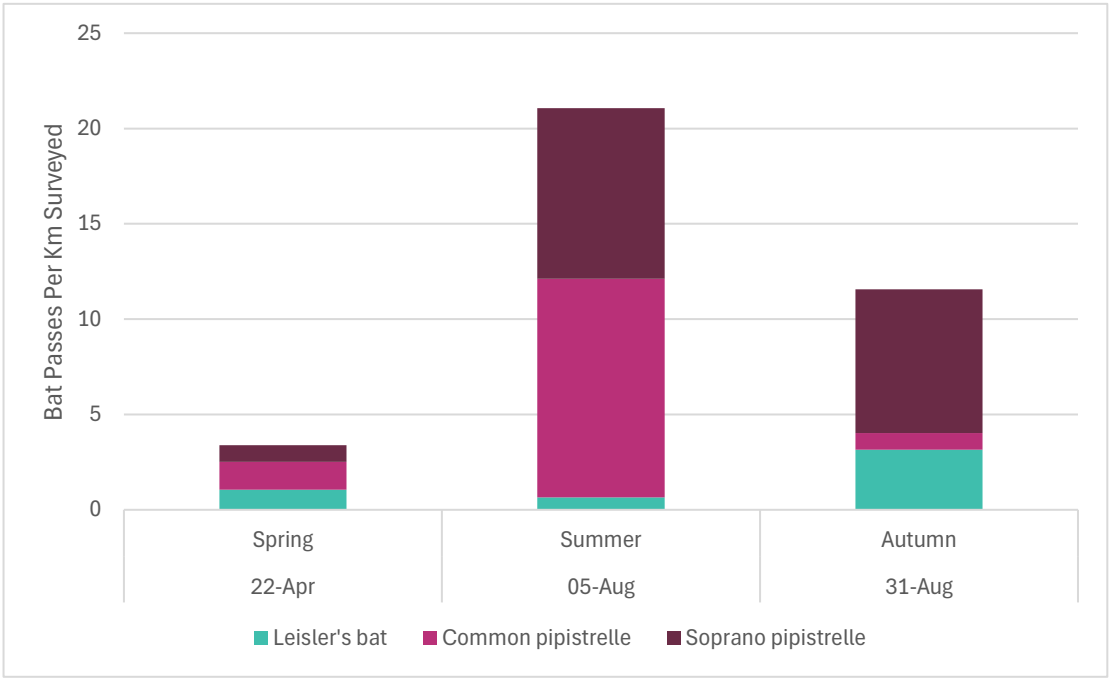
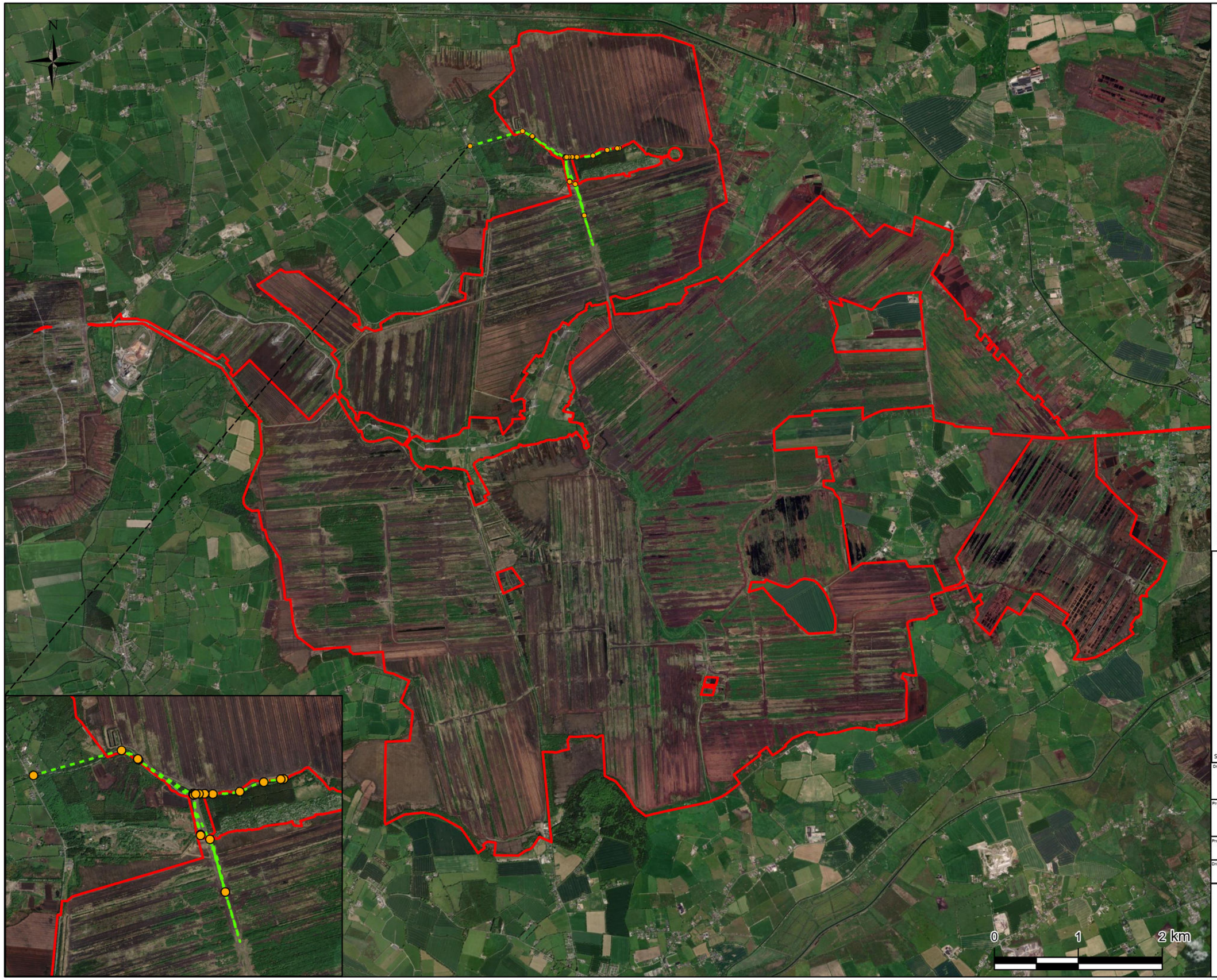


Plate 4-39 2026 Transect Results – Species Composition Per Survey Period



Map Legend

- Project Site
- Spring Transect Results
- Spring Transect Route

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

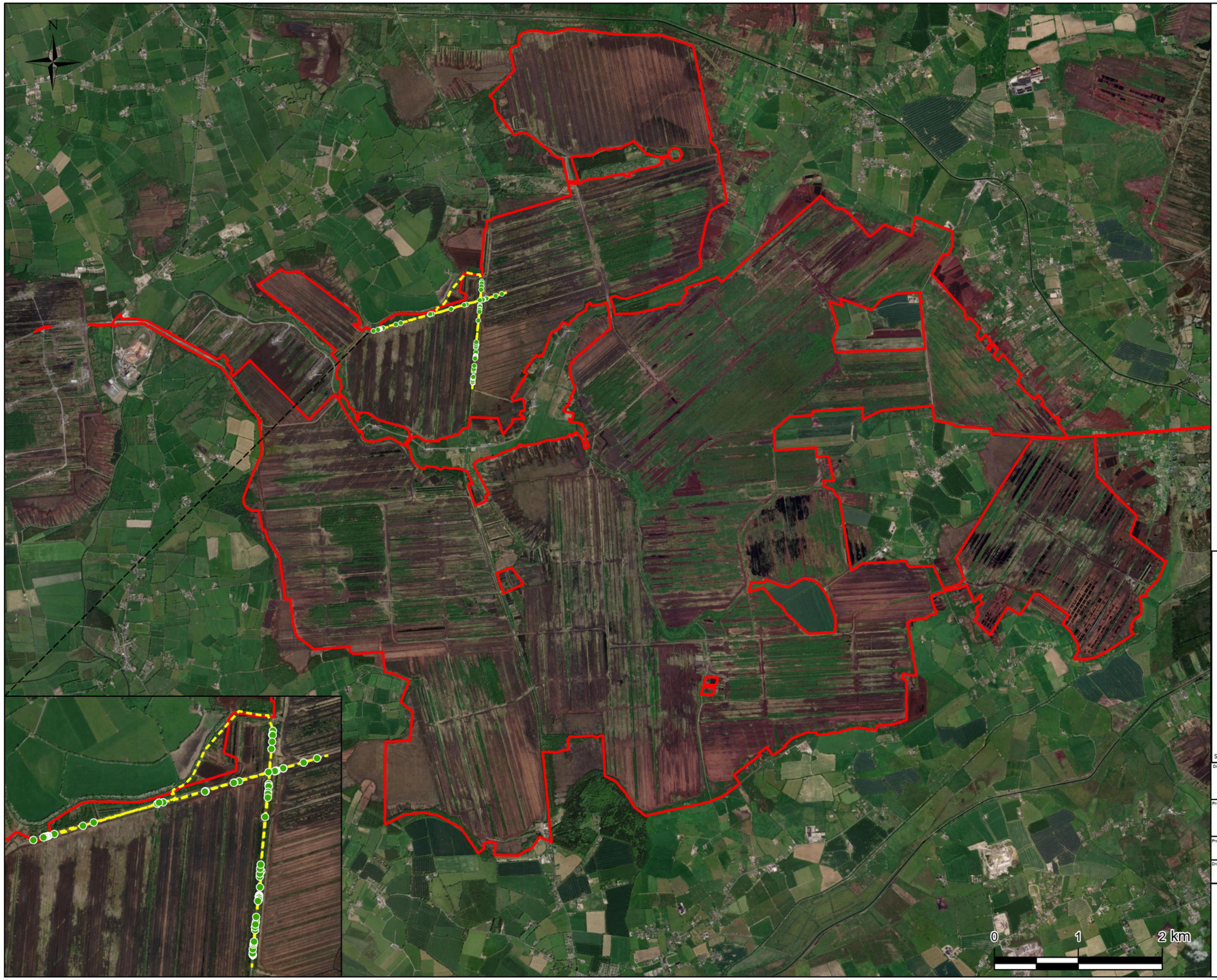
Spring Manual Results 2026

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	4-4	1:42,000
Drawn By	Checked By	Date
BOC	MOH	28/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie



Map Legend

- Project Site
- Summer Transect Results
- Summer Transect Route

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

Summer Manual Results 2026

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	4-5	1:42,000
Drawn By	Checked By	Date
BOC	MOH	28/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie



Map Legend

- Project Site
- Autumn Transect Results
- Autumn Transect Route

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

Autumn Manual Results 2026

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	4-6	1:42,000
Drawn By	Checked By	Date
BOC	MOH	28/09/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

4.3.4 Vantage Point Surveys

Two vantage point surveys were undertaken during the 2026 survey season to observe bat flight activity within the proposed rotor swept area, with particular regard to high-flying species such as Leisler's bat. Bat activity, behaviour and flight paths were recorded during both surveys. Observations of flight direction, approximate flight height and behaviour were recorded where possible. Activity was generally concentrated to commuting from north to south along linear connectivity features. Bats were observed on 7 occasions during vantage point surveys. Observations were of individuals and all were of bats commuting or foraging (Table 4-6). Vantage point 1was carried out on the 5th of August 2026 surveying the viewshed at the location of Proposed Turbine T2. VP 2 was carried out on the 31st of August 2026 surveying the viewshed analysis at the location of the Proposed Turbine T8.

Table 4-6 –Vantage point observations

Vantage Point 1 –N 68089 22341					
Species	**Incoming Direction**	**Outgoing Direction**	**Approx. Flight Height**	**Behaviour**	**Duration**
Soprano pipistrelle	*South*	*North*	*1.5m*	*Commuting*	*2 seconds*
Leisler's bat	*South*	*North*	*30m*	*Foraging*	*10 seconds*
Vantage Point 2 - N 66010 23310					
Species	**Incoming Direction**	**Outgoing Direction**	**Approx. Flight Height**	**Behaviour**	**Duration**
Common pipistrelle	*South*	*North*	*30m*	*Commuting*	*3 seconds*
Soprano pipistrelle	*South*	*North*	*1.5m*	*Commuting*	*5 seconds*
Leisler's bat	*Not seen*	*Not seen*	*Not seen*	*Commuting*	*3 seconds*
Common pipistrelle	*Not seen*	*Not seen*	*Not seen*	*Commuting*	*3 seconds*
Soprano pipistrelle	*Not seen*	*Not seen*	*Not seen*	*Commuting*	*3 seconds*

4.3.5 Ground-level Static Surveys

4.3.5.1 Proposed Wind Farm – 2024 Surveys

In total, 84,138 bat passes were recorded across all deployments. In general, common pipistrelle (n=39,702) occurred most frequently, followed by soprano pipistrelle (n=22,118) and Leisler's bat (n=20,428). Instances of *Myotis spp.* (n=1,192), brown long-eared bat (n=355) and Nathusius' pipistrelle (n=343) were recorded less frequently during the 2024 survey period. Plate 4-40 presents relative species composition across all ground-level static detector surveys.

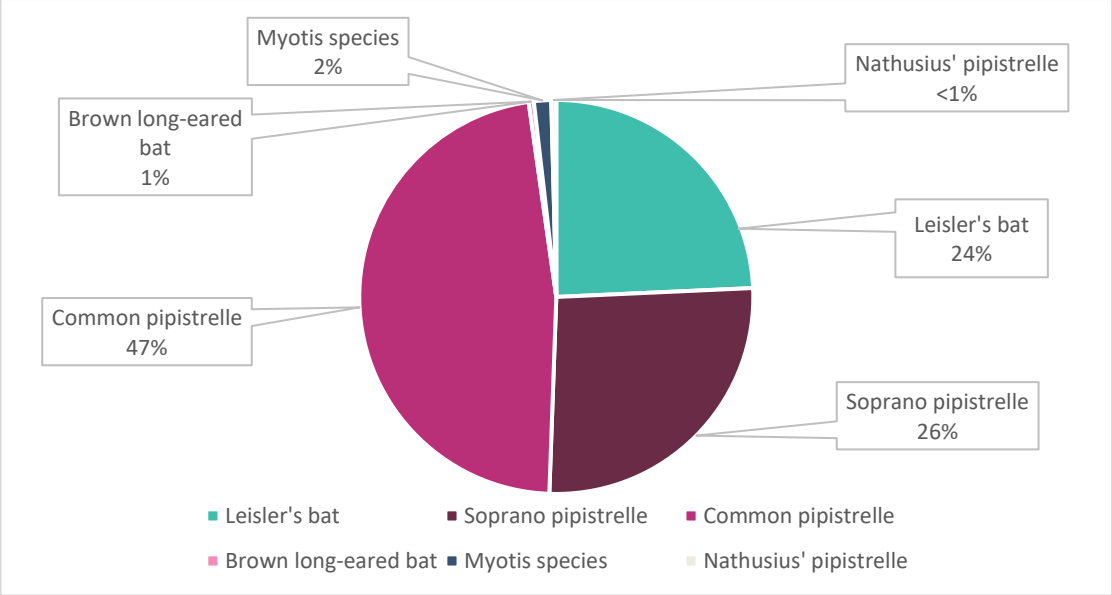


Plate 4-40 2024 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes)

Bat activity was standardised as bat passes per hour (bpph) to account for variation in night length. Plates 4-41 and Table 4-7 presents these results for each species per season. During spring, bat activity was dominated by common pipistrelle and soprano pipistrelle, with notable contributions from Leisler's bat. In summer, activity remained highest for common pipistrelle, though soprano pipistrelle activity declined slightly, and Leisler's bat activity increased. Autumn activity was predominantly led by common pipistrelle, followed by soprano pipistrelle and Leisler's bat. *Myotis spp.* exhibited modest increases across the seasons, while brown long-eared bat and Nathusius' pipistrelle were consistently recorded at low levels, representing only a small amount of the activity in each season.

The median bat activity recorded at each detector during each survey period is presented in Plates 4-42 and 4-43 (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, summer and autumn, activity at detector D06 was notably higher than at all other locations, dominated by common pipistrelle and soprano pipistrelle passes; this detector was located in an area of cutover bog. The seasonal shifts in species composition were evident, with *Myotis spp.* and soprano pipistrelle contributing to the elevated summer activity at D06. Leisler's bat activity was prominent in spring, particularly at D06, while common pipistrelle dominated in autumn. Nathusius' pipistrelle and brown long-eared bat activity remained consistently low across all seasons. Species composition and activity patterns at other detectors showed considerable variation, influenced by their respective habitat contexts and seasonal dynamics.

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 4-44). 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). Zero data, when a species was not detected on a night, was also included.

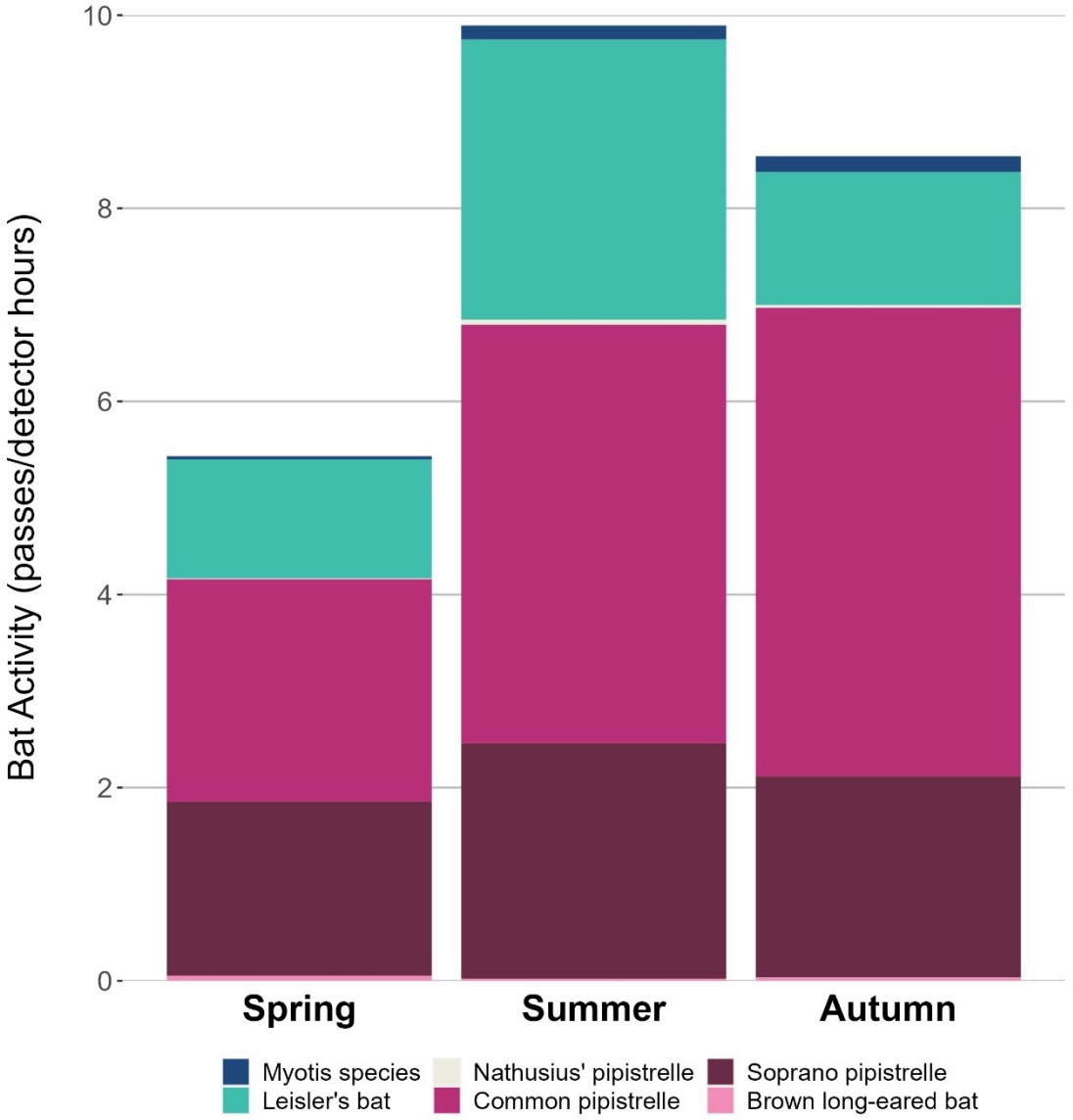


Plate 4-41 2024 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights).

Table 4-7 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

	Spring	Summer	Autumn
Total Survey Hours	**161.9**	**385.2**	**126.1**
Myotis spp.	0.034	0.144	0.164
Leisler's bat	1.233	2.902	1.377
Nathusius' pipistrelle	0.007	0.055	0.028
Common pipistrelle	2.305	4.332	4.852
Soprano pipistrelle	1.802	2.438	2.083
Brown long-eared bat	0.052	0.022	0.035

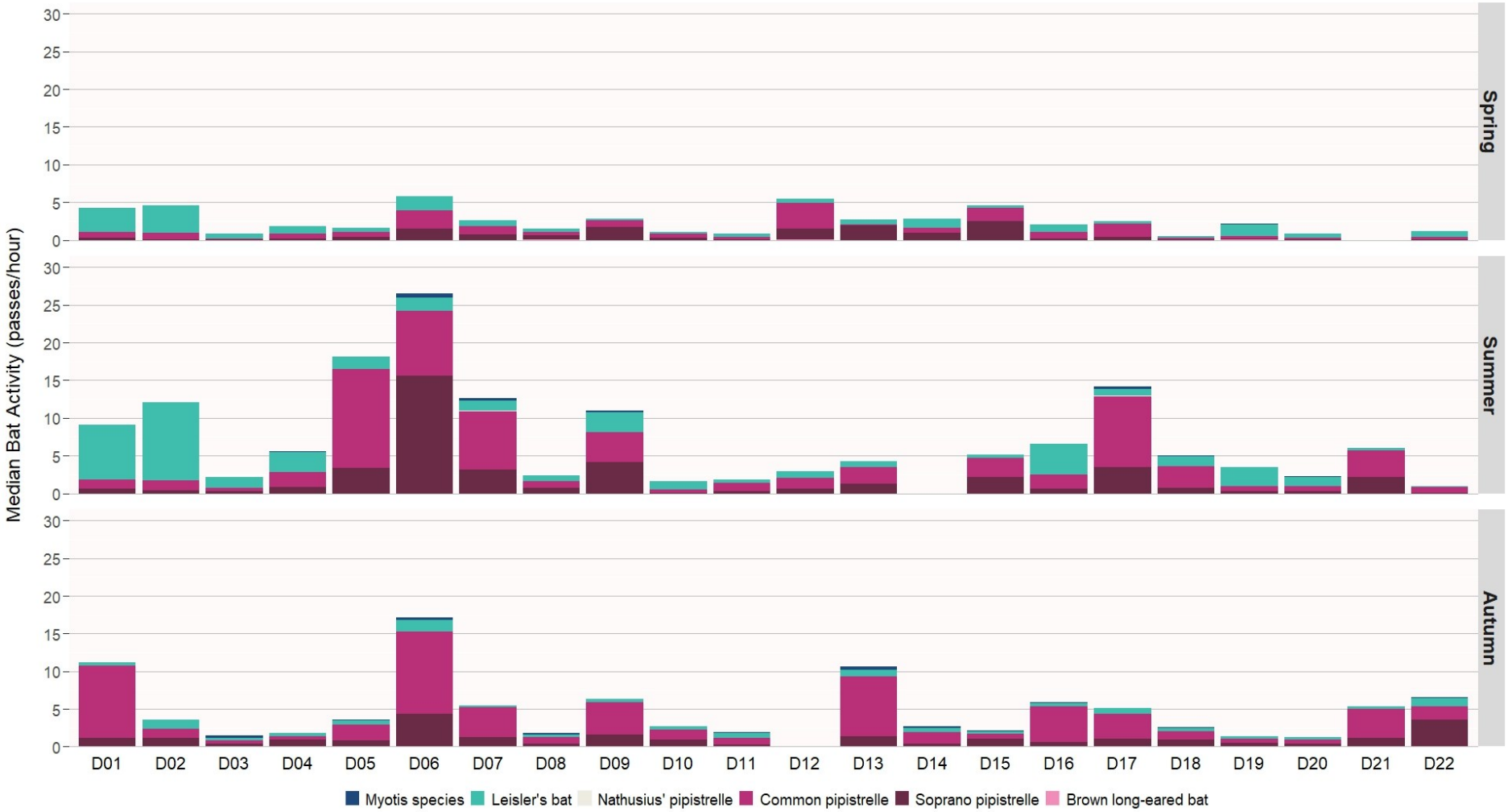


Plate 4-42 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period.

