Planning and Environmental Consultants

Baseline Bat Report

Ulster Canal Restoration

DOCUMENT DETAILS

Client:	**Waterways Ireland**
Project Title:	**Ulster Canal Restoration**
Project Number:	**230914-b**
Document Title:	**Baseline Bat Report**
Document File Name:	**230914b Ulster Canal BBR – 2025.03.11**
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Rev	Status	Date	Author(s)	Approved By
01	D1	21/02/2025	LM/DC	SF
01	F	11/03/2025	LM/DC	SF

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1. INTRODUCTION

1.1 Purpose of this Report

MKO was commissioned to complete a comprehensive assessment of the potential effects on bats, as part of an Environmental Imapct Assessment Report (EIAR) for an application for planning permission for the restoration of approximately 3.75km of the Ulster Canal between the townlands of Clonoony, Co. Monaghan and Derrynure, Co. Fermanagh. This report provides details of the bat surveys undertaken, including survey design, methods and results, and recommendation to safeguard bats. An impact assessment based on the information contained in this report is carried out within the Biodiversity chapter of the EIAR.

The report presents the ecological baseline recorded within the Proposed Development in relation to bats. Surveys were carried out between January and September 2024. Surveys included a suitability appraisal and inspection of the habitats and potential roosting features present on site. Seasonal manual activity and roost surveys were carried out, as well as ground-level static detectors surveys. Eight detectors were deployed around the site for a minimum of 10 nights per season.

The main objective of the surveys was to assess the site for its suitability for foraging and commuting bats, as well as assess and inspect any structures for potential roosts, including maternity roosts. The bat surveys were designed to establish the nature, scale and locations of potential bat activity within the site.

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

- *Bat Survey Guidelines: Traditional Farm Buildings Scheme. The Heritage Council, Áras na hOidhreachta, Church Lane, Kilkenny (Aughney, T., Kelleher, C. & Mullen, D., 2008)).*
- *The Lesser Horseshoe Bat Conservation Handbook, Vincent Wildlife Trust (Schofield, HW., 2008).*
- *Bat Surveys for Professional Ecologists – Good Practice Guidelines (4th edn.) (Collins, 2023)*
- *Bat Roosts in Trees (Andrews, 2018)*
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a)*
- CIEEM (2013) *Competencies for Species Surveys: Bats.* Chartered Institute of Ecology and Environmental Management, Winchester.
- *Guidelines for the Treatment of Bats during the Construction of National Road Schemes (NRA, 2006b)*
- *British Bat Calls: A Guide to Species Identification (Russ, 2012)*
- *Bat Mitigation Guidelines for Ireland – V2. Irish Wildlife Manuals, No. 134. (Marnell, Kelleher & Mullen 2022)*
- *UK Bat Mitigation Guidelines, (Reason, P. F. and Wray, S. 2023)*
- *Guidance Note 08/23: Bats and Artificial Lighting at Night (ILP, 2023)*

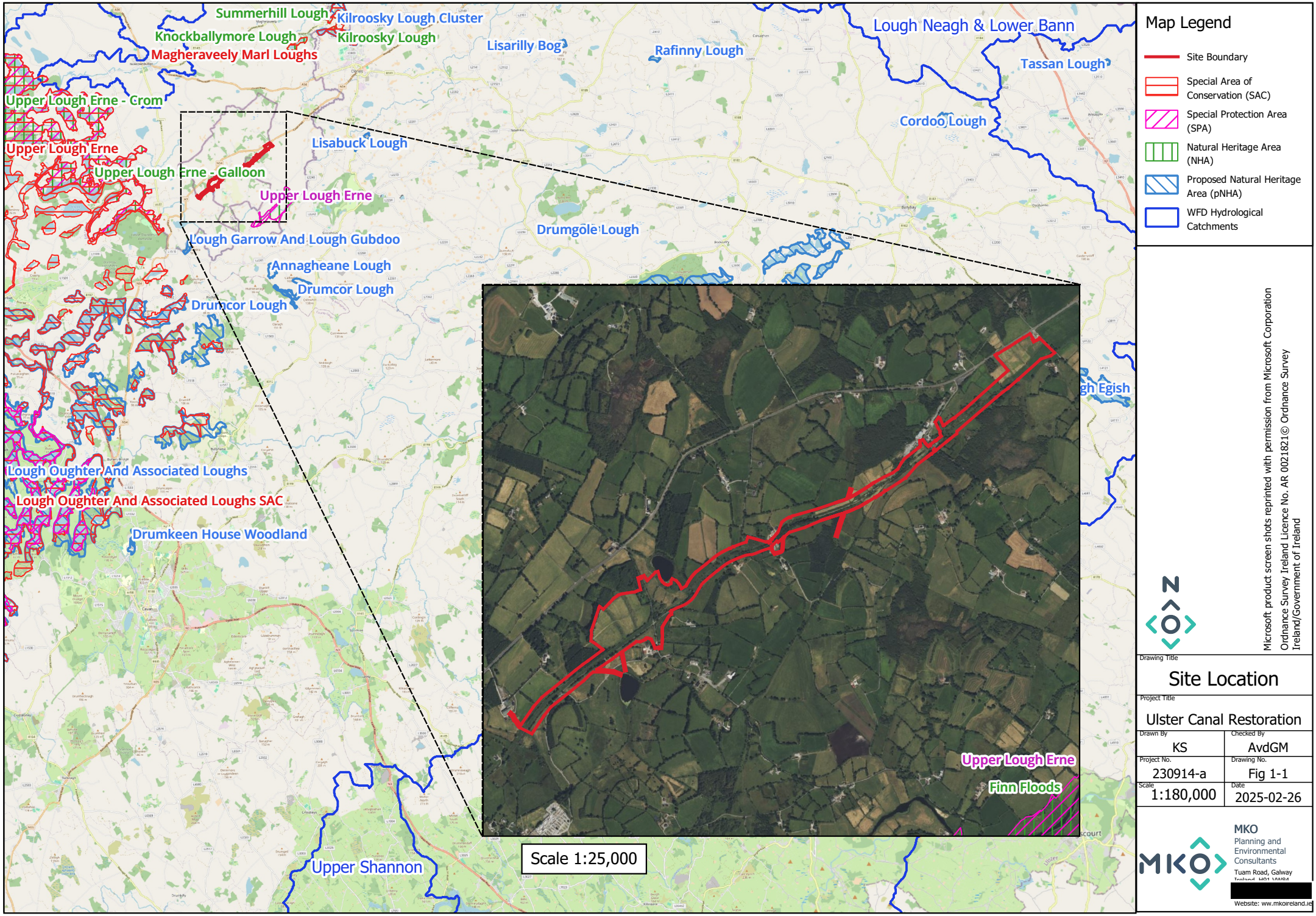
1.2 Site Description

The Proposed Development (termed Phase 3.3.) concerns the restoration of the Ulster Canal within the jurisdiction of Monaghan County Council, and makes reference to the existing planning consent for the restoration of the overall Ulster Canal Project which has outstanding consent via Fermanagh and Omagh District Council. The Proposed Development is an approximate 3.75 km corridor which extends from the border crossing at Clonoony, in the Republic of Ireland in a north-easterly direction to the border crossing at Derrynure, County Fermanagh in Northern Ireland. The Grid Reference co-ordinates of the border crossing at Clonoony are ITM X 643963 Y 820900. The Grid Reference co-ordinates of the border crossing at Derrynure are ITM X 646712 Y 822988 ITM.

The town of Clones is located approximately 4.5 km to the northeast of the Proposed Development site at the closest point where it crosses the border at Derrynure. Gortnacarrow is located adjoining the site boundary to the northwest of the Proposed Development.