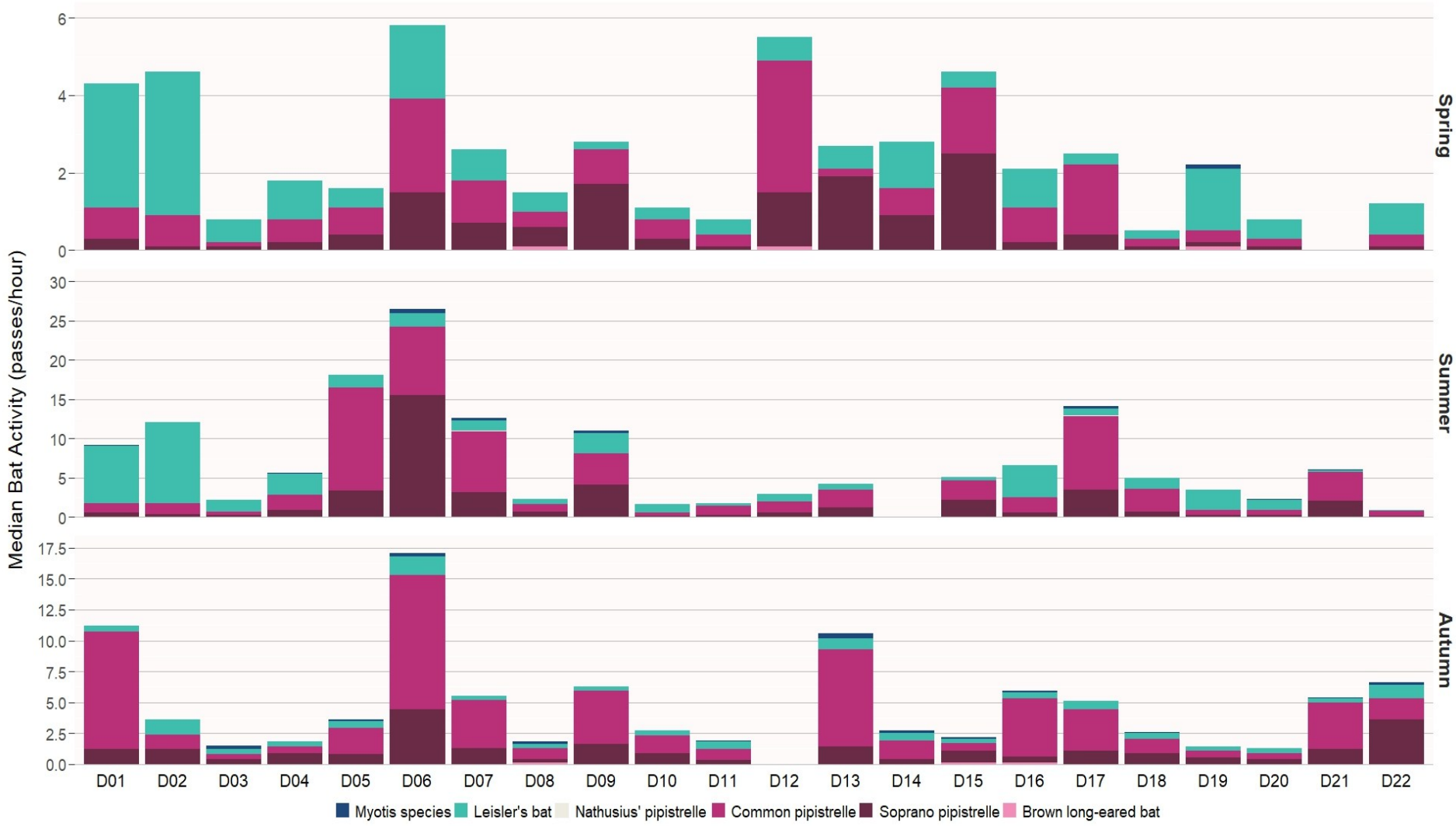


Plate 4-43 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale).

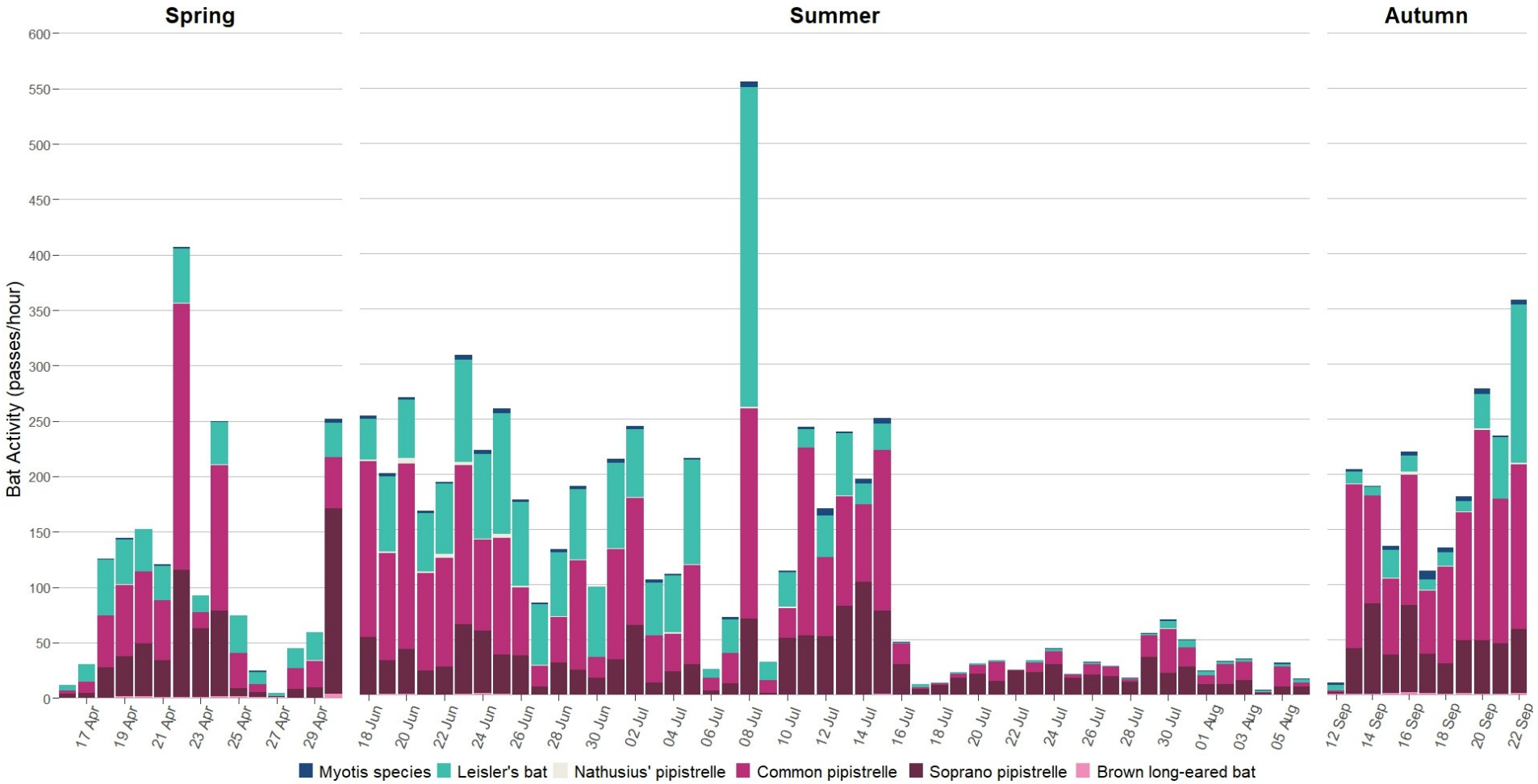


Plate 4-44 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night

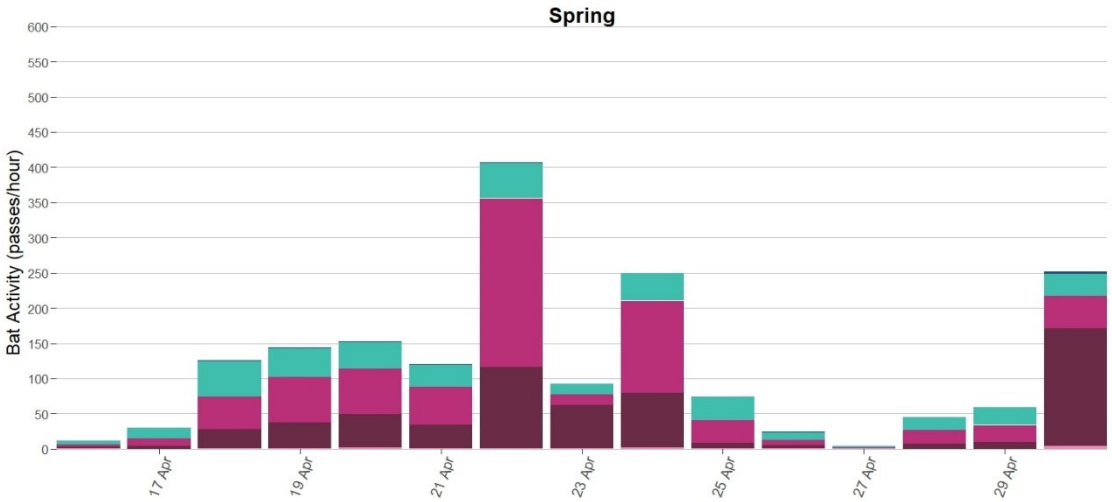


Plate 4-45 Static Detector Surveys: Spring Median Bat Pass Rate (bpph) Including Absences, Per Night

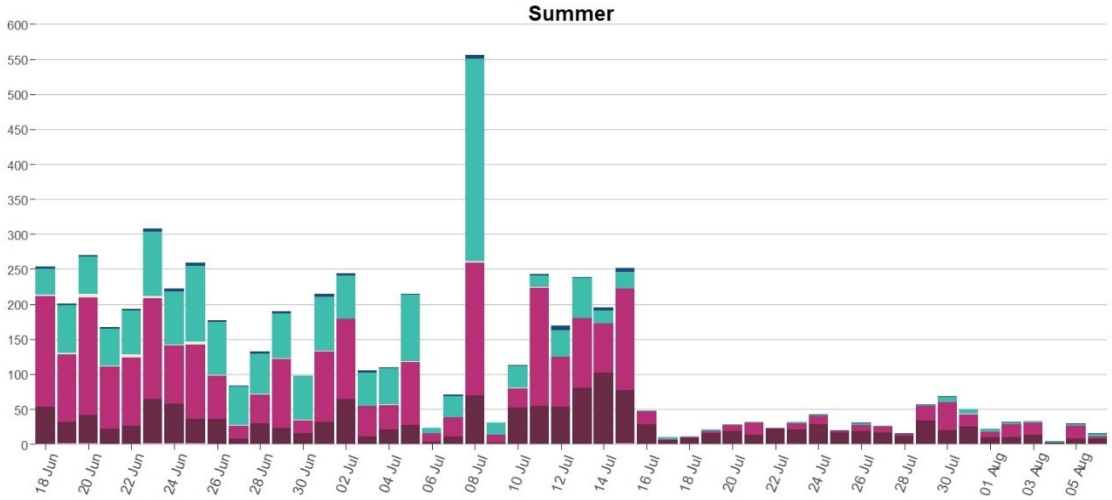


Plate 4-46 Static Detector Surveys: Summer Median Bat Pass Rate (bpph) Including Absences, Per Night

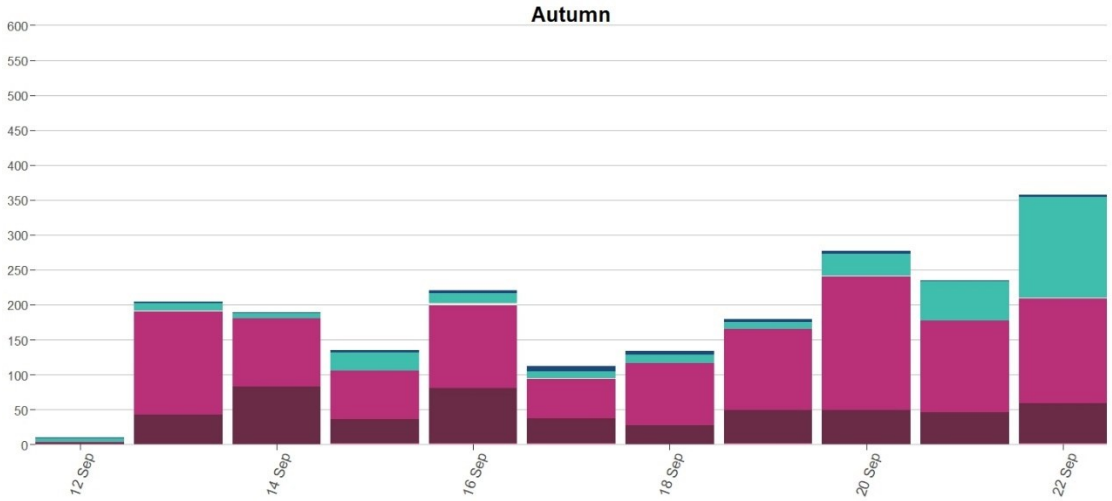


Plate 4-47 Static Detector Surveys: Autumn Median Bat Pass Rate (bpph) Including Absences, Per Night

4.3.5.2 Proposed Enhancement Areas - Lodge Bog Enhancement and Proposed Killina Bog Offsetting Area – 2026 Surveys

In total, 13,331 bat passes were recorded across all deployments. In general, soprano pipistrelle (n=8,433) occurred most frequently, followed by common pipistrelle (n=2,850) and Leisler's bat (n=1,813). Instances of *Myotis spp.* (n=177), brown long-eared bat (n=43) and Nathusius' pipistrelle (n=15) were recorded less frequently during the 2026 survey period. Plate 4-48 presents relative species composition across all ground-level static detector surveys.

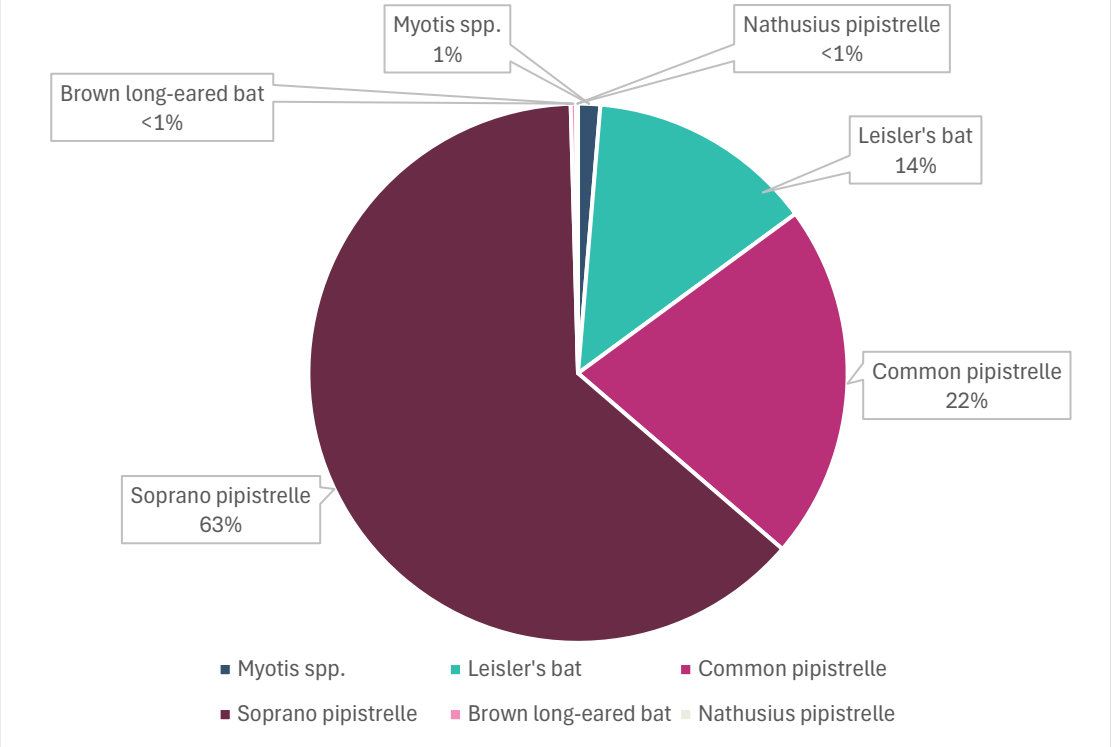


Plate 4-48 2026 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes)

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 4-49 and Table 4-8. Activity was dominated by soprano pipistrelle across all survey periods, followed by common pipistrelle and Leisler's bat. Common pipistrelle activity peaked in spring and Leisler's bat activity peaked in autumn. Myotis spp. were recorded consistently across all three survey periods, with the highest level of activity recorded in summer. Brown long-eared bat and Nathusius's pipistrelle were recorded infrequently.

The median bat activity recorded at each detector during each survey period is presented in Plates 4-50 and 4-51 (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, summer and autumn, activity at detector D04 was notably higher than at all other locations, dominated by soprano pipistrelle passes. During autumn, overall bat activity decreased substantially and Leisler's bat activity increased across all detector locations. In autumn, soprano pipistrelles dominated and *Myotis spp.* was only recorded at detector D01. Activity remained generally low throughout the survey periods at detectors D01, D02 and D03.

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 Lodge Bog Enhancement and Killina Bog Offsetting Area, reducing the influence of occasional high-activity nights on overall results (Plate 4-52). 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). Zero data, when a species

was not detected on a night, was also included. Three nights in particular, 25th of April, 1st of May, and 28th of June, stood out for their increased bat activity. On the 22nd of April, bat activity peaked at 100.6 bpph, largely driven by soprano pipistrelle. The highest single-night activity occurred on the 28th of June, at 108.9 bpph, dominated by soprano pipistrelle. Finally, on the 1st of May, another notable spike of 108.6 bpph was observed, again led by soprano pipistrelle as well as Leisler's bat. Plates 4-53 to 4-55 present the weather suitability across the deployment periods.

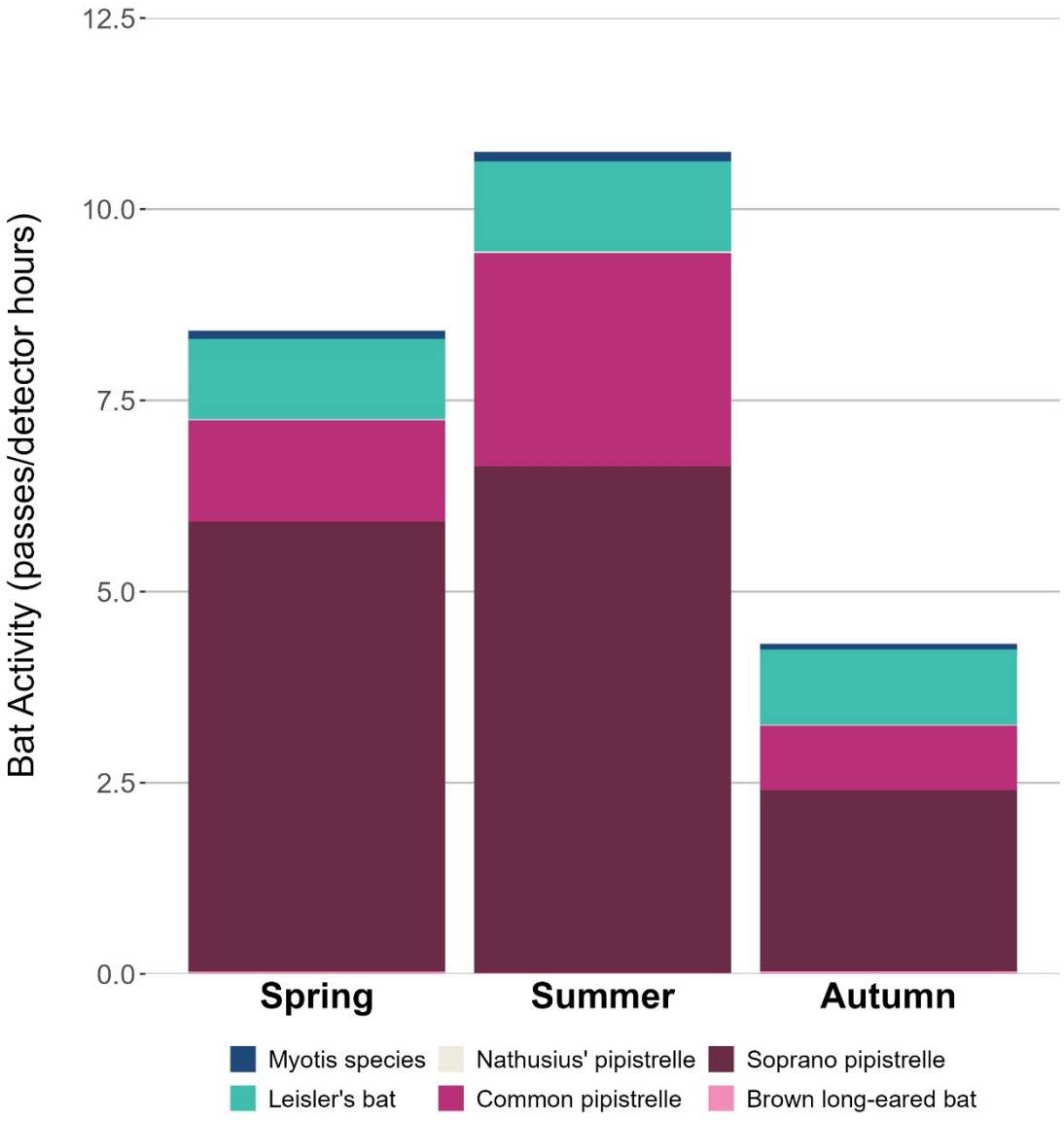


Plate 4-49 2026 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights).

Table 4-8 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

	Spring	Summer	Autumn
Total Survey Hours	**136.153**	**148.239**	**137.51**
Myotis spp.	0.11	0.125	0.078
Leisler's bat	1.05	1.179	0.985
Nathusius' pipistrelle	0.007	0.015	0.004
Common pipistrelle	1.328	2.796	0.853
Soprano pipistrelle	5.887	6.624	2.362
Brown long-eared bat	0.029	0.012	0.036

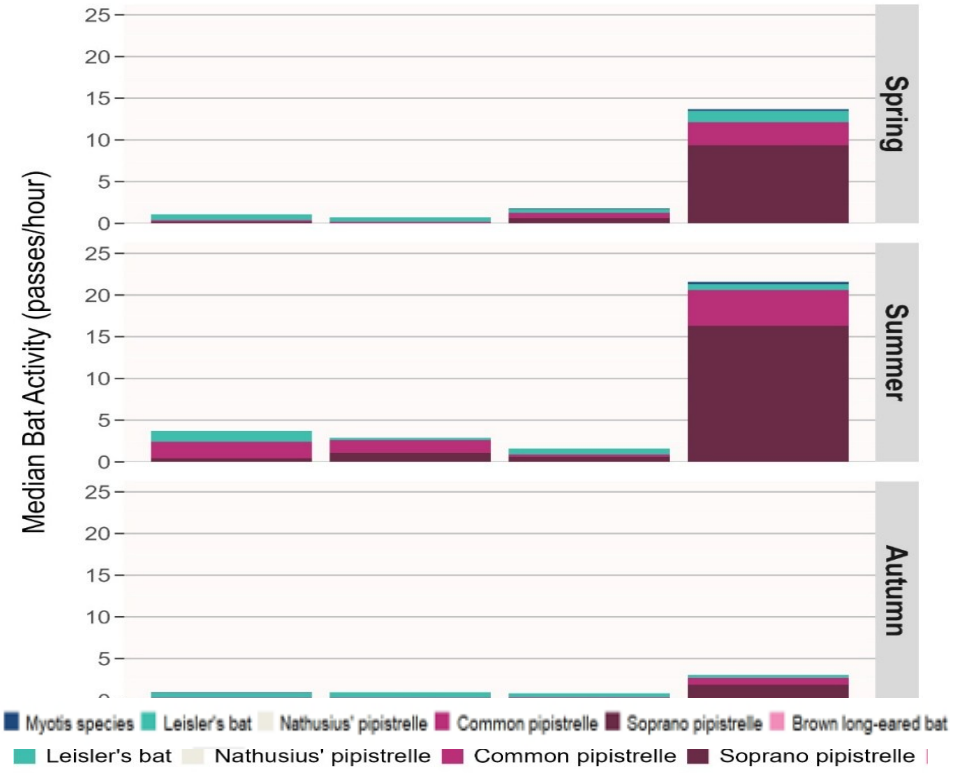


Plate 4-50 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period.

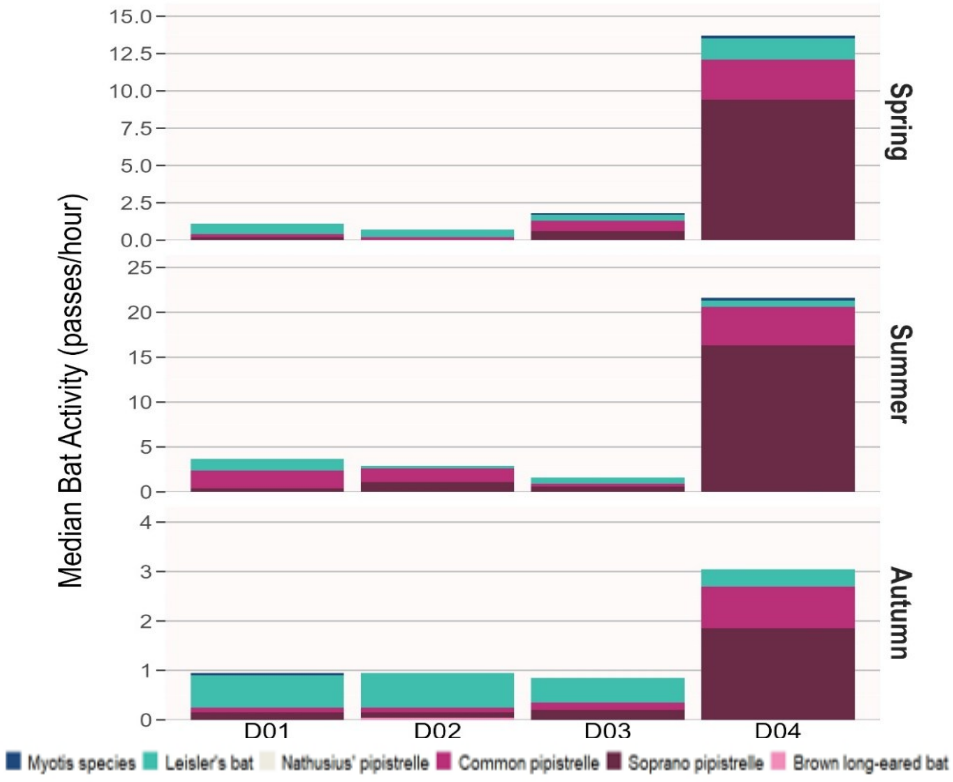


Plate 4-51 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale).

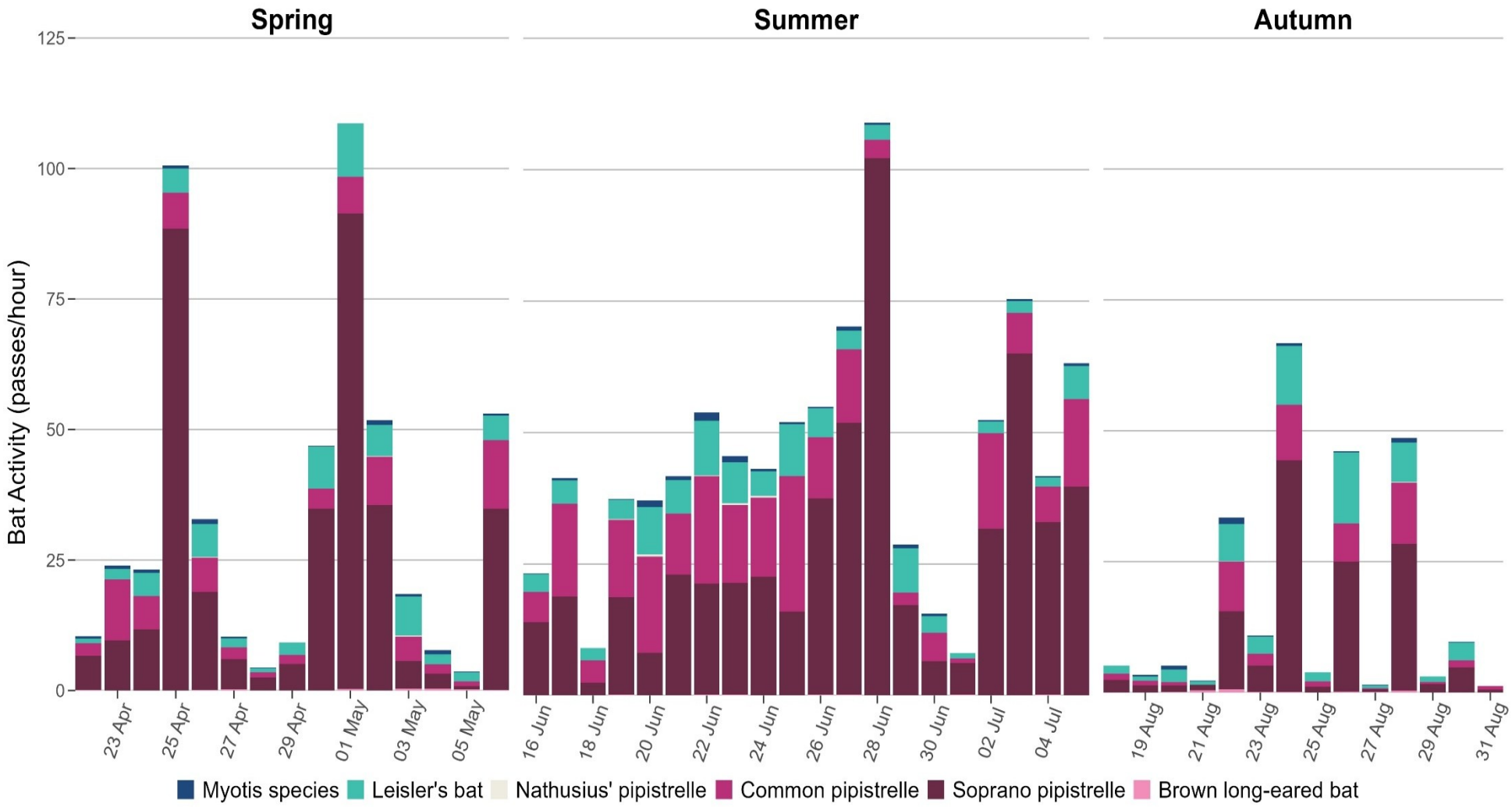


Plate 4-52 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night

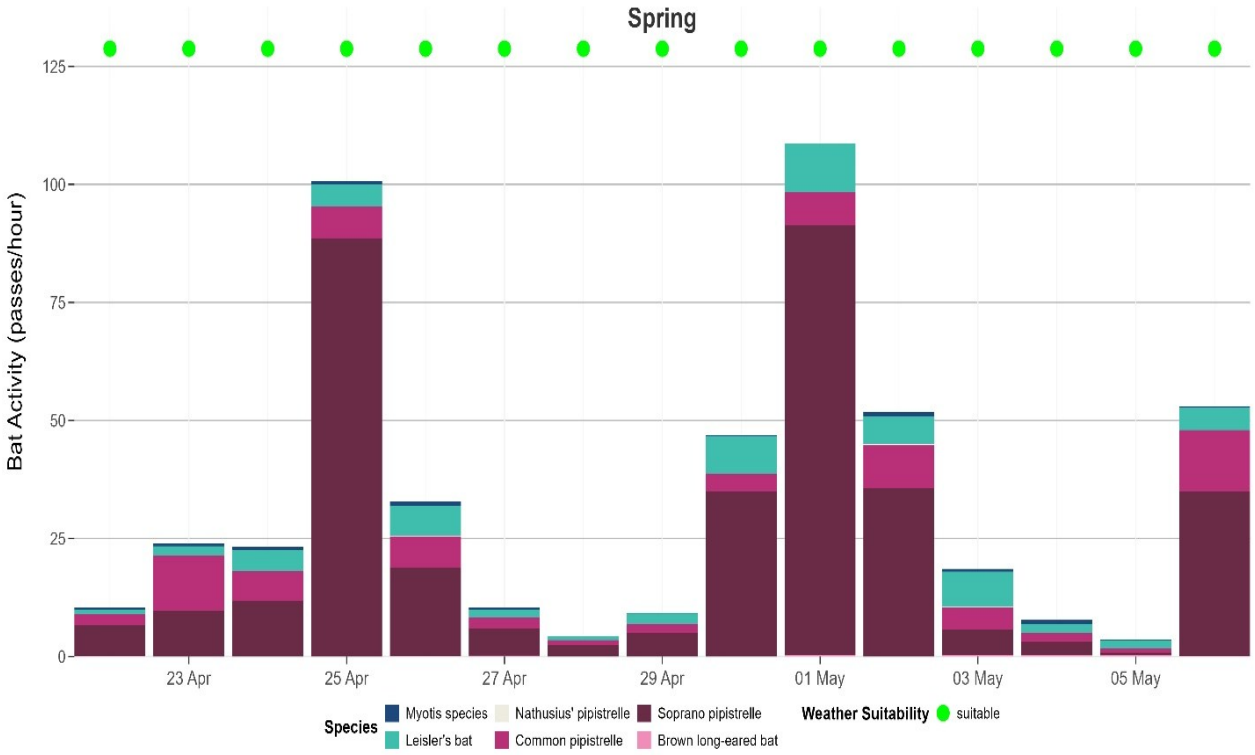


Plate 4-53 Static Detector Surveys: Spring Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability

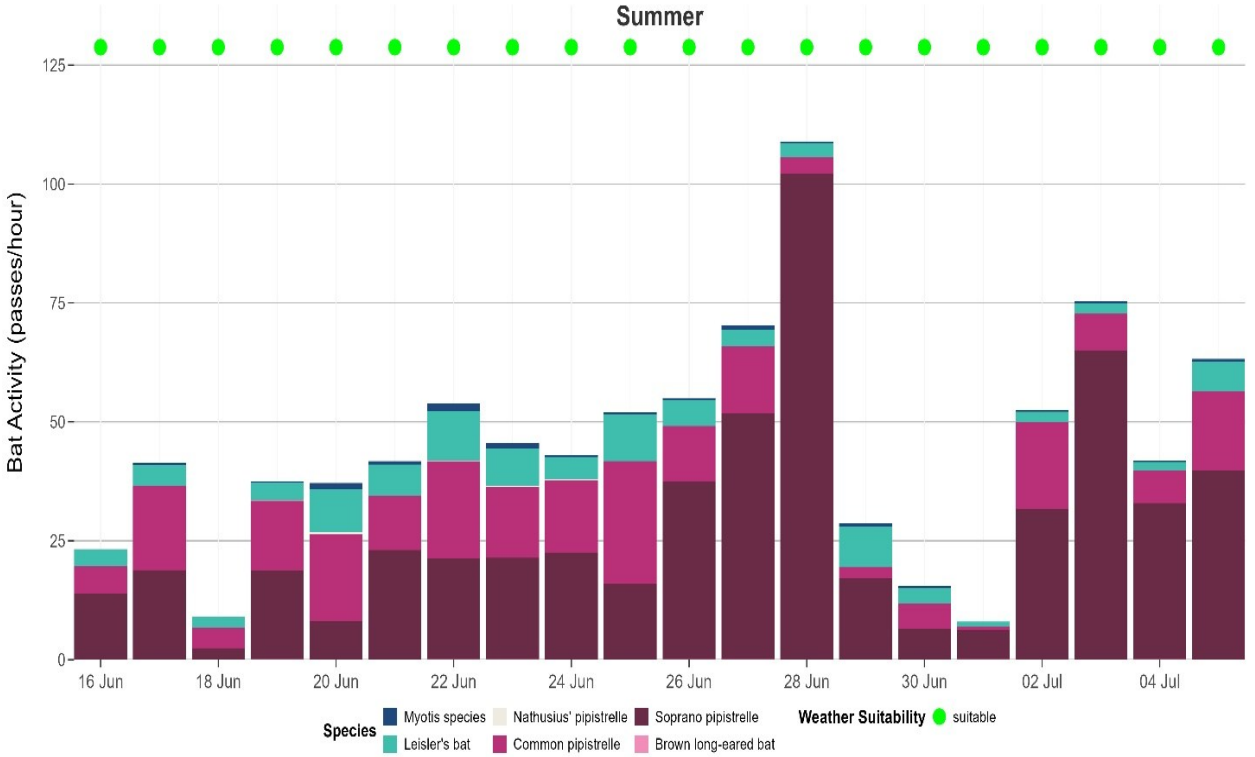


Plate 4-54 Static Detector Surveys: Summer Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability

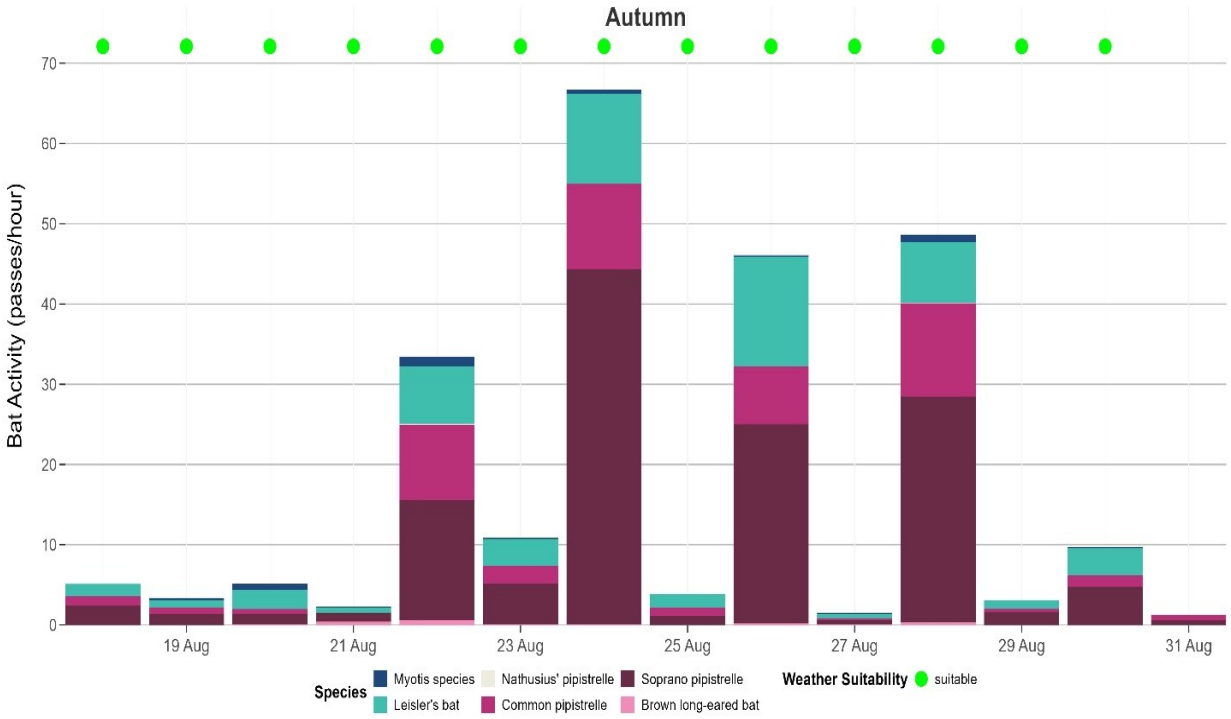


Plate 4-55 Static Detector Surveys: Autumn Median Bat Pass Rate (bpph) Including Absences, Per Night with Weather Suitability

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 site in 2024, as adapted from Mathews *et al.* (2016) and detailed in section 3.5. Table 4-9 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.

Myotis bats exhibited Low median activity levels at all detectors across all seasons. Maximum activity levels were also generally Low, with a peak of 3.7bpph (High) recorded at D02 (T45) in autumn.

Leisler's bat displayed predominantly Low to Medium median activity levels across the Proposed Wind Farm site, with notable High median activity recorded at D01 (T46) (7.3bpph) and D02 (10.3bpph) during summer. Activity levels were highest in summer and decreased in spring and autumn. An outlier was identified at D02 in summer with a maximum activity level of 108.2bpph.

Nathusius' pipistrelle was consistently recorded at Low activity levels across the Proposed Wind Farm site. Median activity remained Low at all detectors during all seasons, with a maximum activity of 2.7bpph recorded at D05 (T2) in summer.

Common pipistrelle demonstrated Low median activity during spring, with Medium median activity recorded at several detectors in summer and autumn. High median activity was observed at D05 (T2) (13.05bpph) in summer and D06 (T38) (10.9bpph) in autumn. The highest maximum activity for this species was recorded in summer at D05 (T2), reaching 82.4bpph.

Soprano pipistrelle displayed Low median activity levels across all detectors in spring, with occasional Medium median activity recorded during summer and autumn. High median activity was limited to

D06 (T38) in summer (15.55bpph). Peak maximum activity occurred at D09 (T6) during spring, reaching 90.2bpph.

Brown long-eared bats exhibited uniformly Low median activity levels across all detectors and seasons. The highest maximum activity recorded was 1.2bpph at D21 (T35) in spring.

Table 4-9 Median Nightly Bat Activity (bpph) per Species, per Season, per Detector Location 2024 None, Low, Moderate, High. Outliers are highlighted in Orange.