The Proposed Development of the historic Ulster Canal mainly follows the original canal corridor, mostly within an agricultural landscape where the original canal has been infilled, and the site is currently used for livestock grazing. Some sections of the original canal still remain and are found along the site. Land use of the wider area surrounding the site comprises mainly agricultural pasture with areas of wet grassland. The topography is generally rolling low drumlins with flooded hollows linked by streams. There are a small number of private residences and farm buildings scattered alongside the proposed canal route. Land-use in the wider landscape of the site comprises a mix of rural and agricultural farmland. The nearest surface water feature to the site is the Clonoony Lough which is located approximately 220 m northwest of the site and the Lakeview Lough located which bounds the site southeast. The St Alphonsus, Connons Church and the St Comgall's National School are located to the southeast approximately 270 m southwest.

The location of the Proposed Development is presented in Figure 1-1.



Map Legend

- Site Boundary
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)
- WFD Hydrological Catchments

Drawing Title

Site Location

Project Title

Ulster Canal Restoration

Drawn By	Checked By
KS	AvdGM
Project No.	Drawing No.
230914-a	Fig 1-1
Scale	Date
1:180,000	2025-02-26

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1.3 Policy and Legislation

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

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

The NPWS monitors the conservation status of European protected habitats and species and reports their findings to the European Commission every 6 years in the form of an Article 17 Report. The most recent report for the Republic of Ireland was submitted in 2019. Table 1-1 summarises the current conservation status of Irish bat species and identified threats to Irish bat populations.

Table 1-1 Irish Bat Species Conservation Status and Threats (NPWS, 2019)

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

1.4 Bat Roosting Behaviour

Bats use a variety of natural and manmade structures as roosting or resting places. The type of roost and its level of use is determined by its function in the bat life cycle. Table 1-2 provides a summary of different types of bat roosts (Collins, 2023).

Table 1-2 Bat Roost Types and Definitions

Roost Type	Definition
Day	Where individuals or small groups of male's rest/shelter in the day but are rarely found by night in summer.
Night	Where bats rest/shelter at night but are rarely found in the day.
Feeding	Where individuals rest/feed during the night but are rarely found during the day.
Transitional	Used by a few individuals for short periods of time prior to or following hibernation.
Swarming	Where large numbers gather in late summer to autumn. Important mating sites.
Mating	Where mating takes place in late summer to winter.
Maternity	Where females give birth and raise their young.
Hibernation	Where bats are found during winter (constant cool temperature and high humidity).
Satellite	An alternative roost found in close proximity to the main nursery colony.

The likelihood of detecting active roosts is determined by the timing of the roost survey. In general:

- April surveys may detect transitional roosts used by bats following hibernation and prior to summer roosting.
- May-August surveys may detect maternity colonies and male/non-breeding female summer roosts.
- August surveys are best to determine maximum counts of adult and juvenile bats.
- August – October surveys may detect swarming and mating bats.
- September and October surveys may detect transitional roosts used by bats following the dispersal of maternity colonies and prior to hibernation.
- Day, night, feeding and satellite roosts may be found anytime between April and October.
- November – March surveys may detect hibernacula.

1.4.1 Bat Roost Significance

Whilst there are no clear Irish guidelines on assessing the significance of a roost, significance should be assessed at an appropriate spatial scale, based on species distribution, conservation status, current population trends, functionality of the site and the Zone of Influence (ZoI) of the project in question as it relates to bats (Reason and Wray, 2023). The significance of a bat roost is dependent on the rarity of the species using the roost and its function to the bat's life cycle, as outlined in Table 1-2 above. Table 3.2 of the CIEEM guidelines (adapted in Table 1-3) provides a starting point on the geographical assessment, which will rely on professional judgement and will be based on the baseline data collected and available information gathered during desktop studies.