2024 Season	Detector	*Myotis spp.*		Leisler's bat		Nathusius' pipistrelle		Common pipistrelle		Soprano pipistrelle		Brown long-eared bat	
		Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity
Spring	D01	0	0.1	3.2	5.5			0.8	6.4	0.3	1.2	0	0.2
	D02	0	0.1	3.7	7.8	0	0.1	0.8	5.4	0.1	1.2	0	0.1
	D03	0	0.1	0.6	2.3			0.1	3.6	0.1	0.8	0	0.3
	D04	0	0	1	5.2			0.6	9.3	0.2	1.7	0	0.1
	D05	0	0.1	0.5	8.1	0	0.1	0.7	3.1	0.4	1	0	0.2
	D06	0	2	1.9	5.8	0	0.4	2.4	18.1	1.5	5.9	0	0.4
	D07	0	0.2	0.8	1.9	0	0.5	1.1	27.3	0.7	3.7	0	0.1
	D08	0	0.2	0.5	2.5			0.4	5.5	0.5	35.5	0.1	0.3
	D09	0	0.1	0.2	0.9			0.9	15.4	1.7	90.2	0	0.2
	D10	0	0.1	0.3	0.9	0	0.1	0.5	10	0.3	2.3	0	0.1
	D11	0	0.1	0.4	2.7			0.3	2.5	0.1	1.3	0	0.2
	D12	0	0.2	0.6	2.6			3.4	69.3	1.4	25.4	0.1	0.3
	D13	0	0.2	0.6	2.1			0.2	9.3	1.9	3.3	0	0.3
	D14	0	0.3	1.2	4.3			0.7	3.6	0.9	1.6	0	0.2
	D15	0	0.3	0.4	3.1			1.7	34.2	2.5	10.4	0	0.2
	D16	0	0.3	1	10.7	0	0.1	0.9	14.3	0.2	3.7	0	0.3
	D17	0	0.1	0.3	1.6	0	0.2	1.8	10.1	0.4	3.4	0	0.1
	D18	0	0.1	0.2	1.2			0.2	19.5	0.1	3.8	0	0.1
	D19	0.1	0.4	1.6	13.1			0.3	8.7	0.1	3.5	0.1	0.7
	D20	0	0.1	0.5	5.8	0	0.1	0.2	43.4	0.1	4.7	0	0.3
	D21	0	0.4	0	1.9			0	12.1	0	20.9	0	1.2
	D22	0	0.1	0.8	6	0	0.1	0.3	3.7	0.1	1.6	0	0.1
Summer	D01	0.05	0.4	7.3	40.2	0	0.1	1.2	7.4	0.6	5	0	0.1
	D02	0	0.3	10.3	108.2	0	0.3	1.4	5.5	0.35	4.2	0	0.3

2024 Season	Detector	*Myotis spp.*		Leisler's bat		Nathusius' pipistrelle		Common pipistrelle		Soprano pipistrelle		Brown long-eared bat	
		Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity
	D03	0.05	0.7	1.45	7.6	0	0.1	0.4	2.3	0.3	1.9	0	0.1
	D04	0.1	0.6	2.65	12.8	0	0.1	2	7.7	0.85	2.4	0	0.1
	D05	0	0.6	1.65	6.7	0.05	2.7	13.05	82.4	3.4	39.4	0	0.3
	D06	0.5	1.5	1.8	6.9	0	0.2	8.65	40	15.55	34	0	0.2
	D07	0.3	1.1	1.3	5.7	0.1	0.7	7.75	47.5	3.15	17.2	0	0.4
	D08	0	0.7	0.7	2.4	0	0.1	0.95	6.1	0.7	4.3	0	0.3
	D09	0.3	2.8	2.55	19.6	0	0.3	4	72.8	4.15	55.7	0	0.3
	D10	0	0.3	1.1	8.5	0	0.4	0.45	2.4	0.1	3.2		
	D11	0	0.6	0.4	3.3	0	0.3	1.1	6	0.3	1.9		
	D12	0	0.4	0.9	4.7	0	0.1	1.4	6.1	0.6	1.8	0	0.3
	D13	0	0.6	0.75	3.4			2.25	6.8	1.25	9.1	0	0.1
	D14	0	0.3	0	0			0	44.3	0	8.1		
	D15	0	1.1	0.45	2.3	0	0.1	2.5	12.9	2.15	12.3	0	0.1
	D16	0	0.3	4.05	48.3	0	0.7	1.9	25.1	0.6	5.4	0	0.7
	D17	0.3	0.7	0.9	2.8	0.1	1.6	9.4	34.4	3.45	9	0	0.6
	D18	0.05	0.7	1.4	10.2	0	0.6	2.85	10	0.7	3.8	0	0.1
	D19	0	0.3	2.55	46.5	0	0.3	0.65	3.2	0.3	1.7	0	0.1
	D20	0.1	0.4	1.25	5.3			0.65	5.6	0.3	1.5	0	0.1
	D21	0.05	0.7	0.3	2.4	0	0.9	3.6	13.3	2.1	10	0	0.1
	D22	0	0.3	0.1	4.3			0.7	1.6	0.1	2.1	0	0.1
	D01	0	3.2	0.5	10.7	0	0.8	9.5	22.2	1.2	5.3	0	0.1
	D02	0	3.7	1.2	17.8	0	0.3	1.2	25.7	1.2	18.4	0	0.2
	D03	0.3	0.6	0.4	1.1			0.4	7.4	0.4	0.8	0	0.2
	D04	0	1	0.4	3.6	0	0.1	0.5	1.7	0.9	1.7	0	0.2
Autumn	D05	0.1	0.5	0.6	34			2.1	10.1	0.8	2.1	0	0.1

2024 Season	Detector	*Myotis spp.*		Leisler's bat		Nathusius' pipistrelle		Common pipistrelle		Soprano pipistrelle		Brown long-eared bat	
		Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity	Median Activity	Maximum Activity
	D06	0.3	1.9	1.5	3.6	0	1.5	10.9	60.9	4.4	18.6	0	0.1
	D07	0	0.8	0.3	1.9	0	0.3	3.9	30.6	1.3	11.1	0	0.1
	D08	0.2	0.5	0.3	1.1			0.9	1.7	0.3	1.2	0.1	0.2
	D09	0	0.2	0.4	3.2	0	0.1	4.3	29.2	1.6	9.4		
	D10	0	0.3	0.4	9.1	0	0.6	1.4	12.5	0.9	6.9	0	0.2
	D11	0.1	0.4	0.6	1.1	0	0.2	0.9	2.2	0.3	0.9	0	0.1
	D12	0	0.6	0	1.4			0	1.2	0	0.7		
	D13	0.4	0.6	0.9	3.2			7.9	26.7	1.4	11	0	0.2
	D14	0.2	1.2	0.6	1.1			1.5	6.4	0.4	2.2	0	0.1
	D15	0.2	0.4	0.3	1.6			0.6	1.9	1	4	0.1	0.3
	D16	0.1	1	0.5	6.2	0	0.3	4.7	26.4	0.5	10.9	0.1	0.1
	D17	0	0.3	0.7	5.9	0	0.2	3.3	89.9	1.1	77.6	0	0.2
	D18	0.1	0.2	0.5	14.1	0	0.1	1.1	9	0.9	3.6	0	0.2
	D19	0	1.6	0.3	1.2	0	0.1	0.6	1.8	0.5	1	0	0.1
	D20	0	0.5	0.4	0.9	0	0	0.5	1.7	0.4	1	0	0.1
	D21	0.1	0	0.3	1.8	0	0.3	3.8	11.7	1.2	4.5	0	0.2
	D22	0.2	0.8	1.1	43	0	0.1	1.7	8.7	3.6	23.9	0	0.3

4.5 Importance of Bat Population Recorded at the Project Site

Ecological evaluation within this section follows a methodology that is set out in Chapter 3 of the *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (TII, 2009).

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

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

No bat roosts were identified within the footprint of the Proposed Project. No large or significant maternity roosts (i.e. >100 individuals or of National Importance) were identified within the Project Site.

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 Project Site 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	No roosts were identified within the Proposed Wind Farm infrastructure footprint or the Proposed Grid Connection infrastructure footprint. The area within the part of the Proposed Wind Farm site containing the Proposed Turbines is dominated by open cutover bog (PB4), characterised by extensive areas of bare peat and limited features typically associated with high bat activity. Areas of long-abandoned cutover bog have revegetated with Calluna-dominated communities , birch scrub, bog woodland, poor fen and small areas of grassland; however, these habitats are generally scattered and do not form a highly connected habitat network. No confirmed roosts were identified, and woodland edges, treelines, hedgerows and other key commuting features are limited within the area within the part of the Proposed Wind Farm site containing the Proposed Turbines. Consequently, while the Proposed Wind Farm site provides some foraging and commuting opportunities, does not provide a habitat that could be used extensively by foraging bats or meet any of the criteria of a *High* risk site as set out in Table 3a of NatureScot, 2021.	Low
Project Size	Following the criteria set out in NatureScot, 2021 the Project Site is considered to be 'Large' in scale as it consists of 46 no. Proposed Turbines and turbine height exceeds 100m.	Large

	There are five existing, three proposed, 1 pre-application and 1 permitted wind energy developments within 15km of the Proposed Turbine locations.	
Overall Site Risk Assessment - Based on a Low habitat risk and Large scale of the Proposed Project, the Proposed Project is classified as a Medium Site Risk, in accordance with Table 3a of NatureScot (2021).		**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 Project Site lies within the current known range of the Leisler's bat (*Nyctalus leisleri*) in Ireland (NPWS, 2025). 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 site. When interpreted in the context of the medium site risk (see Section 5.1.1) and using Table 3b of NatureScot (2021), Leisler's bat activity was characterised by ***Low*** typical collision risk in Spring and Autumn and ***Medium*** in Summer (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 D02 in summer, with a median activity rate of 10.3 bpph. An outlier was identified at D02. Walked transect results also detected higher activity levels of Leisler's bat activity during the summer 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 cutover bog, with smaller areas of scrub, heath, bog 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*** *to* ***Medium*** at typical activity levels**,** with *Medium* risk at peak levels, particularly at detector locations showing concentrated activity in summer.

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 (1)	Typical Risk is Low (3)	Moderate (3)	Peak Risk is Medium (9)
Summer 2024		Low-moderate (2)	Typical Risk is Medium (6)	Moderate-high (4)	Peak Risk is Medium (12)
Autumn 2024		Low (1)	Typical Risk is Low (3)	Moderate (3)	Peak Risk is Medium (9)

5.1.2.2 Soprano pipistrelle

The Project Site lies within the range of the soprano pipistrelle (NPWS, 2025). 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 site. 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*** 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 site, characterised mainly by cutover bog, with smaller areas of scrub, heath, bog 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 (1)	Typical Risk is Low (3)	Low-Moderate (2)	Peak Risk is Medium (6)
Summer 2024		Low (1)	Typical Risk is Low (3)	Moderate (3)	Peak Risk is Medium (9)
Autumn 2024		Low (1)	Typical Risk is Low (3)	Moderate (3)	Peak Risk is Medium (9)

5.1.2.3 Common pipistrelle

The Project Site is located within the current range of the common pipistrelle (NPWS, 2025). 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 site. When assessed against the identified site risk and following Table 3b (NatureScot, 2021), overall typical activity risk for common pipistrelle was ***Low*** in spring and ***Medium*** during summer, and autumn. Peak activity levels were ***Moderate*** to ***High*** in spring and *Moderate in summer and autumn* to 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 site, characterised mainly by cutover bog, with smaller areas of scrub, heath, bog woodland, and sparse linear features such as hedgerows and treelines.

Therefore, a ***Low*** typical collision risk is assigned during spring and ***Medium*** typical risk during summer and autumn. 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)	Low (1)	Typical Risk is Low (3)	Moderate-high (4)	Peak Risk is Medium (12)
Summer 2024		Low-moderate (2)	Typical Risk is Medium (6)	Moderate (3)	Peak Risk is Medium (9)
Autumn 2024		Low-moderate (2)	Typical Risk is Medium (6)	Moderate (3)	Peak Risk is Medium (9)

5.1.1 Nathusius' pipistrelle

The Project Site is outside the current known range of Nathusius' pipistrelle (NPWS, 2025), 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 Project 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 Project 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 ***Low*** to ***Moderate*** levels at some detector locations across all seasons, resulting in a ***Low*** to ***Medium*** peak risk**.** (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 area within the part of the Proposed Wind Farm site containing the Proposed Turbines, characterised mainly by cutover bog, with smaller areas of scrub, heath, bog 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 ***Low*** to ***Medium*** peak risk assessed for summer.

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)	Low (1)	Peak Risk is Low (3)
Summer 2024		Low (1)	Typical Risk is Low (3)	Low-Moderate (2)	Peak Risk is Medium (6)
Autumn 2024		Low (1)	Typical Risk is Low (3)	Low (1)	Peak Risk is Low (3)

5.1.2 Collision Risk Summary

Following the methodology set out in NatureScot (2021), site-level collision risk for high collision-risk bat species at the Project Site was assessed as Low under typical activity conditions. At peak activity levels, collision risk increased to Medium for Leisler's bat, common pipistrelle, Nathusius' pipistrelle and soprano pipistrelle. However, peak activity values were associated with short-duration periods of elevated activity and are not considered representative of typical site conditions. The use of median activity levels is therefore considered to provide the most realistic assessment of collision risk at the Project Site.

Overall bat activity was consistent with the habitat composition of the Proposed Wind Farm site, which is dominated by cutover bog with smaller areas of scrub, heath, bog woodland, grassland and scattered linear features. While these habitats provide opportunities for bat foraging and commuting, suitable habitat is fragmented and largely confined to discrete areas rather than being widespread across the Proposed Wind Farm site. Static detector and manual transect survey results indicated activity levels typical of a commercial peatland landscape, with localised areas of elevated activity associated with habitat features of increased suitability for bats.

Detector-level analysis identified four locations (D01, D02, D05 and D06) where high median activity levels were recorded for high collision-risk species. These records were concentrated during the summer period and were associated with localised habitat features, particularly scrub, hedgerow and drainage ditch habitats that provide enhanced foraging and commuting opportunities. The elevated activity recorded at these locations is therefore considered to reflect habitat-driven concentrations of bat activity rather than widespread elevated collision risk across the Project Site. Importantly, the areas of highest activity are associated with specific linear and edge habitats and do not indicate extensive use of the wider cutover bog landscape by high collision-risk species.

While Leisler's bat activity was recorded widely across the Project Site, as a higher-flying and less habitat-constrained species, residual collision risk to Leisler's bat is less readily addressed through habitat-based mitigation alone. Consequently, a site-specific monitoring and mitigation strategy has been developed in accordance with NatureScot (2021), including post-construction monitoring, blade feathering and the implementation of adaptive curtailment where monitoring identifies an elevated risk of collision.

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

Detector ID	Nearest Proposed Turbine	Species	*High* Median Activity Survey Period
D01	T46	Leisler's bat	Summer 2024
D02	T45	Leisler's bat	Summer 2024
D05	T2	Common pipistrelle	Summer 2024
D06	T38	Common pipistrelle	Autumn 2024
D06	T38	Soprano pipistrelle	Summer 2024

5.2 Loss or Damage to Commuting and Foraging Habitat

Wind farm developments have the potential to result in the loss or modification of habitats used by bats for commuting and foraging, primarily during the construction phase. These impacts may arise through vegetation removal, habitat fragmentation and localised disturbance associated with turbine bases, crane hardstands, access tracks, internal cabling, grid connection underground cabling and turbine delivery route accommodation works. As a result of the proposed project infrastructure footprint there will be a loss of approximately 131.7ha of Scrub (WS1) and scrub mosaic habitats,44.3ha of Bog woodland (WN7) and 60.7ha of Conifer plantation (WD4, as well as 180m of treeline habitats.

Proposed Wind Farm

The Proposed Wind Farm site is dominated by open and exposed habitats, including cutover bog which are assessed as providing *Negligible* to *Low* suitability for commuting and foraging bats. Habitats of greater relevance to bats are limited to localised linear features, including plantation edges, bog woodland, scrub, watercourses and occasional hedgerows and treelines, which provide *Moderate* suitability for commuting and foraging bats within the Proposed Wind Farm site.

Direct habitat loss associated with the Proposed Project will primarily affect areas of peatland habitats of *Negligible* to *Low* suitability. These habitats do not represent key commuting or foraging features for bats and are widely available within the surrounding landscape. As such, the loss of these habitats is not expected to result in a significant reduction in foraging resources or connectivity for the local bat population.

The Proposed Wind Farm will contribute to the loss of Scrub (WS1) and scrub mosaic habitats, Bog woodland (WN7) Conifer plantation (WD4). The loss of these habitats collectively will occur as a result of the construction of Proposed Turbine hardstands, proposed internal site access roads, proposed peat and spoil areas, and other associated Proposed Wind Farm infrastructure footprint including proposed bat buffer zones around the Proposed Turbines

The removal scrub and bog woodland is not anticipated to result in the loss of high-value bat commuting or foraging habitat**.** Any localised loss of plantation edge habitat will be limited in extent and will not result in fragmentation at the site scale. Opening up previously closed canopy forestry also has the potential to increase the extent of forestry edge habitat which is known to support both foraging and commuting.

Lodge Bog Enhancement

As part of the proposed enhancement measures for golden plover outlined within the BMP (see Appendix 6-5), all areas of scrub will also be removed and managed within Lodge Bog. This will result in the loss of scrub habitats in these areas. D04 recorded the highest level of bat activity out of the detectors deployed within the Lodge Bog Enhancement area. It was located within the centre of Lodge Bog, showing that the area is being utilised for commuting and foraging by bats in the area, with particularly high levels of soprano pipistrelle recorded. Although there is scrub habitat proposed for removal in this area which has *Moderate* suitability for commuting and foraging bats, there will be an overall net gain of scrub habitat within the Proposed Wind Farm site with 246ha of scrub habitat proposed to be replanted as part of the Proposed Project.

Golden Plover Offsetting Area

As part of the proposed offsetting measures for golden plover outlined within the BMP (see Appendix 6-5), the identified area of existing forestry within Killina Bog will be permanently removed and the area will be allowed to revert to peatland habitat. This will result in the loss of forestry habitat in these areas.

Proposed Grid Connection

The Proposed Onsite Substation is located in the north of Lodge Bog, Co. Kildare. The habitats in this location are dominated by Cutover bog (PB4), Poor fen (PF2), and Scrub (WS1).

The Proposed Grid Connection underground electrical cabling route will predominantly be constructed within existing road infrastructure and low biodiversity value agricultural grassland. However, it will require the loss of treelines as a result of the construction of Site Entrance 7M at the location of the Proposed Offsite Substation during construction.

The Proposed Offsite Substation is located within Improved agricultural grassland (GA1), Dry meadows and grassy verges (GS2), Wet grassland (GS4) and Treeline (WL2).

Dry meadows and grassy verges (GS2), wet grassland (GS4), improved agricultural grassland (GA1), cutover bog (PB4), and Poor fen (PF2)associated with the Proposed Grid Connection infrastructure footprint, were assessed as offering *Negligible to Low* suitability for commuting and foraging bats due to their generally open nature and limited structural connectivity.

Habitats and Linear features) associated with the Proposed Grid Connection infrastructure footprint including Treelines (WL2) and Scrub (WS1), were assessed as offering *Moderate* suitability for commuting and foraging bats, due to their connectivity with the wider landscape and the presence of linear vegetation providing navigational structure and shelter.

Proposed Turbine Delivery Route

The Proposed Turbine Delivery Route is located within existing road infrastructure, with areas of accommodation works requiring the removal of approximately linear habitat in the form of treelines. These treelines will be replanted using young tree saplings once the works are completed.

The implementation of the Biodiversity Management Plan (Appendix 6-5) will deliver positive measures for bats within the Project Site. The BMP provides the management of 15.6ha of species rich grassland in the form of pollinator and marsh fritillary enhancement areas and the establishment and management of 45.3 ha of native trees which will over time develop into native woodland habitat throughout the Project Site. The BMP also proposes to create 246ha of scrub mosaic habitats, Whilst the BMP does not provide for hedgerows, with the implementation of the above, the losses of linear habitats to facilitate the Proposed Project will be offset via the establishment of woodland habitats. Overall, these measures will result in net gain of linear habitat and will enhance ecological corridors across the Proposed Wind Farm site, providing new foraging and commuting opportunities once established.

During the operational phase, no further direct habitat loss is predicted. Potential indirect effects may arise through operational lighting; however, a site-specific lighting design will be implemented in accordance with best practice guidance to minimise light spill onto adjacent habitats and maintain dark corridors for commuting and foraging bats.

Overall, taking into account the limited extent of suitable bat habitat within the Project Site, the localised nature of habitat loss, and the implementation of mitigation measures, the Proposed Project is not predicted to result in significant adverse effects on commuting or foraging bats.

5.3 Loss of, or Damage to, Roosts

Wind farm developments could have the potential to result in the loss of, or disturbance to, bat roosts through direct impacts to structures or trees supporting roosting bats, or through indirect effects such as noise, vibration and artificial lighting during construction and operation.

Proposed Wind Farm

Wind farm developments could have the potential to result in the loss of, or disturbance to, bat roosts through direct impacts to structures or trees supporting roosting bats, or through indirect effects such as noise, vibration and artificial lighting during construction and operation. No confirmed bat roosts or evidence of bat occupation were recorded within any inspected structure. Furthermore, no structures with bat roosting potential were identified within 285m of the Proposed Turbine locations within the Proposed Wind Farm infrastructure footprint.

A total of 13 structures were identified within the Proposed Wind Farm site and assessed for bat roosting potential. One building complex located elsewhere within the Proposed Wind Farm was assessed as having *Low* bat roost suitability due to the presence of a limited number of features that could potentially support individual roosting bats. This complex consists of the structures at the Ballydermot Works (IG Ref: N 66025 21597). This complex is located approximately 862 m from the nearest Proposed Turbine (T14). There are no proposed plans to alter these buildings as part of the Proposed Project. All other structures were assessed as having no (*none*) roosting potential.

Of the 15 water course crossings within the Proposed Wind Farm, 12 of them had associated infrastructure that were assessed for roosting potential. Two of water course crossings will be upgraded to a clear span bridge. No roosts or evidence of roosting bats were identified at these watercourse crossing structures during inspections undertaken. The removal of the watercourse crossing structures will not result in the loss of roosting structures as they offer no potential roosting suitability. As such, the proposed works are unlikely to result in significant disturbance to bats, and a derogation licence is not required.

Trees within the Proposed Wind Farm site comprise predominantly bog woodland conifer forestry, which does not typically support suitable roosting features due to its uniform structure and management regime. Targeted inspections of non-conifer trees within works areas did not identify any potential roost features, and all trees affected by the Proposed Wind Farm were assessed as having no (*None*) roosting suitability and no roosts were identified. As such, no impacts to tree roosts are anticipated.

Lodge Bog Enhancement area

Trees present on the Lodge Bog Enhancement area comprise treelines, consisting of downy birch and grey willow, scrub and bog woodland. With regard to roosting bats, no trees within this area were found to have roosting potential. These were all assessed as *Negligible.* The proposed scrub and bog woodland removal do not contain any potential roosting features, therefore no loss or damage to roosts are anticipated.

Golden Plover Offsetting Area

With regard to roosting bats, no trees within the Killina Bog Offsetting Area were found to have roosting potential. These were all assessed as *Negligible* and comprised areas of commercial forestry and young broadleaved trees. These trees lacked the size, age, or features required to provide suitable roosting opportunities for bats, therefore no loss or damage to roosts are anticipated.

Proposed Grid Connection

The Proposed Grid Connection underground electrical cabling route will be installed predominantly within existing road infrastructure and will not directly affect any structures. Eleven watercourse crossings (7 no. crossings over EPA mapped watercourses, 1 no. crossing under the Grand Canal and 3 no. crossings over unmapped watercourses) occur along the Proposed Grid Connection underground electrical cabling route. Of the water crossings assessed 6 no. had no (none) roosting potential, 3 no. had *Negligible* roosting potential, and 2 no. had *Low* roosting potential**.** No bats were identified roosting within the water crossing structures, and no evidence of roosting was found during the surveys.

All works along the Proposed Grid Connection watercourse crossings will be confined to the existing road structure or completed using temporary construction methods such as flatbed formation within the existing road or horizontal directional drilling (HDD) offset from the crossing structures, with no requirement to remove or alter structures that could support bats. The crossing under the grand canal (WC2) which was assessed as having no (none) roosting potential as no structure was present for bats to roost in, is proposed to be crossed by HDD. Flatbed formation under or flatbed formation over is proposed for the remaining watercourse crossings. No structural modifications are required on existing bridge or culvert infrastructure associated with crossings along the Proposed Grid Connection as works will be confined to the existing road infrastructure, and temporary excavations associated with launch and receiver pits for HDD works will be set back from these structures. As such, no loss or damage to potential roosting structures is anticipated as a result of these works. Any potential noise and vibration impacts would be short-term in nature and not likely to be out of character with that associated with existing traffic conditions to which any roosting bats would be accustomed. Therefore, the work is unlikely to result in significant disturbance to bats and a derogation licence is not required.

Although a small amount of treeline removal is required to facilitate the Proposed Grid Connection at the Proposed Offsite Substation entrance no potential roost features or evidence of bat roosts were identified within these areas. As such, no impacts to bat roosts are anticipated in association with the Proposed Grid Connection.

Proposed Turbine Delivery Route

No trees with PRF's or structures with roosting potential were identified along the Proposed Turbine Delivery Route accommodation areas or within areas of proposed treeline removal. Accordingly, no roost loss or damage is predicted in association with the Proposed Turbine Delivery Route.