Table 1-3 Roost importance at various geographic levels, adapted to Ireland from Table 3.2 of CIEEM guidelines (Reason and Wary, 2023)

Conservation status/ distribution	Individual or very small occasional/ transitional/ opportunistic roosts	Non-breeding day roosts (small numbers of species)	Mating sites, small numbers of hibernating bats	Larger transitional roosts	Hibernation sites	Autumn swarming sites	Maternity sites
Widespread all geographies	Site	Site	Site	Site/Local	Local/County [Larger hibernation	Local/County [Very large pipistrelle swarming sites	Unlikely to exceed Local/County importance

					sites rare in the UK]	appear uncommon in the Ireland]	unless colonies are atypically large; importance increased for assemblages.
Widespread in many geographies, but not as abundant in all	Site	Site	Site, dependent on local distribution [For *Myotis*, see swarming site column]	Local/County	Local/County importance dependent on size and number of species	County/National importance dependent on size; importance increased for larger sites that serve larger numbers/species	Unlikely to exceed County importance unless colonies are atypically large; importance increased for assemblages.
Rarer or restricted distribution	Site (very well-used night roosts may be of County importance for some species)	Site/Local/County, dependent on local distribution	Site/Local/County dependent on local distribution	Local/County	Local/County importance dependent on size and local distribution; increased value for assemblages.	County/National importance on size and local distribution; increased value for assemblages.	County/National importance on size and local distribution; increased value for assemblages.
Rarest Annex II species and very rare	Site (very well-used night roosts may be of Local/County importance for some species)	Site/Local/County, dependent on local distribution	Site/ Local/County, dependent on local distribution	Local/County	County/Regional importance on size and local distribution; increased value for assemblages	County/National importance on size and local distribution; increased value for assemblages.	County/National importance on size and local distribution; increased value for assemblages

All the largest roosts of Lesser Horseshoe Bat (LHB) in Ireland are of international importance and it is anticipated that all large Leisler's bat roosts (>100) would also have international significance (NRA, 2006) due to the limited distribution of this species in other European countries. **Error! Reference source not found.** provides some criteria for determining the significance of different building roosts, as determined by the Bat Expert Panel of the Heritage Council in 2003 (NRA, 2006). Geographic criteria will be applied to these values.

Table 1-4 Level of Importance of Various Roosts

Species	Indicator	Significance
Lesser horseshoe bat	Special Area of Conservation	Very significant
	If present	Significant
Whiskered bat	>10	Very significant
	If present	Significant
Natterer's bat	>10	Very significant
	If present	Significant
Daubenton's bat	Maternity roost	Significant
Leisler's bat	Maternity roost	Significant
Common pipistrelle	Maternity roost	Significant
Soprano pipistrelle	Maternity roost	Significant
Brown long-eared bat	Maternity roost	Significant

1.5 Statement of Authority

MKO employs a dedicated bat unit within its Ecology team, dedicated to scoping, carrying out, and reporting on bat surveys, as well as producing impact assessments in relation to bats. MKO ecologists have relevant academic qualifications and are qualified in undertaking surveys to the levels required. MKO's Ecology team holds an open bat derogation licence from NPWS (DER-BAT-2024-54). The licence is intended for professionals carrying out surveys with the potential to disturb roosting bats (i.e. roost inspections). Graduate and seasonal ecologist staff is covered under the licence under condition of being accompanied by more experienced colleagues.

The daytime walkover survey and inspections were carried out by Laura McEntegart (B.Sc.) and and David Culleton (B.Sc., M.Sc.). This report was prepared by Laura McEntegart and was reviewed and approved by Sara Fissolo (B.Sc.). Project team qualifications and training are shown in the Table 1-4 below.

Table 1-5 Project team qualifications and training.