While no features with roosting suitability or potential are proposed to be removed as part of the Proposed Project as part of the Biodiversity Management Plan (BMP) 15 bat boxes are proposed to be installed which will result in an increase of potential roosting features. Further details on bat box installation are provided in Appendix 6-5, BMP

5.4 Disturbance and Displacement of Individuals or Populations

Displacement may occur where bats avoid areas due to disturbance associated with construction activities, operational turbine presence, noise, vibration, artificial lighting, or the loss and alteration of commuting and foraging habitat. This can reduce the use of otherwise suitable habitat within the Proposed Wind Farm site by individual bats and, where extensive, has the potential to affect local bat populations.

Construction Phase

Potential sources of displacement during construction include noise and vibration associated with turbine and infrastructure construction, vegetation clearance, and temporary disturbance associated with construction activities.

Construction activities associated with the Proposed Project will not occur in proximity to any structures or trees with any known roosts. Works will be undertaken in accordance with the construction methodology and best practice noise control measures outlined in Chapter 12. Given the lack of roosting suitability and potential roosting features present in structures and trees, disturbance effects on roosting bats are not anticipated.

Temporary disturbance may also arise from construction of the Proposed Grid Connection underground electrical cabling route including underground cabling works such as horizontal

directional drilling and flatbed formations over and under at watercourse crossings. These activities will be localised and temporary in nature and will not result in fragmentation of habitat or a substantial reduction in habitat availability. No bat roosts were identified at, or in the immediate vicinity of, the Proposed Grid Connection underground electrical cabling route water crossing locations. Any short-term noise and vibration associated with these works are unlikely to differ significantly from existing background conditions such as road traffic to which bats in the area are already accustomed. Consequently, any construction-related displacement of individual bats is expected to be highly localised, temporary and reversible.

Habitat Loss and Alteration

There is proposed habitat loss as a result of the Proposed Project infrastructure footprint. Areas of Bog woodland, conifer plantation and scrub are proposed for removal as well as sections of treelines. These habitats will require removal or partial clearance. While these habitats and features contribute to local habitat connectivity, the overall layout has been designed to avoid significant fragmentation and retain the majority of existing linear habitats.

To offset habitat losses and maintain connectivity for commuting and foraging bats, the Proposed Project includes habitat enhancement measures, including approximately 45.3ha of native tree planting which over time will develop into native scrub and woodland. It is proposed to create 246ha of scrub mosaic habitats, which combined with native tree planting will result in a net gain of these habitats. Treelines proposed for removal will be replanted once works are completed. These measures are detailed in Section 6.1 and the Biodiversity Management Plan (BMP) (Appendix 6-5). It is recommended that this planting is implemented during the earliest phase of construction, as outlined in Chapter 6, to ensure replacement habitat establishes as quickly as practicable.

Artificial Lighting

Artificial lighting has the potential to alter bat commuting and foraging behaviour, particularly for light-sensitive species such as brown long-eared bat and Myotis species. A site-specific lighting strategy in line with Section 6.1.2 will be implemented in accordance with current best-practice guidance to minimise light spill, maintain dark corridors and avoid illumination of retained linear features, sensitive habitats and known roost locations.

With these measures in place, significant displacement effects resulting from artificial lighting are not anticipated.

Operational Phase

During operation, bats may exhibit avoidance behaviour in the immediate vicinity of turbines. However, available evidence indicates that any such effect is generally confined to a relatively small area surrounding individual turbines and does not typically result in displacement across wider landscapes.

Baseline surveys recorded generally *Low* to *Moderate* median activity levels of bat activity across the Proposed Wind Farm site, with activity concentrated along habitat edges and linear features such as scrub dominated hedgerow and drainage ditches rather than within the turbine envelope itself. Given the extent of habitat loss, the retention of the majority of commuting and foraging features, the lack of potential roosting features, and the provision of habitat enhancement measures, any operational displacement is expected to be restricted to a small number of individual bats within the immediate vicinity of turbines.

Assessment of Effects on Individuals and Populations

Some displacement of individual bats may occur locally during construction and operation of the Proposed Project. However, such effects are expected to be limited in spatial extent, temporary or reversible in nature, and confined primarily to the immediate vicinity of construction activities and turbine infrastructure.

The Proposed Project has been designed to maintain ecological connectivity across the site and retain the majority of suitable commuting and foraging habitat. In addition, enhancement and mitigation measures will provide a long-term net gain in linear and woodland habitat availability.

As a result, the displacement of bats is not expected to reduce the availability of critical resources, disrupt the functioning or adversely affect the conservation status, viability or long-term persistence of local bat populations. Accordingly, significant displacement effects on individual bats are not anticipated, and no significant displacement effects at the local population level are predicted.

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.

6.1 Standard Best Practice Measures

6.1.1 Noise Restrictions

During the construction phase, all plant and equipment will be operated in accordance with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended). Plant machinery will be switched off when not in use, and works will be managed to minimise unnecessary noise generation. Methodology and mitigation outlined in Chapter 12: Noise and Vibration will be followed to minimise noise and vibration during construction.

Operational noise associated with the Proposed Project will arise principally from the Proposed Turbines and electrical and mechanical plant, including the Proposed Onsite Substation and Proposed Offsite Substation.

All Proposed Turbine and electrical infrastructure associated with the Proposed Project will be specified, installed and maintained in accordance with relevant standards and manufacturer guidance to minimise unnecessary noise generation and the potential for unintended high-frequency noise emissions.

A minimum 10m buffer will be maintained between the Proposed Onsite Substation and Proposed Offsite Substation fence lines and the nearest retained linear habitat features. The treelines and hedgerows surrounding the Proposed Onsite Substation and Proposed Offsite Substation will be retained as bat commuting and foraging habitat.

These measures have been incorporated into the assessment presented in Section 5.4 and will minimise the potential for operational noise to result in disturbance, displacement or behavioural effects on bats.

6.1.2 Lighting Restrictions

In accordance with the Institute of Lighting Professionals Guidance Note 08/23 (ILP, 2023), lighting associated with the Proposed Project will be designed to maintain dark commuting corridors and minimise light spill onto woodland, scrub, treelines, hedgerows, and other habitats used by bats.

During the construction phase, lighting requirements will be temporary and limited to areas where required for health, safety and security purposes, including temporary compounds and works associated with the Proposed Onsite Substation and Proposed Offsite Substation. Where works are required during hours of darkness, lighting will be directed away from retained woodland, treelines, hedgerows, and bat commuting or foraging habitats. Directional accessories, including baffles, hoods, cowls and louvres, will be used where appropriate to reduce light spill and focus illumination only where required. The same restrictions will apply during decommissioning.

During the operational phase, lighting associated with the Proposed Project will be kept to the minimum necessary for operation, maintenance, safety and security purposes. Turbines will not be continuously illuminated, other than where aviation lighting is required. External lighting associated with the Proposed Onsite Substation and Proposed Offsite Substation will be motion-activated and will

not be continuously illuminated. Luminaires will be fully shielded, have a 0% upward light ratio and be directed away from retained boundary habitats.

All permanent lighting will utilise warm-spectrum LED sources with a correlated colour temperature of 3000K or less. Lighting will be designed and operated to maintain dark commuting corridors along retained habitat features and avoid fragmentation of bat commuting routes.

A buffer of dark, unlit habitat will be maintained between the Proposed Onsite Substation and Proposed Offsite Substation fence line and the nearest retained treeline or hedgerow

The lighting measures will also follow Dark Sky Ireland principles by ensuring that lighting is used only where necessary, appropriately directed and maintained at the minimum intensity required for operational and safety purposes.

6.1.3 Biodiversity Management Plan

The Project Site is predominantly located within cutover bog, with smaller areas of scrub, Calluna-dominated communities on Cutover bog, bog 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 44.3ha of bog woodland habitat, 131.7ha of scrub and 60.7 ha of conifer plantation to facilitate the Proposed Wind Farm. While the Proposed Offsite Substation and the Proposed Turbine Delivery Route accommodation areas will require the removal of approximately 180m of Treeline habitat. These treelines will be replanted once works are completed.

As part of the BMP, it is proposed to plant a total of 45.31ha of native trees which over time will develop into native scrub and woodland habitat. All planting will consist of species indigenous to the local area. The BMP also proposes to create 246ha of scrub mosaic habitats, which combined with native tree planting will result in a net gain of these habitats. As well as habitat creation the BMP proposes the instalment of artificial roosting features which will be incorporated within the Proposed Wind Farm site to enhance roost availability and strengthen the ecological functionality of the landscape for bats. The enhancement measures will comprise a minimum of 15 no. bat boxes. Bat boxes will not be placed within the Proposed Turbine risk area to avoid encouraging bats to roost or forage within rotor-swept zones. All placements will be at the edges of the Proposed Wind Farm, near existing linear features leading away from turbines or within Killina Bog Offsetting Area and Lodge Bog Enhancement area.

Overall, the proposed planting of native trees along with the creation of scrub mosaic habitats, will result in a net gain of scrub and woodland habitats within the Project Site. Alongside the instalment of artificial roosting features these measures will enhance both the roosting potential and the foraging and commuting opportunities for bats that use the area. Further details on removal and replanting areas are provided in Appendix 6-5, BMP.

6.1.4 Collision Risk Mitigation Measures

6.1.4.1 Bat Felling Buffers

In accordance with NatureScot (2021), NIEA (2021) and BCI (2026), a minimum 50m buffer is applied between turbine blade tips and habitat features used by bats (e.g. hedgerows, treelines and woodland edges), to reduce the risk of bat activity occurring within the rotor-swept zone.

While larger buffers (100–200m) have been recommended in Eurobats Publication No. 6 and NIEA guidance for woodland habitats, these are not currently supported by consistent empirical evidence in the UK and Ireland and are therefore not applied as standard.

A 50m buffer between turbine blade tip and the nearest habitat feature will be implemented, based on the turbine specification for the two proposed turbine models (tip height: 200m and 220m; rotor diameter: 170m; hub height: 115m and 135m). These buffers were calculated using the Natural England formula (Plate 6-1) and have been incorporated into the Proposed Turbine layout. The application of these buffers forms a key embedded mitigation measure to reduce collision risk, particularly for high-risk species such as Leisler's bat and pipistrelle species, which utilise linear landscape features for commuting but also forage more widely in open habitats. Maintaining separation from these features reduces the likelihood of bats moving through the rotor-swept zone during commuting movements.

To facilitate these buffers, areas of scrub, woodland, conifer plantation and other vegetation will be removed or managed within the Proposed Wind Farm in tandem with the golden plover offsetting areas. These areas will be maintained as vegetation-free (i.e. less than 2m in height) by hand or other mechanical means as appropriate throughout the operational life of the Proposed Wind Farm. This ensures that no new edge habitats or linear features develop within the buffer zone that could attract bat activity towards turbine locations. Should it prove impracticable to maintain the required buffer condition in any location, alternative mitigation measures, including turbine curtailment and/or other measures informed by updated bat activity data, carcass searches and best practice guidance, will be developed and implemented to maintain an equivalent level of protection for bats.

In the case of the Proposed Wind Farm, the required bat felling buffer equates to approximately **78m** for turbines with a tip height of 200m and **36m** for turbines with a tip height of 220m from the turbine base to the nearest habitat feature. Bat buffers meeting this requirement will be established and maintained around all proposed turbines.

It is necessary to calculate the distance between the edge of the habitat feature and the centre of the turbine (b), using the following formula:

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

Where, bl = blade length, hh = hub height, fh = feature height all in metres. An example calculation is provided below, where b = 69.3 m (Plate 6-1).

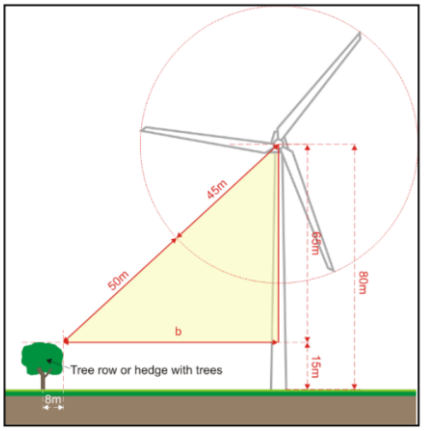


Plate 6-1 Calculation of buffer distances (NatureScot, 2021).

6.1.4.2 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 3m/s, the cut-in speed of the Proposed Turbines. 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).

Blade feathering below the turbine cut-in speed is expected to be implemented automatically through the turbine control system. Feathering will be limited to periods and locations as follows:

- Seasonal Application:

Feathering will be applied at all Proposed Turbine locations during the main bat activity season (typically April–October) between dusk and dawn only when wind speeds are below the below the cut in speed and there is less than 0.5mm/hr of rain fall. This is when bats are active and at potential increased risk of collision for the duration of the operational life of the wind farm. Blade feathering will not be applied during winter months (November - March) when bats are largely inactive.

- Spatial Targeting:

Feathering will be implemented only at Proposed Turbines located in areas of high bat activity, as identified through baseline surveys. Proposed Turbines positioned in habitats unsuitable for bats (e.g., extensive bare peat, exposed upland areas with no foraging or commuting value) will not require feathering at low wind speeds. Section 5.1.2 of this report outlines areas which recorded high bat activity for high collision risk bat species.

Should any variations in activity, significant fatalities be recorded or risk levels be identified during post-construction monitoring, turbine specific adjustments will be implemented which could include increasing the cut-in speed i.e. curtailment.

In the event that blade feathering is not available for the selected turbine model, an equivalent operational measure will be implemented to ensure that the Proposed Turbines do not rotate at low wind speeds when electricity generation is not occurring. This may include operational controls such as manual stop or stop-on-demand procedures during periods when the Proposed Turbines would otherwise idle below cut-in speed.

6.2 Post-Construction Bat Monitoring Plan

A programme of post-construction monitoring (PCM) will be implemented to assess the effects of the Proposed Wind Farm on bat activity and collision mortality, and to evaluate the effectiveness of the mitigation measures described above, including blade feathering and site-specific curtailment.

The primary objective of the monitoring programme is to evaluate the effectiveness of the mitigation strategy and to ensure that the *Favourable Conservation Status* of local bat populations is maintained, as required under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

The monitoring programme has been designed in accordance with NatureScot (2021), NIEA (2021) and BCI (2026) guidance and will follow an adaptive management approach.

In accordance with NatureScot (2021) and BCI (2026), PCM will comprise two integrated components:

- **Fatality monitoring (carcass searches)** to quantify collision mortality; and
- **Acoustic monitoring** to assess bat activity patterns and potential displacement or attraction effects.

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 Fatality Monitoring

Carcass searches will be undertaken to quantify any bat mortality associated with turbine operation.

In accordance with NatureScot (2021) and BCI (2026), professionally trained canine search teams will be utilised as the primary method of carcass detection. This reflects the reduced efficiency of human-led searches in Irish upland and vegetated landscapes.

Searches will be undertaken at all Proposed Turbines within a radius of **100m** and **110m from the Proposed Turbines base**, equivalent to half the turbine tip height (200m and 220m), in accordance with best practice guidance.

Carcass searches shall be conducted in accordance with NIEA (2021) guidance and surveys will cover all bat activity seasons (i.e. spring, summer and autumn periods). Carcass searches should be carried out at all turbine locations if feasible. However, for the Proposed Wind Farm, consisting of 46 Turbines, it is recommended that carcass searches, at a minimum, will be undertaken at 20 representative turbines (43.5% of the Proposed Wind Farm), selected on the basis of predicted collision risk, habitat association and pre-construction bat activity levels. The monitoring turbines shall include all turbines identified as high risk in Section 5 of this report. The monitoring programme may be adapted following review of Year 1 results.

Carcass persistence (scavenger removal) trials and searcher efficiency (SEEF) trials will be undertaken to allow robust estimation of collision mortality.

- **Carcass persistence trials:** A minimum of 10 trial carcasses will be deployed and monitored (e.g. using camera traps or regular checks) to determine mean persistence time.
- **Searcher efficiency trials:** Searcher efficiency trials will be undertaken to quantify the probability of carcass detection. These trials will involve the placement of trial carcasses within the search area and subsequent assessment of detection rates by the survey team. The results will be used to derive site-specific correction factors for the estimation of collision mortality.

These data will be used to correct observed carcass counts and calculate realistic estimates of bat mortality.

6.2.2 Acoustic Monitoring

Post-construction acoustic monitoring will be undertaken to assess bat activity patterns and to validate the effectiveness of the curtailment strategy.

Static detectors will be deployed at ground level in accordance with the pre-construction survey design to allow direct comparison with baseline conditions.

In addition, if practical to do so **fifteen turbines will be fitted with nacelle-mounted ultrasonic detectors**, in accordance with BCI (2026) guidance (minimum one detector per three turbines). These detectors will record bat activity at rotor height.

Nacelle-level activity will be compared with baseline and ground-level data to assess bat activity in relation to turbine operation.

Analysis will focus on:

- seasonal patterns of activity,
- within-night activity (particularly sunset and sunrise periods), and

- activity in relation to weather conditions and turbine operation.

6.2.3 Mortality Threshold and Adaptive Management

Collision mortality will be estimated using corrected carcass search data, accounting for carcass persistence and searcher efficiency.

For the purposes of this assessment, a threshold of **greater than one bat per turbine per year** is defined as a level at which collision mortality may be considered significant, in line with NIEA (2021) guidance.

The results of post-construction monitoring will be reviewed annually.

- Where monitoring demonstrates that collision mortality remains below this threshold and that mitigation measures are effective, the existing curtailment strategy will be maintained.
- Where mortality exceeds this threshold, curtailment measures will be strengthened. This may include extending the seasonal curtailment period, increasing the duration of nightly curtailment, or adjusting wind speed and temperature thresholds.

6.2.4 Monitoring Duration and Reporting

Post-construction monitoring will be undertaken for a minimum of three years following commissioning of the Proposed Wind Farm.

Where mortality remains below the defined threshold, the mitigation and curtailment regime in place at that time will be maintained. Additional post-construction monitoring may be undertaken at five-year intervals from Year 5 of operation onwards, subject to the outcomes of the initial monitoring programme and agreement with the relevant authorities.

Where mortality exceeds the threshold, curtailment measures will be strengthened, and monitoring will be extended for a further two years.

An annual monitoring report will be prepared and submitted to the Planning Authority and relevant statutory consultees (i.e. NPWS) by the owner or operator of the wind farm. The reports will include:

- bat activity data and analysis,
- observed fatalities and corrected mortality estimates,
- assessment of mitigation effectiveness, and
- recommendations for any required adjustments to the mitigation strategy.

Transition to Smart Curtailment (Optional Optimisation Pathway)

At the end of Year 3, and subject to the outcomes of post-construction monitoring, the Applicant may submit a **Mitigation Review Report** to the Planning Authority and the NPWS, in accordance with BCI (2026) guidance.

Where monitoring demonstrates that collision mortality remains below the defined significance threshold and confirms that periods of elevated risk are confined to specific temporal or environmental conditions, the curtailment strategy may be refined to more accurately reflect the site-specific risk profile.

In this context, the Applicant may elect to implement a **Smart Curtailment system**, whereby turbine operation is dynamically controlled based on real-time detection of bat activity at rotor height (e.g. using nacelle-mounted detectors integrated with turbine control systems). Under such a system, turbines

would curtail or shut down only when bats are detected within, or approaching, the rotor-swept zone, thereby directly targeting periods of actual collision risk.

This approach allows curtailment to be focused and responsive, rather than applied across broad seasonal or nightly windows, and may therefore reduce unnecessary turbine downtime while maintaining effective protection for bats.

In accordance with BCI (2026), implementation of Smart Curtailment must be supported by a minimum of three years of robust post-construction monitoring data demonstrating that refinement of the mitigation strategy is appropriate.

Where Smart Curtailment is implemented, a post-implementation re-validation audit will be undertaken at intervals of approximately five years**,** including fatality monitoring, ground-level acoustic monitoring and at-height (nacelle) monitoring, to ensure that the system remains effective and continues to protect bat populations under changing environmental conditions.

6.3 Residual Effects

No Significant Effect

Taking into account the design of the Proposed Project and the implementation of embedded and site-specific mitigation measures, no significant long-term negative residual effects on bats are anticipated.

With respect to collision mortality and barotrauma, the combination of noise and lighting restrictions application of bat felling buffers, and blade feathering is expected to reduce collision risk to a level that is not significant at the local population scale. The effectiveness of these measures will be validated through post-construction monitoring, with an adaptive management framework in place to ensure that any unforeseen effects are addressed. On this basis, no significant residual effects are anticipated in relation to collision mortality.

No significant residual effects are anticipated in relation to the loss of, or damage to, potential roosting features. With regard to displacement, the retention and enhancement of linear features, together with the implementation of a lighting strategy that maintains dark corridors, will ensure that commuting and foraging routes remain available. The measures proposed within the Proposed Enhancement Areas will result in a net gain in both the extent and quality of foraging and commuting habitat. As such, no significant residual effects are anticipated in relation to displacement of individuals or populations.

A temporary residual effect at the local geographic scale is anticipated in relation to the loss of commuting and foraging habitat during the construction phase, due to the removal of sections of habitat required to facilitate infrastructure and turbine buffers. Although this loss will be offset through a comprehensive replanting programme, it will take approximately 5–10 years for newly planted vegetation to establish and provide comparable ecological connectivity, during which a temporary minor reduction in habitat connectivity may occur.

Overall, taking into account the mitigation measures implemented and the proposed habitat enhancement strategy, the Proposed Project will not adversely affect the conservation status of local bat populations.

6.4 Cumulative Effects

A thorough review of publicly available information relating to wind farm developments within 15km of the Proposed Project confirms that the site is located within a landscape with an existing concentration of operational wind energy infrastructure There are five existing, three proposed, 2 pre-application and 1 permitted wind energy developments within 15km of the Proposed Turbine locations. The projects

and/or plans considered are detailed in Section 2.8 in Chapter 2 of the EIAR. A more detailed cumulative assessment is presented in Chapter 6.

The key cumulative pathway for bats is collision mortality, with additional potential for cumulative effects through loss, fragmentation or displacement from commuting and foraging habitat. However, the Proposed Project includes a project-specific risk assessment, and incorporates a range of mitigation measures, including turbine-specific blade feathering, buffering, lighting controls, habitat measures and operational monitoring.

Clear-felled Forestry and Associated Replanting

Clear-felled tree felling will be required within and around the Proposed Project footprint to allow for the construction of the turbine bases, access roads, underground cabling, and other ancillary infrastructure and Proposed Enhancement Areas.

A total of 60.7ha of forestry (comprising conifer plantation (WD4) and mixed broadleaved woodland (WD1)) will be permanently clear-felled within and around the Proposed Wind Farm site.

The felling activities required as part of the Proposed Project will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The Forest Service policy requires that planning permission for the Proposed Project is available prior to determination of the associated felling licence application. Where replacement afforestation is required by the Forest Service as part of the felling licence process, the replacement afforestation lands will also be subject to the applicable statutory forestry consent process.

Replacement Afforestation

In line with the Forest Service's published policy on felling for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will have to be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare-for-hectare basis for the footprint of the infrastructure developments.

The felling of 60.7ha of forestry will be subject to a Limited Felling Licence application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017. The Forest Service policy requires that planning permission for the Proposed Project is available prior to determination of the associated felling licence application. Where replacement afforestation is required by the Forest Service as part of the felling licence process, the replacement afforestation lands will also be subject to the applicable statutory forestry consent process. The specific lands on which any such replacement afforestation would occur have not been identified at this stage.

The key environmental issues relating to afforestation include water, biodiversity, archaeology, and landscape. Each is subject to regular updates in terms of best practice, guidelines, standards and national policies. Delaying the identification of alternative afforestation lands until such time as they are required enables identification of optimum lands available (from an environmental perspective) for afforestation at that time. On a precautionary basis, the Applicant commits that, where replacement afforestation is required, the replacement afforestation lands will be located at least 10km from the Proposed Wind Farm site and will not be located where there is a hydrological pathway through which the afforestation works could give rise to cumulative effects with the Proposed Project. On this basis, it is reasonable to conclude that there will be no more than imperceptible in-combination cumulative effects associated with the replacement afforestation.

Collision Risk

Following the detailed assessment provided in the preceding sections and in Chapter 6, it is concluded that, the Proposed Project will not result in any residual adverse effects on bats, when considered on its own and provided the mitigation and monitoring strategy are implemented. There are five existing, three proposed, 1 pre-application and 1 permitted wind energy developments within 15km of the Project Site. No potential for the Proposed Project to contribute to any cumulative adverse effects on any bat populations resulting from cumulative collision risk is predicted when considered in-combination with other plans and projects.

Summary

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.

Subject to the full implementation of the proposed mitigation measures and taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, the Proposed Project is not predicted to give rise to significant residual cumulative effects on bats.

7. CONCLUSION

This report presents a comprehensive assessment of the potential effects of the Proposed Project on bat populations. Surveys were undertaken in accordance with NatureScot (2021) guidance, and the assessment and mitigation have been informed by NatureScot (2021), NIEA (2021) and BCI (2026) guidance. Following consideration of the residual effects (post mitigation) it is noted that the Proposed Project will not result in any significant effects on bats and the measures proposed in Appendix 6-5 of the BMP will result in the net gain of habitats and roosting features.

All potential impacts, including collision risk, loss of potential roosting features, 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.

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

8. BIBLIOGRAPHY

Abbott, I., Aughney, T., Langton, S. and Roche, N. (2015) BATLAS 2020 Pilot Project Report. Bat Conservation Ireland, Virginia, Cavan.

Amorim, F., Rebelo, H., & Rodrigues, L. (2012). Factors influencing bat activity and mortality at a wind farm in the Mediterranean region. Acta Chiropterologica, 14(2), 439-457.

Andrews, H. (2013) Bat Tree Habitat Key. AEcol, Bridgewater.

Arnett, E. B. (2006). A preliminary evaluation on the use of dogs to recover bat fatalities at wind energy facilities. Wildlife Society Bulletin, 34(5), 1440-1445.

Arnett, E. B., Baerwald, E. F., Mathews, F., Rodrigues, L., Rodríguez-Durán, A., Rydell, J., ... & Voigt, C. C. (2016). Impacts of wind energy development on bats: a global perspective. In Bats in the Anthropocene: Conservation of Bats in a Changing World (pp. 295-323). Springer International Publishing.

Aughney, T. (2008) An investigation of the impact of development projects on bat populations: Comparing pre- and post-development bat faunas. Irish Bat Monitoring Programme. Bat Conservation Ireland, Virginia, Cavan.

Aughney, T., Langton, S. and Roche, N. (2011) Brown long-eared bat roost monitoring scheme for the Republic of Ireland: synthesis report 2007-2010. Irish Wildlife Manuals, No.56. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Aughney, T., Langton, S. and Roche, N. (2012) All Ireland Daubenton's bat Waterway Monitoring Scheme 2006-2011. Irish Wildlife Manuals, No. 61. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Barataud, M. and Tupinier, Y. Écologie acoustique des chiroptères d'Europe: identification des espèces, étude de leurs habitats et comportements de chasse. Biotope, 2012.

Baerwald, E. F., D'Amours, G. H., Klug, B. J., & Barclay, R. M. (2008). Barotrauma is a significant cause of bat fatalities at wind turbines. Current biology, 18(16), R695-R696.

Baerwald, E. F., & Barclay, R. M. (2009). Geographic variation in activity and fatality of migratory bats at wind energy facilities. Journal of Mammalogy, 90(6), 1341-1349.

BCI (2012a). Wind Turbine/Wind Farm Development Bat Survey Guidelines, Version 2.8, December 2012. Bat Conservation Ireland, Virginia, Co. Cavan

BCI (2012b) Bats and Appropriate Assessment Guidelines, Version 1, December 2012. Bat Conservation Ireland, Virginia, Co. Cavan Berthinussen, A., Richardson. O.C. and Altringham, J.D. (2014) Bat Conservation: Global evidence for the effects of interventions. Exeter: Pelagic Publishing.

BCT (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London. https://www.bats.org.uk/resources/guidance-for-professionals/bat-species-core-sustenance-zonesand-habitats-for-biodiversity-net-gain

Carden, R., Aughney T., Kelleher C. and Roche, N. (2010) Irish Bat Monitoring Schemes. BATLAS Republic of Ireland Report for 2008-2009.

Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn). The Bat Conservation Trust, London.

Collins, J., and Jones, G. (2009). Differences in bat activity in relation to bat detector height: implications for bat surveys at proposed windfarm sites. Acta Chiropterologica, 11(2), 343-350.

Cryan, Paul M., et al. (2014) Behavior of bats at wind turbines. Proceedings of the National Academy of Sciences 111.42: 15126-15131.

Department of Housing, Local Government and Heritage (DHLGH) (2026). Applications for Regulation 54 Derogations for Annex IV Species: Guidance for Applicants. Version 2.0. Department of Housing, Local Government and Heritage, Ireland.

EUROBATS (2016) Report of the Intersessional Working Group on Wind Turbines and Bat Populations at 21st Meeting of the Advisory Committee, Zandvoort, the Netherlands, 18 – 20 April 2016.

Hein, C.D., Gruver, J. and Arnett, E.B. (2013). Relating pre-construction bat activity and post-construction bat fatality to predict risk at wind energy facilities: a synthesis. A report submitted to the National Renewable Energy Laboratory. Bat Conservation International, Austin, TX, USA.

Hill D., Fasham, M., Tucker P., Shewry, M. and Shaw, P (eds) (2005) Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring, 433-449. Cambridge University Press, Cambridge.

Horn, J.W., Arnett, E.B. and Kunz, T.H. (2008). Behavioral responses of bats to operating wind turbines. Journal of wildlife management, 72(1), 123-132.

Hundt L. (2012) Bat Surveys: Good Practice Guidelines, 2nd edition. Bat Conservation Trust ISBN-13: 9781872745985.

ILP (2023) Guidance Note 08/23: Bats and Artificial Lighting at Night.

Korner-Nievergelt, F., Brinkmann, R., Niermann, I., & Behr, O. (2013). Estimating bat and bird mortality occurring at wind energy turbines from covariates and carcass searches using mixture models. PloS one, 8(7), e67997.

Kunz, Thomas H., Edward B. Arnett, Brian M. Cooper, Wallace P. Erickson, Ronald P. Larkin, Todd Mabee, Michael L. Morrison, M. Dale Strickland, and Joseph M. Szewczak. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. Journal of Wildlife Management 71, no. 8 (2007): 2449-2486.

Kunz, T.H. and Parsons, S. (2009). Ecological and Behavioral Methods for the Study of Bats, 2nd Edition. The Johns Hopkins University Press, USA.

Lintott, P.R. & Mathews, F. (2018) Basic mathematical errors may make ecological assessments unreliable. Biodiversity and Conservation 27: 265-7.

Lintott, P. R., Richardson, S. M., Hosken, D. J., Fensome, S. A., & Mathews, F. (2016). Ecological impact assessments fail to reduce risk of bat casualties at wind farms. *Current Biology*, *26* (21), R1135–R1136. https://doi.org/10.1016/j.cub.2016.10.003

Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Mathews, F., Swindells, M., Goodhead, R., August, T. A., Hardman, P., Linton, D. M., and Hosken, D. J. (2013). Effectiveness of search dogs compared with human observers in locating bat carcasses at wind-turbine sites: A blinded randomized trial. Wildlife Society Bulletin, 37(1), 34-40.

Mathews, F., Richardson, S., Lintott, P. and Hosken, D. (2016) Understanding the risk to European protected species (bats) at onshore wind turbine sites to inform risk management. Final Report. University of Exeter.

Mitchell-Jones, A. J. and McLeish, A. P. (2004). The Bat Worker's Manual, 3rd Edition. JNCC, Peterborough.

Mitchell-Jones, A.J. (2004). Bat Mitigation Guidelines. English Nature.

Montgomery, W. I., Provan, J., McCabe, A. M., and Yalden, D. W. (2014). Origin of British and Irish mammals: disparate post-glacial colonisation and species introductions. Quaternary Science Reviews, 98, 144-165.

NRA (2006a) Best practice guidelines for the conservation of bats in the planning of national road schemes. National Roads Authority, Dublin, Ireland.

NRA (2006b) Guidelines for the treatment of bats during the construction of national road schemes. National Roads Authority, Dublin, Ireland.

Natural England (2014). Bats and Onshore Wind Turbines: Interim Guidance. Third Edition TIN051. English Nature.

NatureScot (2021). Bats and onshore wind turbines: survey, assessment and mitigation. August 2021 (updated with minor revisions).

Nealon, Ú.C. (2016) Bats and wind farms in Ireland: An assessment of current practices in surveying and monitoring. Oral presentation at the 1st Ecology and Evolution Ireland conference, Sligo.

Northern Ireland Environment Agency (2011) Bat Survey – Specific Requirements for Wind Farm Proposals.

NIEA, Natural Environment Division (2021, amended 2026). Guidance on Bat Surveys, Assessment & Mitigation for Onshore Wind Turbine Developments.

Perrow, M. (Ed.). (2017). Wildlife and Wind Farms-Conflicts and Solutions, Pelagic Publishing Ltd.

Regini, K. (2000) Guidelines for ecological evaluation and impact assessment, In Practice: Bulletin of the Institute of Ecology and Environmental Management, 29, 1-7.

Roche, N., Langton, S. & Aughney T. (2012) Car-based bat monitoring in Ireland 2003-2011. Irish Wildlife Manuals, No. 60. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

Roche, N., T. Aughney, F. Marnell, and M. Lundy (2014). Irish Bats in the 21st Century. Bat Conservation Ireland, Virginia, Co. Cavan, Ireland.

Roche, N., Aughney T. & Langton S. (2015) Lesser horseshoe bat: population trends and status of its roosting resource. Irish Wildlife Manuals, No 85. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Rodrigues, L., L. Bach, M. J. Dubourg-Savage, B. Karapandža, D. Kovač, T. Kervyn, J. Dekker, A. Kepel, P. Bach, J. Collins, C. Harbusch, K. Park, B. Micevski, and J. Minderman (2015). Guidelines for consideration of bats in wind farm projects - Revision 2014. UNEP/EUROBATS Secretariat Bonn, Germany.

Russ, J. (2012). British bat calls: a guide to species identification. Pelagic publishing.

Rydell, J., Bach, L. Dubourg-Savage, M.-J., Green, M., Rodrigues, L. and Hedenström, A. (2010). Bat mortality at wind turbines in northwestern Europe. Acta Chiropterologica 12. 2: 261 – 274.

Schofield H. (2008). The Lesser horseshoe Bat: Conservation Handbook. The Vincent Wildlife Trust, Ledbury, UK.

Schuster, E., L. Bulling, and J. Köppel (2015). Consolidating the State of Knowledge: A Synoptical Review of Wind Energy's Wildlife Effects. Environmental Management 56:300-331.

SNH (2019). Bats and onshore wind turbines: survey, assessment and mitigation.

Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. December (2010). Valuing Bats in Ecological Impact Assessment, CIEEM In-Practice.

APPENDIX 1

BAT HABITAT SUITABILITY APPRAISAL

BAT HABITAT SUITABILITY ASSESSMENT

Guidelines for assessing the potential suitability of a site for bats, based on the presence of habitat features within the landscape (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 2

SITE RISK ASSESSMENT

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 3

OVERALL SITE RISK

OVERALL SITE RISK ASSESSMENT

Table 3b: Stage 2 – Overall Risk Assessment

Site Risk Level (from Table 3a)	Ecobat activity category (or equivalent justified categorisation)					
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

Overall assessment

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

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.

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).

APPENDIX 4

2022 BASELINE BAT SURVEYS

Table of Contents

1. INTRODUCTION 4
2. METHODS 5
2.1 Field Surveys 5
2.1.1 Bat Habitat Suitability Appraisal 5
2.1.2 Roost Surveys 5
2.1.3 Manual Activity Surveys 5
2.1.4 Ground-level Static Surveys - 2022 6
2.2 Bat Call Analysis 7
2.3 Assessment of Bat Activity Levels 8
3. RESULTS 10
3.1 Field Surveys 10
3.1.1 Bat Habitat Suitability Appraisal 10
3.1.2 Roost Surveys 10
3.1.3 Manual Activity Surveys 10
3.1.4 Ground-level Static Surveys - 2022 11
4. DISCUSSION 17
4.1 Assessment of Bat Activity Levels 17
4.1.1 Adapted Site-specific Ranges 17
5. CONCLUSION 21
6. REFERENCES 22

TABLE OF TABLES

Table 2-1 Survey Effort - Manual Activity Surveys 5
Table 2-2 Ground-level Static Detector Locations 6
Table 2-3 Survey Effort - Ground-level Static Surveys 2022 7
Table 2-4 Ecobat Percentile Score and Categorised Level of Activity (NatureScot, 2021) 8
Table 2-5 Site-specific Activity Level Categories based on Maximum Bat Passes per Hour (bpph) 9
Table 4-1 Detector Locations Recording High Median Activity in 2022 18
Table 4-2 Assessment of Activity Levels. Absent, Low, Moderate, High. Outliers are highlighted in Orange. 19

TABLE OF PLATES

Plate 2-1 Sonogram of Echolocation Pulses of Common pipistrelle (Peak Frequency 45kHz) 8
Plate 3-1 Transect Results - Species Composition (Total species composition) 10
Plate 3-2 2022 Transect Results - Species Composition Per Survey Period 11
Plate 3-3 Total Species Composition recorded in 2022 11
Plate 3-4 Static Detector Surveys 2022: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights) 12
Plate 3-5 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period. 13
Plate 3-6 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale). 14
Plate 3-7 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night 15
Plate 3-8 Weather suitability across nights of static detector surveys in 2022. 16

1. INTRODUCTION

This appendix provides supplementary data from bat surveys undertaken at the Proposed Ballydermot Wind Farm (i.e., the Proposed Project) during 2022.

These surveys were designed and implemented having consideration of Collins, 2016, Scottish Natural Heritage (SNH) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation* (2019), and NatureScot, 2021 which were the relevant guidance at the time of the surveys.

Surveys completed included:

- Bat habitat suitability appraisal;
- Roost Surveys:
- Manual transects and
- Ground-level static detector surveys.

Although now outside the valid temporal scope for this EIAR, the 2022 data is presented as supplementary information to provide additional context on baseline conditions and to complement the 2024 and 2026 survey results. The 2022 data has been considered together with those more recent surveys in the EIAR impact assessment.

2. METHODS

2.1 Field Surveys

2.1.1 Bat Habitat Suitability Appraisal

Bat walkover surveys were carried out throughout 2022. During these surveys, habitats within the Proposed Wind Farm site 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 (2016) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories are divided into *High, Moderate, Low* and *Negligible*.

2.1.2 Roost Surveys

A search for roosts was undertaken within 200m plus the rotor radius (i.e. 85m) of the Proposed Turbine locations (NatureScot, 2021). The aim was to determine the presence of roosting bats and the need for further survey work or mitigation. A search for structures and likely suitable roosting areas was first conducted during initial desktop studies of the site. Repeated visits were carried out in April, July and September 2022. A walkover was carried out and all structures and trees identified within the search buffer were assessed for their potential to support roosting bats.

No structures containing potential suitable bat roosting features were identified within 200m plus the rotor radius (i.e.85m) of the Proposed Turbine locations. Any potential tree roosts were examined from the ground for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other potential roost features (PRFs) identified by Andrews (2018).

2.1.3 Manual Activity Surveys

Manual activity surveys comprised of walked transects at dusk. A series of representative transect routes were selected throughout the Project Site. The aim of these surveys was to identify bat species using the site and gather any information on bat behaviour and important features used by bats. 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.

Transects were walked by two surveyors, recording bats in real time. Dusk surveys commenced 30 minutes before sunset and were completed for 2-3 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 2022. Table 2-1 summarises survey effort in relation to walked transects.

Table 2-1 Survey Effort - Manual Activity Surveys

Date	Surveyors	Sunrise/ Sunset	Type	Weather
27th April 2022	Laura Granicz and Cathal Bergin	20:40	Dusk Transect	12°C, dry, 50% cloud cover calm/light breeze
9th June 2022	Laura Granicz and Keith Costello	21:53	Dusk Transect	19°C, dry, 20% cloud cover, calm/light breeze
28th September 2022	Laura Granicz and Laura McEntegart	19:13	Dusk Transect	15°C dry, 10% cloud cover, calm breeze

2.1.4 Ground-level Static Surveys - 2022

Where developments have more than 10 turbines, NatureScot (2021) requires one detector per turbine up to 10, plus one detector for every three additional turbines. The scope of bat work was designed considering a 46-turbine layout, 22 detectors were deployed to ensure compliance with NatureScot guidance. Detector locations were based on indicative turbine locations provided before the Spring deployment. Automated bat detectors were deployed at 22 no. locations for at least 10 nights in 2022 in spring (April-May), and at least 20 nights in summer (June-mid August) and autumn (mid-August-October) (NatureScot, 2021). Detector locations were based on indicative turbine locations and differ slightly to the final proposed layout. Static detector locations are described in Table 2-2.

Table 2-2 Ground-level Static Detector Locations

ID	Location (IG Ref)	Habitat	Linear Feature within 50m	Nearest Proposed Turbine
D01	N 66018 30399	Cutover bog (PB4), Scrub (WS1)	Scrubby hedgerow and drainage ditch	T46
D02	N 67354 30115	Cutover bog (PB4)	Drainage ditch	T45
D03	N 67507 28373	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	T42
D04	N 65605 28222	Cutover bog (PB4)	None	T41
D05	N 64078 25467	Cutover bog (PB4)	Scrub to the SW, immature treeline to north, drainage ditch	T2
D06	N 63887 27343	Cutover bog (PB4), Scrub (WS1)	Scrub/small hedgerow to East, drainage ditches	T38
D07	N 63059 26166	Cutover bog (PB4), Scrub (WS1)	Row of Scrub	T1
D08	N 63570 24646	Cutover bog (PB4)	Edge of woodland	T4
D09	N 64360 24053	Scrub (WS1)	Immature treeline, small hedgerow and drainage	T6
D10	N 66066 24404	Cutover bog (PB4)	Drainage ditches	T20
D11	N 65309 23028	Cutover bog (PB4), Scrub (WS1)	Edge of woodland	T9
D12	N 65172 21805	Cutover bog (PB4)	Treeline and scrub, drainage ditch	T12
D13	N 68509 25390	Conifer plantation (WD4), Bog woodland (WN7)	Drainage, cutover bog	T24
D14	N 69624 23386	Cutover bog (PB4)	Drainage, scrub, small hedgerow	T15
D15	N 68292 24111	Cutover bog (PB4)	Drainage, scrub	T26
D16	N 68010 22324	Cutover bog (PB4)	Cutover bog, treeline, artificial road surface	T17
D17	N 66819 22894	Cutover bog (PB4)	Treeline and scrub, drainage ditch	T19
D18	N 66983 25035	Cutover bog (PB4)	Drainage ditch, scrubby hedgerow to West	T22
D19	N 67341 26284	Eroding blanket bog (PB5)	Scrub to East and SE, drainage ditches	T30
D20	N 67260 27509	Treelines (WL2), Bog woodland (WN7)	Cutover bog, drainage, scrub	T32
D21	N 68967 27677	Cutover bog (PB4)	Immature woodland/scrub, drainage	T35
D22	N 70423 28418	Cutover bog (PB4)	Scrub and drainage ditches	T37

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 no.) with appropriate weather conditions were captured (i.e., dusk temperatures above 8˚ C, wind speeds less than 5m/s and no or only very light rainfall). Table 2-3 summarises survey effort achieved in 2022 for each of the 22 no. detector locations.

Table 2-3 Survey Effort - Ground-level Static Surveys 2022

Season	Survey Period	Total Survey Nights per Detector Location	Nights with Appropriate Weather
Spring	27th April – 10th May 2022	13	12
Summer	9th June – 5th July 2022	26	20
Autumn	28th September – 11th October 2022	11	9
Total survey effort		**50**	**41**

2.2 Bat Call Analysis

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.8 (Wildlife Acoustics, MA, USA). The aim of this was to identify, to a species or genus level, what bats were present at the Proposed Project site. Bat species were identified using established call parameters, to create site-specific custom classifiers and all data were manually verified.

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

Plate 2-1 below shows a typical sonogram of echolocation pulses for common pipistrelle recorded with a SM4BAT bioacoustic static bat recording device. The recorded file is illustrated using Wildlife Acoustics Kaleidoscope software.

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2016). 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. Were multiple species were recorded within the same recording, rarer or less recorded species were prioritised over common species.

Consideration was given to the fact that species such as Brown long-eared bats and Lesser horseshoe bats are known to have quiet and very directional echolocation calls, which are difficult to record and are likely to cause an underrepresentation of these species in the data collected, in comparison to "louder" species (i.e. Leisler's bats). Standardised equipment methods, including the use of omni-directional microphones, ensure data collection is uniform across the site and data are comparable despite this limitation.

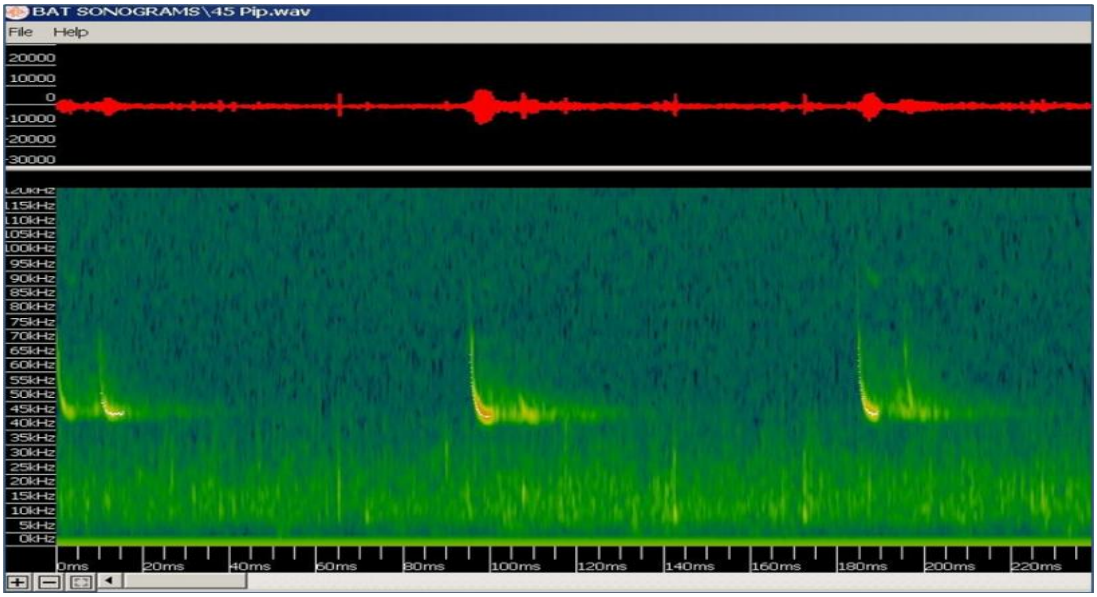


Plate 2-1 Sonogram of Echolocation Pulses of Common pipistrelle (Peak Frequency 45kHz)

2.3 Assessment of Bat Activity Levels

The online database tool Ecobat (mammal.org.uk) is recommended by NatureScot 2021 to assess bat activity levels within a proposed wind farm development. 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 2-4 defines bat activity levels as they relate to Ecobat percentile values (NatureScot, 2021).