Staff	Role	Qualifications and Training
Sara Fissolo (B.Sc.)	Project Ecologist	B.Sc. (Hons) Ecology and Environmental Biology, University College Cork, Ireland. Advanced Bat Survey Techniques (BCI), Bat Impacts and Mitigation (CIEEM), Bats in Heritage Structures (BCI), Bat Care (BCT), Bats and Lighting (BCI), Kaleidocope Pro Analysis (Wildlife Acoustics).
Laura McEntegart (B.Sc., M.Sc.)	Ecologist	B.Sc. (Hons) Botany and Plant Science, National University of Ireland, Galway. Bat Handling Training Course (BCI), Bats: Assessing the Impact of Development on Bats, Mitigation & Enhancement - (CIEEM), Kaleidocope Pro Analysis (Wildlife Acoustics), Kaleidocope 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)
David Culleton (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. (Hons) Zoology, University College Cork, Ireland. M.Sc. (Hons) Conservation Behaviour, Atlantic Technological University, Galway, Ireland. 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).
Kate Greaney (B.Sc., M.Sc.)	Ecologist	B.Sc. (Hons) Botany and Plant Science National university of Ireland, Galway. M.Sc. (Hons) Climate Change, Agriculture, and Food Security (MScCCAFS) National university of Ireland, Galway, Kaleidoscope Pro Analysis (Wildlife Acoustics). Endoscope Training (Internal), Emergence and Re-Entry Surveys (Internal) Structure & Tree Inspection (Internal),

		Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal)
Ryan Connors (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. (Hons) Zoology, University College Galway, Ireland. M.Sc. (Hons) Conservation Behaviour, Atlantic Technological University, Galway, Ireland. Surveying Trees for Bats (BRTS), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Kaleidoscope Pro Analysis (Internal), Winter Tree Identification (Internal), Wintering Bird Surveying (Internal).
Charlie Meehan (B.Sc., M.Sc.)	Seasonal Bat Ecologist	B.A. History and Classical Studies, National University of Ireland, Galway M.Sc., Sustainable Environments, National University of Ireland, Galway Kaleidoscope Pro Analysis (Wildlife Acoustics), Endoscope Training (Internal), Structure and Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal)
Frederick Mosley (B.Sc., 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) 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)
Nathan Finn (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. (Hons) Science, National University of Ireland, Galway. M.Sc. (Hons) Environmental Science, University College Dublin. Bat Detector and Survey Training (BCI), Kaleidoscope Pro Analysis (Internal), Endoscope Training (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal).
Cormac Roberts	Student Ecologist	Summer intern in the bat team. Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal)

2. METHODOLOGY

2.1 Desktop Study

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

The following list describes the sources of data consulted:

- *Review of online web-mappers: National Parks and Wildlife Service (NPWS) mapping.*
- *Review of NPWS Article 17 Report.*
- *Review of the publicly available National Biodiversity Data Centre web-mapper.*
- *Review of specially requested records from the NPWS Rare and Protected Species Database for the hectads which overlap with the study area.*
- *Monaghan County Development Plan 2019-2025*
- *BCI Database*

2.1.1 Bat Species' Range

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

The 2019 Article 17 Reports were reviewed for information on bat species' range and distribution in relation to the location of the proposed development.

2.1.2 National Bat Database of Ireland

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

2.1.3 Designated Sites

The potential for the proposed works to impact on sites that are designated for nature conservation is considered in the Biodiversity chapter of the EIAR. Special Areas of Conservation (SACs) are designated under EU Habitats Directive. The European Sites that are within the Zone of Likely Impact, with bats identified as Qualifying Interests, are listed in Section 3.1.3 below.

Natural Heritage Areas (NHAs) are designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. Any identified NHAs and pNHAs designated for the protection of bats are presented in Section 3.1.3 and potential for impacts was fully considered.

2.1.4 Habitat and Landscape

2.1.4.1 Ordnance Survey Mapping

Ordnance survey maps (OSI 1:5,000 and 1: 50,000) and aerial imagery (ortho-based maps) were reviewed to identify any habitats and features likely to be used by bats. Maps and images of the site and general landscape were examined for suitable foraging, commuting or roosting habitats including woodlands and forestry, hedgerows, tree lines and watercourses.

2.1.4.2 Geological Survey Ireland

The Geological Survey Ireland (GSI) online mapping tool and University of Bristol Spelaeological Society (UBSS) Cave Database for the Republic of Ireland were consulted for any indication of natural subterranean bat sites, such as caves, within 10km of the proposed site (BCI, 2012) (last searched on the 17/04/2024). 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 17/04/2024).