Table 2-4 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

Ecobat was unavailable for a cross-site analysis of 2022 data as the platform has been undergoing maintenance since late 2022. Ecobat relaunched at the end of 2024 after data evaluation had been undertaken, it was decided not to use the software for the site and rely on the site-specific analysis already undertaken.

All statistical analyses and graphical representations in this report were conducted using R (version 4.3.2), and RStudio (version 2023.09.+494.). R is a powerful statistical programming language and provided the framework for data manipulation and statistical testing. To allow this, data were standardised into bat passes per hour. RStudio, as an integrated development environment for R, facilitated efficient coding, visualization, and reproducibility. The 'ggplot2' package in R was particularly instrumental in creating the detailed graphs presented in the results section.

The methodology used to assess activity levels across the Proposed Wind Farm site was adapted from Mathews *et al.* (2016), where activity ranges of pipistrelle species were defined using an average of maximum nightly pass rates (in total passes) across the Proposed Wind Farm site, divided into tertiles. The use of bat passes per hour rates was deemed more appropriate to account for seasonal changes in night length. For all other species groups maximum nightly pass rate (bpph) recorded across the Proposed Wind Farm site divided into quartiles was used. Activity levels were assessed separately for

widespread pipistrelle species (*Pipistrellus pipistrellus, Pipistrellus pygmaeus*), noctules (*Nyctalus leisleri*), *Myotis* spp. and rare or hard to record species (*Plecotus auritus, Pipistrellus nathusii*). Median and maximum nightly activity (bpph) at each detector location was then assessed as Low, Medium or High activity for each season recorded based on the quartile ranges identified. Table 2-5 presents activity ranges per species group identified.

Table 2-5 Site-specific Activity Level Categories based on Maximum Bat Passes per Hour (bpph)

Assessment Level	Activity thresholds (bat passes per hour, bpph) by species				
	Soprano and common pipistrelles	Nathusius' pipistrelle	Leisler's bat	*Myotis* spp.	Brown long-eared bat
Low	< 2.21	< 0.70	< 0.74	< 0.68	< 0.25
Moderate	2.21 – 6.64	0.70 – 2.10	0.74 – 2.22	0.68 – 2.03	0.25 – 0.75
High	> 6.64	> 2.10	> 2.22	> 2.03	> 0.75

3. RESULTS

3.1 Field Surveys

3.1.1 Bat Habitat Suitability Appraisal

A total of twenty-three habitats were recorded within the Proposed Wind Farm site including: Cutover bog, dry heath, scrub, and bog woodland. Further details on habitats within the Proposed Wind Farm site can be found in Section 6.3.2 of Chapter 6 of this EIAR. The area within the Proposed Wind Farm site containing the Proposed Turbines is dominated by Cutover bog (PB4) characterized by bare peat

Results from the walkover surveys were used to assess habitats for their suitability to support foraging and commuting bats, and roosting bats, according to Collins (2016). Suitability categories, divided into High, Moderate, Low and Negligible and None. Please see section 4.2.1 of Appendix 6-2.

3.1.2 Roost Surveys

A detailed daytime bat roost inspection was undertaken within the Proposed Wind Farm site during the 2022 bat activity seasons to identify structures and features with the potential to support roosting bats. No structures or trees containing suitable potential roosting features were identified within 285m (200m plus rotor radius) of any Proposed Turbine location. Please see section 4.2.2 of Appendix 6-2 for more detail on roost surveys.

3.1.3 Manual Activity Surveys

Manual activity surveys were undertaken in the form of walked and driven transects in Spring, Summer and Autumn 2022. Bat activity was recorded on all surveys. A total of 149 bat passes were recorded. In general, Soprano pipistrelle (n=81) was recorded most frequently, followed by Common pipistrelle (n=62) and Leisler's bat (n=4) and *Myotis spp.* (n=1) were recorded less frequently (Plate 3-1).

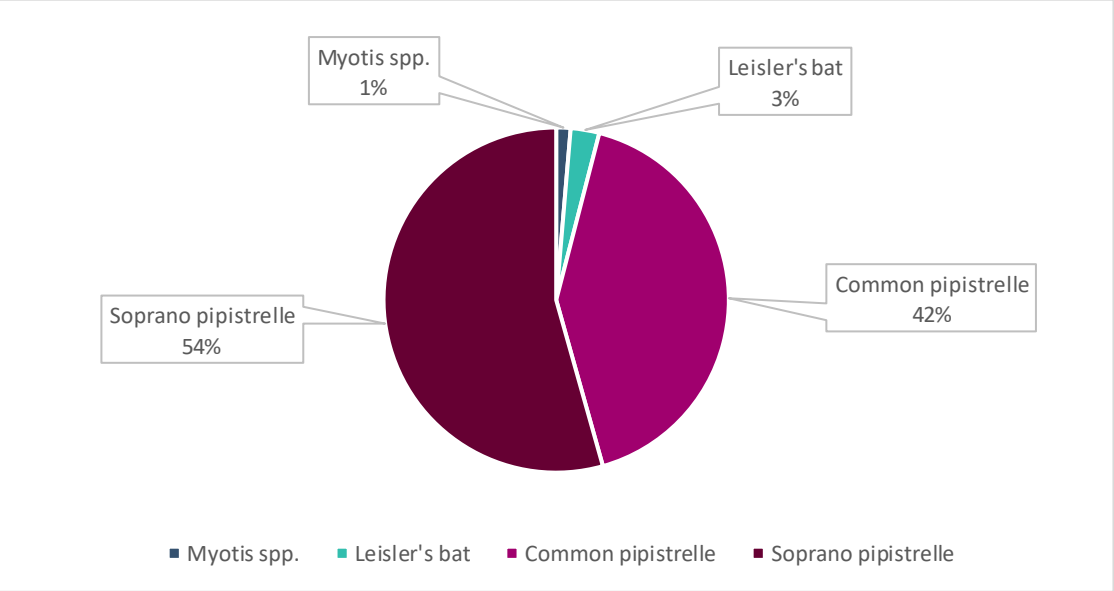


Plate 3-1 Transect Results - Species Composition (Total species composition)

Species composition and activity levels varied across the survey periods. Transect survey results were calculated as bat passes per km surveyed to account for differences in survey effort. Plate 3-2 presents results for individual species per survey period (Spring, Summer, and Autumn). Common and soprano pipistrelle were most commonly recorded across spring and summer. Higher levels of Leisler's bat and

Myotis spp. were recorded in summer. In autumn, the activity was dominated by soprano pipistrelle. Overall, activity was highest in spring, activity decreased in summer and the lowest overall activity was in autumn.

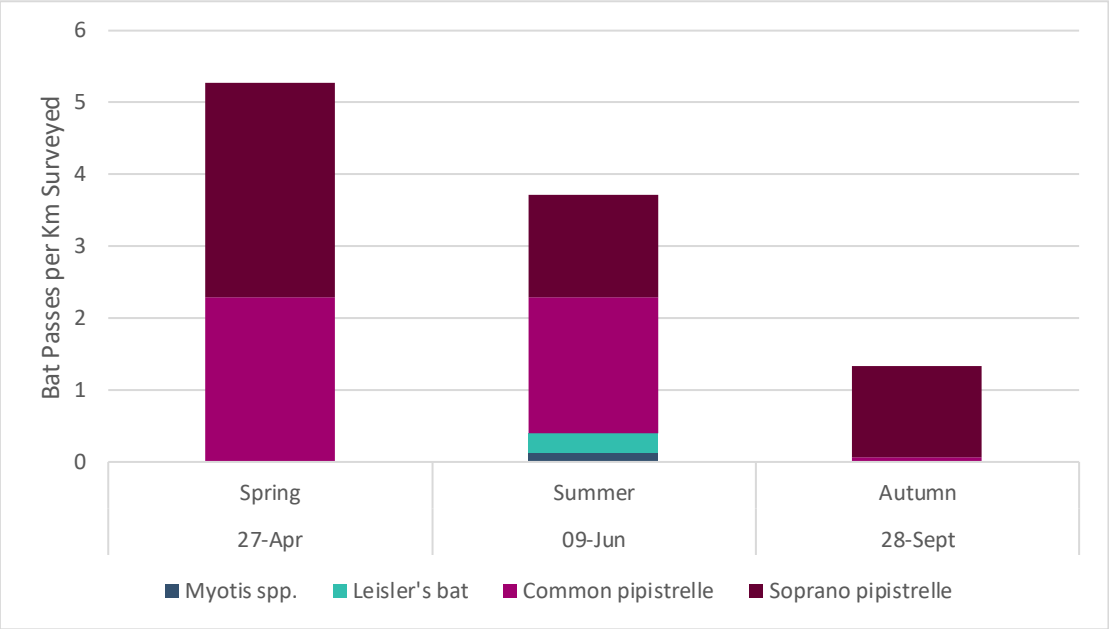


Plate 3-2 2022 Transect Results - Species Composition Per Survey Period

3.1.4 Ground-level Static Surveys - 2022

In total, 65,420 bat passes were recorded across all deployments. In general, Common pipistrelle (n=35,920) was recorded most frequently, followed by Soprano pipistrelle (n=18,621), Leisler's bat (n=7,728) and Myotis spp. (n=2,215). Instances of Nathusius' pipistrelle (n-627) and Brown long-eared bat (n=309) were less frequent. Plate 3-3 presents relative species composition across all ground-level static detector surveys.

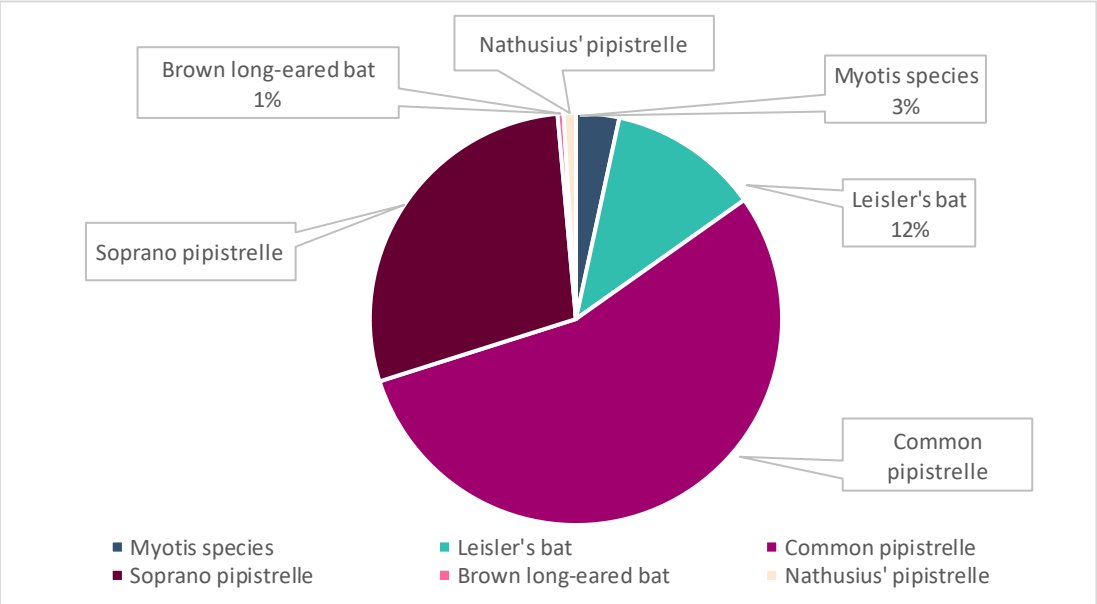


Plate 3-3 Total Species Composition recorded in 2022.

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 4-4 presents these results for each species per season. Spring activity was dominated by Common pipistrelle, with additional activity from soprano pipistrelle and Leisler's bat. Myotiss spp. activity was highest in spring in comparison to other

seasons. During summer, Common pipistrelle was the most active species, followed by Soprano pipistrelle. Nathusius' pipistrelle activity peaked in summer. Overall activity levels were lowest in autumn. Activity was dominated by Soprano pipistrelle in autumn followed by Common pipistrelle. Brown long-eared bat activity remained low throughtout the survey periods.. Nathusius' pipistrelle activity was not detected in autumn.

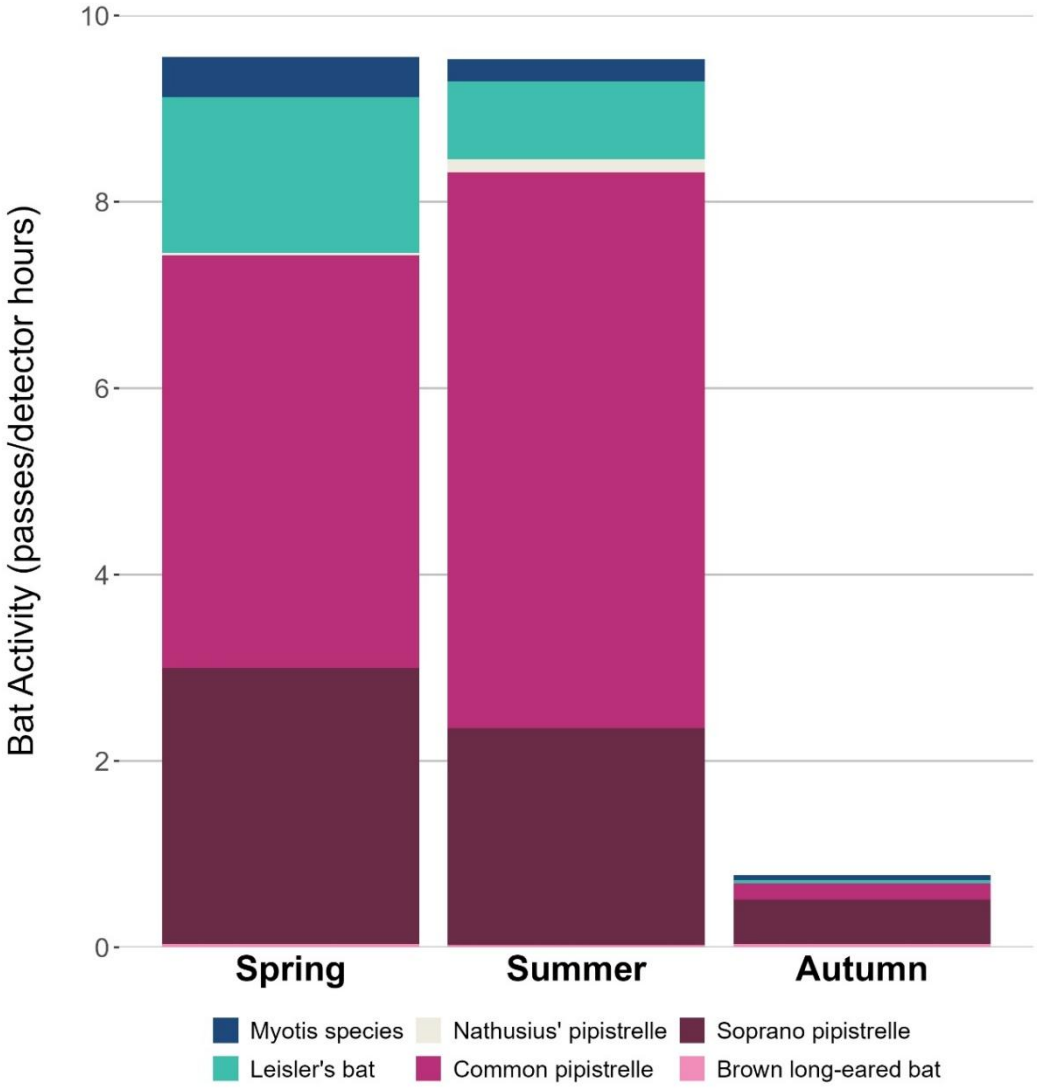


Plate 3-4 Static Detector Surveys 2022: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights)

The Median Bat Pass Rate per detector, per survey period is shown in Plates 3-5 & 3-6 (varied axis scale) and demonstrates clear seasonal and spatial variation in bat activity. In spring, activity was highest at D01 with notable levels also at D05 and D09. Summer bat activity was highest at D12, followed by D13, D06, and D05. Autumn had the lowest activity levels, D15 was the most active site, attributable to soprano pipistrelle activity, with notable levels of activity at D04, D06 D07and D17, and reduced levels elsewhere.

The Nightly Pass Rate (i.e. total bat passes per hour, per night) was used to determine typical bat activity at the Proposed Wind Farm. 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). Plate 3-11 illustrates the median nightly pass rate per species and deployment season in 2022. Notable peaks in activity were seen on the 2nd of May and the 17th of June. The decrease in activity in autumn is clearly visible with much less activity recorded on the final days of the deployment.

Weather (rainfall, windspeed and temperature) at night during deployments are presented below. Spring had the highest level of rainfall per nights while windspeed was the highest during summer, see Plate 3-8.

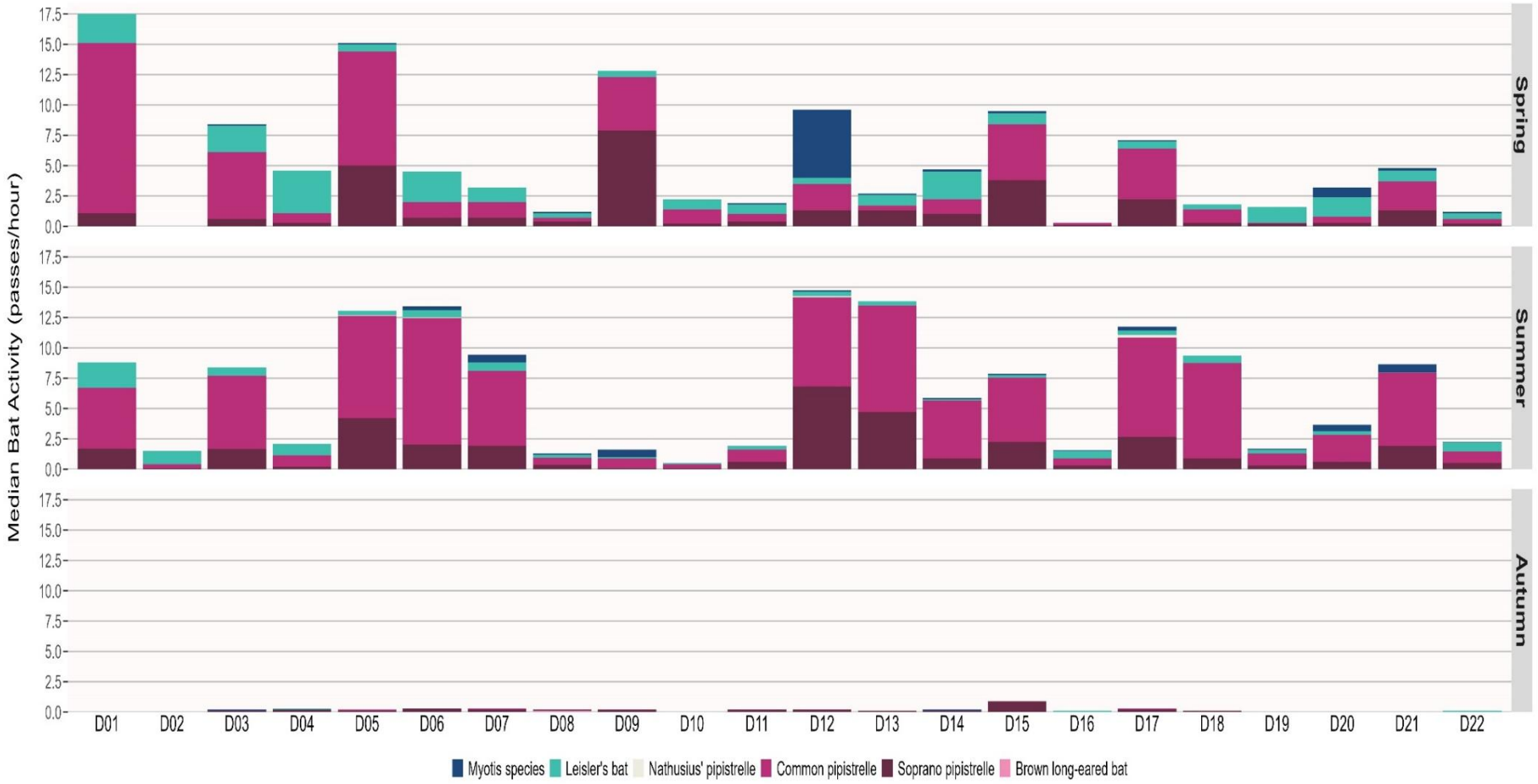


Plate 3-5 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period.

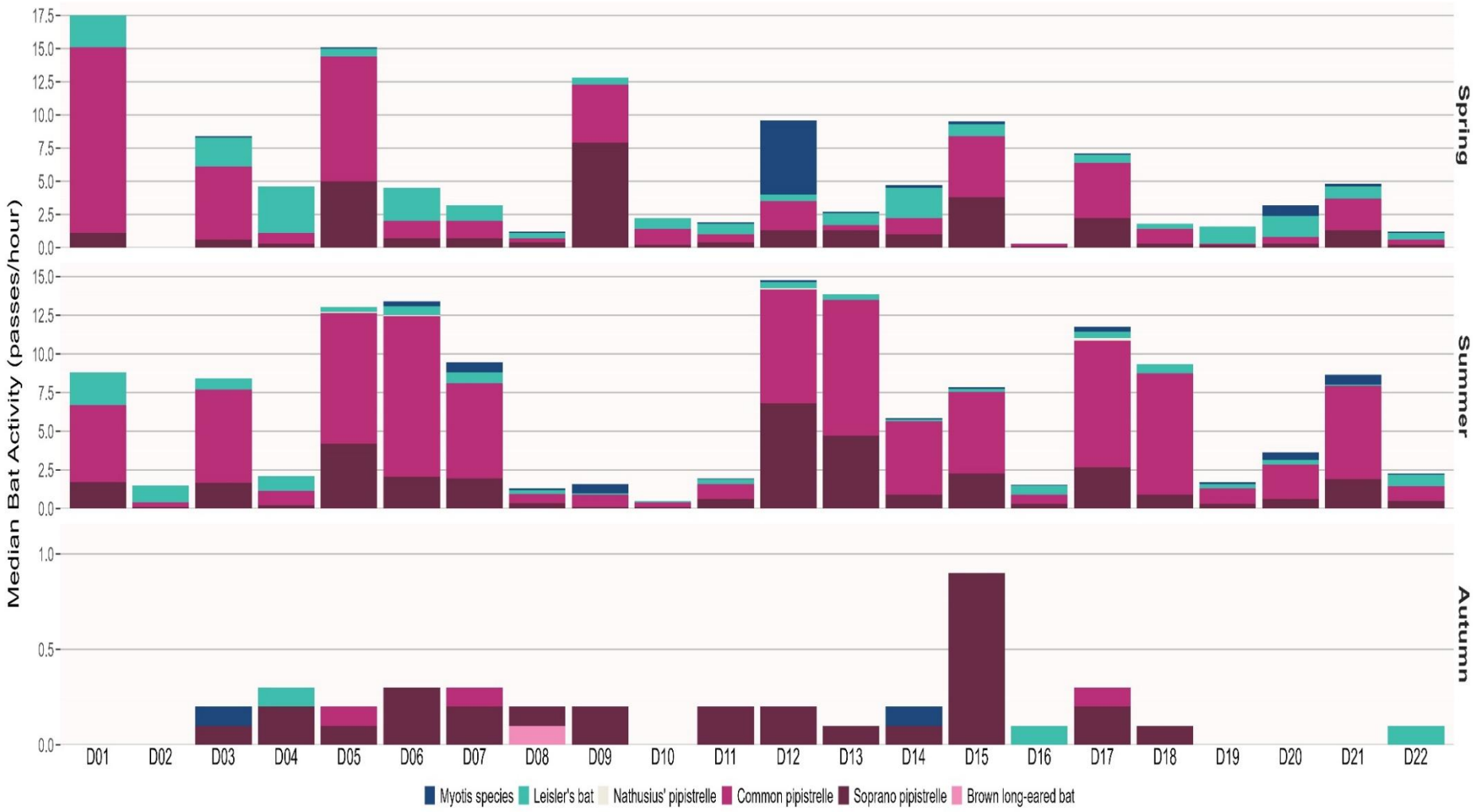


Plate 3-6 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Location Per Survey Period (Varied Axis Scale).

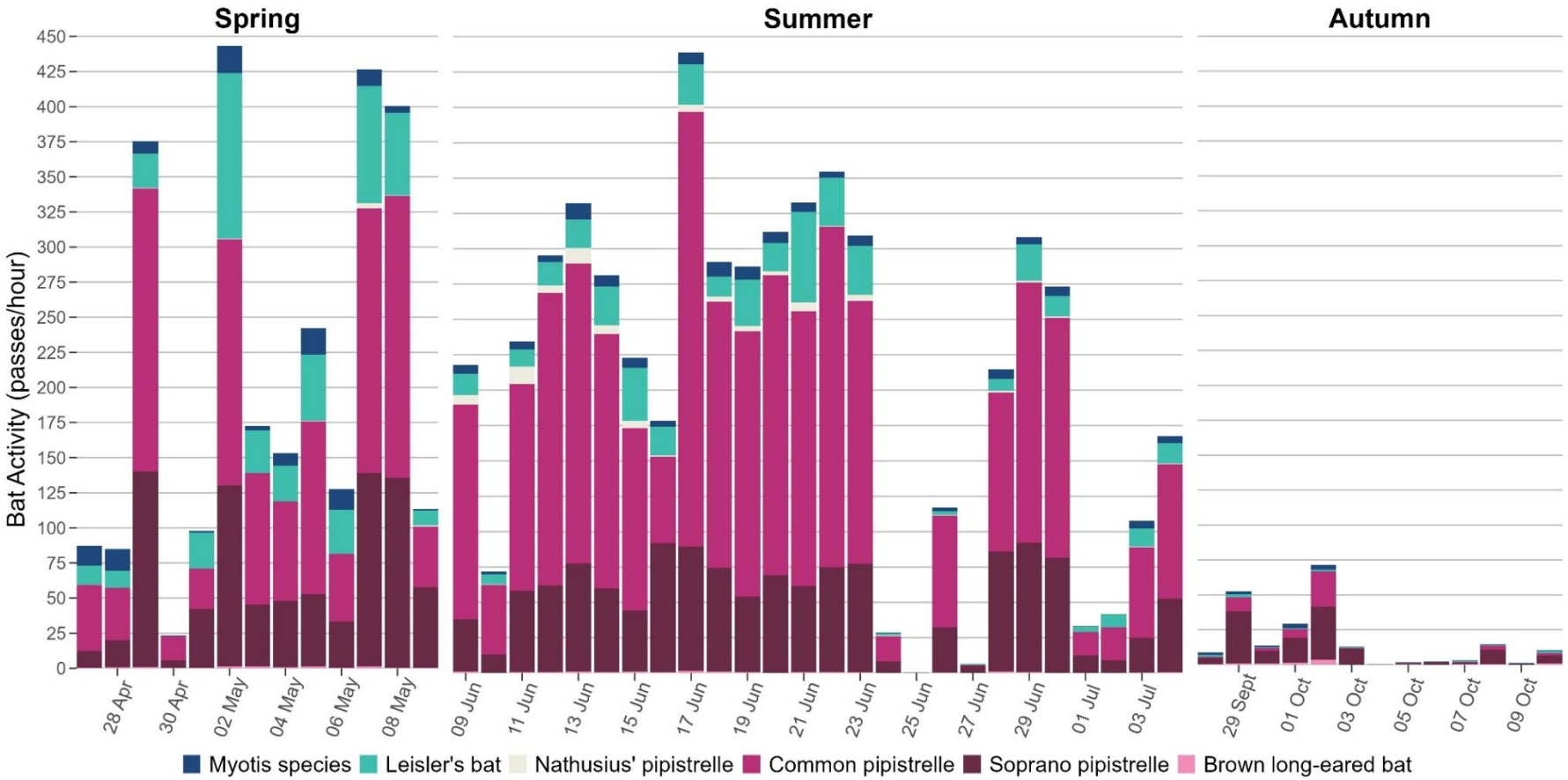


Plate 3-7 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night

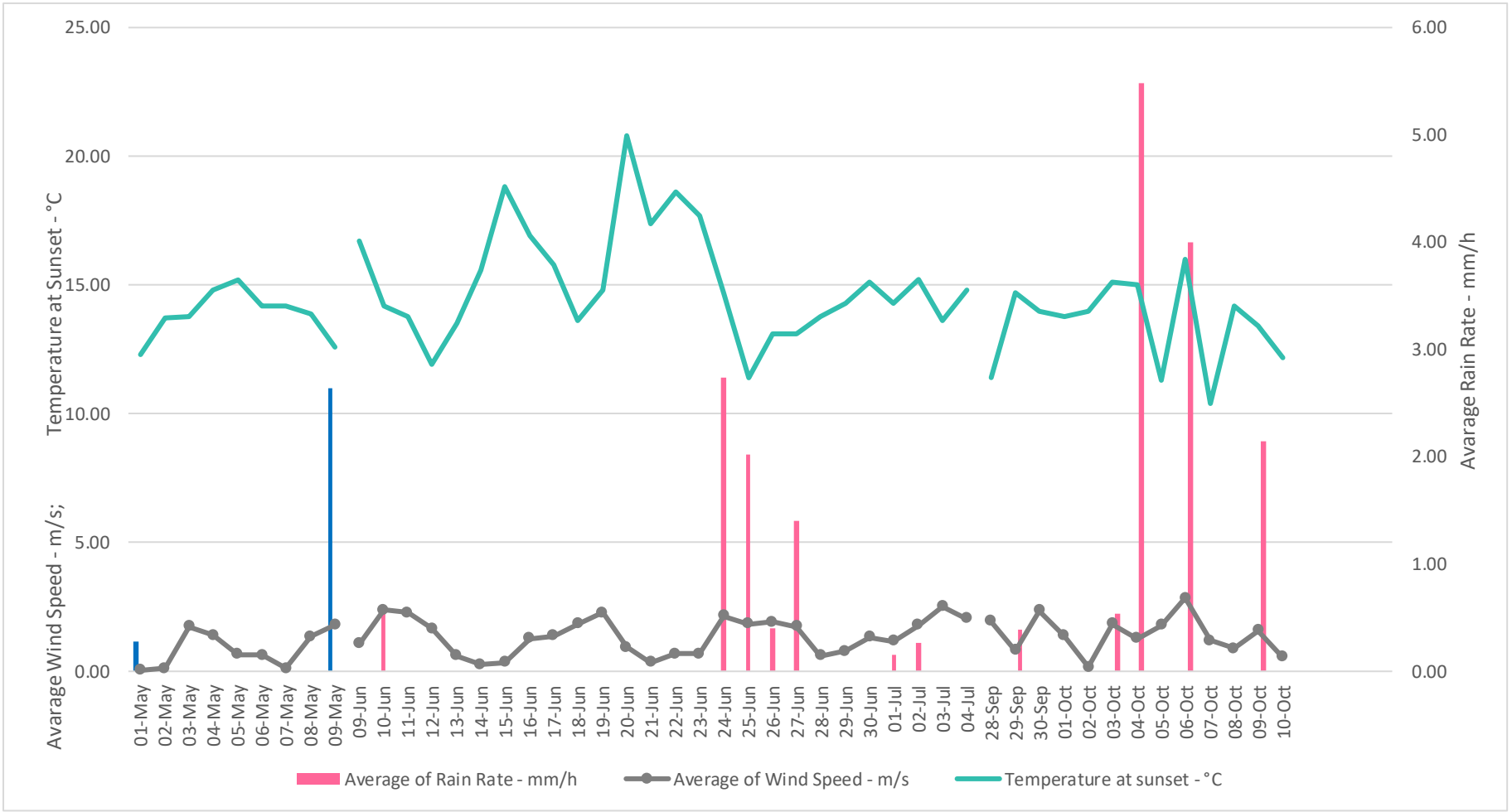


Plate 3-8 Weather suitability across nights of static detector surveys in 2022.

4. DISCUSSION

4.1 Assessment of Bat Activity Levels

Details on activity assessment per detector are presented below. Table 4-2 shows the results of the site-level assessment. Activity was assessed as Low, Medium or High based on the methodology described in Section 2.3. Where no median activity at a detector is reported, no data was recorded for that species throughout the deployment. A summary of the detector locations that recorded High median bat activity is presented in Table 4-1.

4.1.1 Adapted Site-specific Ranges

Leisler's bat

Leisler's bat exhibited mostly *Moderate* and *High median* activity in spring and summer with *Low* overall median activity in autumn. There was no *High* median activity recorded across the three seasons. The highest median activity was recorded at D04 in Spring (3.5bpph). A significant outlier was identified at D01 in Spring with a maximum activity of 38.8bpph.

Pipistrelle species – Common and Soprano

Common pipistrelle demonstrated *Low, Moderate* and *High* median activity levels in spring, with the highest median activity recorded at D01 (14 bpph). Summer showed *Moderate* and *High* median activity with the highest median activity recorded at D06 (10.4 bpph). Median activity was *Low* at all locations during the autumn season. A significant outlier was identified at D05 in Spring with a maximum activity of 103.2 bpph.

Soprano pipistrelle was recorded at Moderate and *High* median activity levels across spring and summer with the highest median activity recorded at D09 in Spring (7.9 bpph) and at D12 in summer (6.8bpph). Median activity was *Low* at all locations during the autumn season. A significant outlier was identified at D05 in Spring and Summer with a maximum activity of 79.3 bpph and 79.6 bpph

Nathusius' pipistrelle

Nathusius' pipistrelle activity exhibited *Low* median activity levels across all three seasons. Summer had the highest activity levels, and the species was recorded across all detector locations. There was no activity recorded during the autumn. Significant outliers were identified at D03 and D05 in Summer with a maximum activity of 9.2 bpph and 4.4 bpph respectively.

Myotis spp.

Myotis species exhibited *Low* median activity in summer and autumn and the species was not recorded at D02 in summer or autumn. High median activity was recorded at D12 in Spring (5.6 bpph). A significant outlier was identified at D12 in Spring with a maximum activity of 14.9bpph.

Brown long-eared bat

Brown long-eared bat exhibited Low median activity levels across all seasons. This species was absent from a few detector locations in each season. Significant outliers were identified at D05 in Spring (1.4 bpph), D04 in Autumn (1.1 bpph) and D15 in Autumn (1.2 bpph).

Table 4-1 Detector Locations Recording High Median Activity in 2022

Detector ID	Turbine ID	Species	High Median Activity Survey Period
D01	T46	Common pipistrelle and Leisler's bat	Spring 2022
D04	T41	Leisler's bat	Spring 2022
D05	T38	Common pipistrelle	Spring and Summer 2022
D06	T39	Leisler's bat and Common pipistrelle	Spring and Summer 2022
D09	T05	Soprano pipistrelle	Spring 2022
D12	T03	Myotis spp., Soprano pipistrelle and Common pipistrelle	Spring and Summer 2022
D13	T08	Common pipistrelle	Summer 2022
D14	T11	Leisler's bat	Spring 2022
D17	T29	Common pipistrelle	Summer 2022
D18	T31	Common pipistrelle	Summer 2022

Table 4-2 Assessment of Activity Levels. Absent, Low, Moderate, High. Outliers are highlighted in Orange.

Species	Season	Bat activity (bpph)	D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	D22
Myotis spp.	Spring	Median	0	-	0.1	0	0.1	0	0	0.1	0	0	0.1	5.6	0.1	0.2	0.2	0	0.1	0	0	0.8	0.2	0.1
		Maximum	0.2	-	0.5	0.1	0.5	0.4	0.3	0.4	0.2	0.2	0.2	14.9	0.6	0.7	0.4	0.2	0.7	0.3	0.1	2.3	0.8	0.2
	Summer	Median	0	0	0	0	0	0.3	0.65	0.1	0.6	0	0.05	0.1	0	0.1	0.1	0.05	0.3	0	0.1	0.5	0.7	0.05
		Maximum	0.1	0.1	0.4	0.1	0.4	0.7	2.5	0.6	2.2	0.3	0.7	0.8	0.3	1.6	0.4	0.6	0.8	0.3	0.8	2.1	2.7	0.6
	Autumn	Median	0	-	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0
		Maximum	0.2	-	0.2	0.2	0.2	0.3	0.2	1.2	0.3	0.2	0.2	0.3	0.2	0.5	0.2	0.3	0.3	0.1	0.1	0.1	0.2	0.2
Leisler's bat	Spring	Median	2.4	0	2.2	3.5	0.6	2.5	1.2	0.4	0.5	0.8	0.8	0.5	0.9	2.3	0.9	0	0.6	0.4	1.3	1.6	0.9	0.5
		Maximum	38.8	0.5	7.3	15.4	3.5	11.5	3.3	4.3	3	1.9	2.7	1.2	10.6	4.9	2.5	0.1	2.4	3.1	4.4	3.8	6.9	2.3
	Summer	Median	2.1	1.1	0.7	0.95	0.35	0.6	0.7	0.25	0.1	0.1	0.3	0.4	0.35	0.1	0.2	0.6	0.4	0.6	0.3	0.3	0.1	0.75
		Maximum	6.5	3.8	3	4.3	4	3.1	2.3	1.4	4.6	0.9	1.6	15.7	5.7	9	2.5	5.3	1.6	2.9	4	2.3	4.4	3.9
	Autumn	Median	0	-	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1
		Maximum	0.2	-	0.2	0.2	0.1	0.4	0.2	0.3	0.2	0.1	0.5	0.4	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.2
Nathusius' pipistrelle	Spring	Median	0	-	0	0	0	0	-	-	0	-	-	0	0	0	-	0	0	0	-	-	0	-
		Maximum	0.5	-	2.8	0.1	0.1	0.1	-	-	0.1	-	-	0.1	0.2	0.1	-	0.1	0.1	0.1	-	-	0.1	-
	Summer	Median	0	0	0	0	0.05	0.05	0	0	0	0	0	0.1	0	0	0	0	0.2	0	0	0	0	0
		Maximum	0.6	0.1	9.2	0.1	4.4	1.4	0.4	0.3	0.1	0.4	0.4	1	0.3	1.4	0.4	0.1	1.7	1.7	0.3	0.4	0.7	0.1
	Autumn	Median	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Maximum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common pipistrelle	Spring	Median	14	0	5.5	0.8	9.4	1.3	1.3	0.3	4.4	1.2	0.6	2.2	0.4	1.2	4.6	0.2	4.2	1.1	0.1	0.5	2.4	0.4
		Maximum	56.3	0.2	15.5	4.4	103.2	7.2	4.2	1	59.9	8	1.2	11.5	18.8	8.2	15.7	0.9	22.7	3	0.9	5.2	5.9	0.9
	Summer	Median	5	0.3	6.05	0.95	8.45	10.4	6.15	0.6	0.8	0.3	1	7.35	8.8	4.75	5.3	0.6	8.2	7.85	1	2.3	6.1	0.95
		Maximum	22.9	2.3	23.9	3.6	65	36.4	23.7	4.1	3.5	1.6	3	45.6	24.2	16.7	15.7	2.7	20	54.5	20.2	47	35	4.4
	Autumn	Median	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0	-	0	0	0
		Maximum	1.2	3.1	0.5	11.3	0.6	3	0.8	0.5	0.6	1.1	0.2	1	0.5	0.3	0.2	0.4	1.9	3.1	-	0.5	0.2	0.2
Soprano pipistrelle	Spring	Median	1.1	0	0.6	0.3	5	0.7	0.7	0.4	7.9	0.2	0.4	1.3	1.3	1	3.8	0.1	2.2	0.3	0.2	0.3	1.3	0.2
		Maximum	12	0.2	1.5	0.9	79.3	2.9	1.2	1.4	59.9	1.3	2	4.7	44.6	3.5	20.6	0.4	11.7	1.5	1.1	1.1	5.9	1.1
	Summer	Median	1.7	0.1	1.65	0.2	4.2	2.05	1.95	0.35	0.1	0.1	0.6	6.8	4.7	0.9	2.25	0.3	2.65	0.9	0.3	0.6	1.9	0.5

		Maximum	10.3	0.4	5.5	0.7	79.6	11.2	9.7	2.3	0.6	1	2.8	24.4	37.5	4.1	6.1	0.9	13.7	6.7	1	6.4	8.5	2.3
	Autumn	Median	0	0	0.1	0.2	0.1	0.3	0.2	0.1	0.2	0	0.2	0.2	0.1	0.1	0.9	0	0.2	0.1	0	0	0	0
		Maximum	5.6	1.7	0.3	5.5	2.2	2.4	1.1	0.4	1.8	1.1	0.5	1.2	2	0.6	15.1	0.2	3.4	0.3	0.4	0.4	0.3	0.6
Brown long-eared bat	Spring	Median	0	-	0	0	0	0	-	0	0	0	0	0	0	0	0	-	0	0	-	0	0	0
		Maximum	0.1	-	0.3	0.1	1.4	0.1	-	0.3	0.1	0.1	0.1	0	0.1	0.4	0.2	-	0.2	0.1	-	0.1	0.3	0.3
	Summer	Median	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
		Maximum	0.1	-	0.1	0.1	0.3	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	-	0.3	0.1	0.4	0.3	0.9	0.3
	Autumn	Median	0	0	0	0	0	0	-	0.1	-	0	0	0	0	0	0	0	0	0	0	0	0	0
		Maximum	0.1	0.1	0.2	1.1	0.2	0.2	-	0.3	-	0.2	0.1	0.2	0.2	0.1	1.2	0.2	0.1	1	0.2	0.1	0.1	0.2

5. CONCLUSION

Surveys in 2022 were undertaken in line with NatureScot (2021) including a bat habitat appraisal, roost inspections, manual activity surveys and ground level static surveys.

Cutover bog, poor fen, and grasslands within the Proposed Wind Farm site were assessed as having *Low* suitability for foraging and commuting bats, while habitats such as bog woodland, scrub, artificial waterbodies, drainage channels and streams, present in areas where peat extraction has ceased, were classed as *Moderate* to *High* suitability. Woodland and scrub habitats on site consist mainly of immature bog woodland with limited structural development, and the tree resource was therefore assessed as offering no (*None)* to *Negligible* roosting potential.

Static detectors confirmed peaks in median activity levels at several locations. Specifically, detectors D01, D04, D05, D06, D09, D12, D13, D14, D17, and D18 recorded peak activity corresponding to turbines T46, T41, T38, T39, T05, T03, T08, T11, T29, and T31, respectively. Common pipistrelle was the dominant species across the site with peaks in median activity levels at numerous detector locations including D01, D05, D06, D12, D13, D17 and D18. Soprano pipistrelle and Leisler's bat also made up a significant proportion of the species activity. Nathusius' pipistrelle and *Myotis* spp. were recorded occasionally while Brown long-eared bat activity was lowest overall. Activity levels varied significantly both temporally across the three seasons and spatially across detector location. Spring and summer showed the highest levels of bat activity. Overall highest levels of activity were recorded at D01 in spring, D06 in summer and D15 in autumn.

Similarly, during manual transect surveys, Common pipistrelle was most commonly recorded, followed by Soprano pipistrelle and Leisler's bat. Additionally, no roosts were identified within the proposed development footprint or wider site during the inspection surveys undertaken.

Although now outside the valid temporal scope for this EIAR, the 2022 surveys indicate that bat activity at the Proposed Wind Farm site is characterised by widespread Common pipistrelle use. Other species regularly recorded include Soprano pipistrelle and Leisler's bat. These results complement the 2024 and 2026 survey data presented in the EIAR and have been considered in combination to inform the impact assessment and mitigation design.

6. REFERENCES

Andrews, H. (2013) Bat Tree Habitat Key. AEcol, Bridgewater.

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn). The Bat Conservation Trust, London.

EUROBATS (2016) Report of the Intersessional Working Group on Wind Turbines and Bat Populations at 21st Meeting of the Advisory Committee, Zandvoort, the Netherlands, 18 – 20 April 2016.

NatureScot (2021). Bats and onshore wind turbines: survey, Assessment and mitigation. Version: August 2021 (updated with minor revisions).

Northern Ireland Environment Agency (2011) Bat Survey – Specific Requirements for Wind Farm Proposals.

NIEA, Natural Environment Division (2021). Guidance on Bat Surveys, Assessment & Mitigation for Onshore Wind Turbine Developments.

Rodrigues, L., L. Bach, M. J. Dubourg-Savage, B. Karapandža, D. Kovač, T. Kervyn, J. Dekker, A. Kepel, P. Bach, J. Collins, C. Harbusch, K. Park, B. Micevski, and J. Minderman (2015). Guidelines for consideration of bats in wind farm projects - Revision 2014. UNEP/EUROBATS Secretariat Bonn, Germany.

Russ, J. (2012). British bat calls: a guide to species identification. Pelagic publishing.

SNH (2019). Bats and onshore wind turbines: survey, assessment and mitigation.