2.1.4.3 National Monuments

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 17/04/2024).

2.1.5 Previous Reports

MKO was provided with documentation of previous ecological assessment carried out within the site to inform the survey scope. A summary of relevant results from previous surveys is provided within the report.

2.2 Field Study

2.2.1 Bat Habitat Appraisal

A preliminary site visit was carried out on 29th and 30th January, and continued on the 8th and 9th April 2024 by two licensed ecologists, Laura McEntegart and David Culleton. The landscape features within the Proposed Development were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th edn.) (Collins, 2023). The aim of the survey was to identify suitable bat roosting resources and bat habitats within the site to guide further survey efforts. January is outside the bat activity and survey season, but suitable for preliminary roost assessments (Collins, 2023).

A Bat Habitat Appraisal (BHA) was undertaken to assess any structures, trees or other features suitable for roosting bats and/or any habitats that may be suitable for foraging, commuting or swarming behaviour. A walkover survey of the Proposed Development was carried out during daylight hours on the 29th and 30th January 2024 and 8th and 9th April 2024.

Table 4.1 of the 2023 BCT Guidelines identifies a grading protocol for assessing structures, as well as commuting/foraging habitat for bats, which is summarised in Table 2-1 below. The protocol is divided into five Suitability Categories: *High, Moderate, Low*, *Negligible and None*. Table 4.2 of the 2023 BCT Guidelines identifies a grading protocol to assess trees, which is divided into three Suitability Categories: NONE (No suitability), FAR (Further Assessment Required), and PRF (Potential Roosting Feature present). This initial tree grading protocol can inform a preliminary roost assessment (PRA) to determine the available tree-roosting resource within the proposed development site, depending on

whether a PRF could accommodate a small number of bats (PRF-I) or a larger roost, including maternity roosts (PRF-M). More information on PRAs is provided in Table 2-1 below.

Table 2-1 BCT protocol for bat habitat appraisals (Collins, 2023)

Assessment	Rationale
High	Structure with one or more 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, and surrounding habitat. Continuous, high-quality, well-connected habitats, connected to known roosts.
Moderate	A structure used by bats due to their size, shelter, protection, conditions and surrounding habitat, but are unlikely to support a roost of high conservation status, and suitable, connected habitats.
Low	Structures with one or more potential roost sites that could be used by an individual bat opportunistically, and suitable but isolated habitats that could be used by a small number of bats.
Negligible	No obvious features present, but a level of uncertainty remains.
None	No habitat features likely to be used by roosting, foraging or commuting bats.

2.2.1.1 Preliminary Roost Assessment

A search for roosts was undertaken within the boundary of the Proposed Development by two licenced ecologists to identify any potential roost features (PRFs). The licence, issued by NPWS, is intended for professionals carrying out surveys with the potential to disturb roosting bats. The aim of the survey was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

All structures identified within the site were assessed for their potential to support roosting bats. A systematic search of all accessible interiors, including all attic spaces, was undertaken. The exterior of each building was inspected first from ground level and included all accessible windowsills, walls, eaves, roof ridge and roof slates. Inspections were carried out with the aid of torches, a ladder, an endoscope, a thermal camera and binoculars, and searched for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises, as well as potential access points into the structure. All buildings surveyed are shown in Figure 3-2 below.

The proposed development site contains a large number of trees spread within woodland and treeline habitats. Roosting suitability was assessed in clusters and at feature level, and areas were marked in accordance to BCT Guidance (Collins, 2023) during the initial walkover surveys to inform need for further surveys and assessment.

Trees present within the site were examined from ground level for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other PRFs identified by Andrews (2018). Notes were initially compiled on any trees marked as PRF and FAR, including location and species, in January 2024. Further inspections were conducted on 8th and 9th April 2024.

A number of structures and trees were assessed and are described in Section 3.2.1 below.

2.2.2 Bat Activity Surveys

2.2.2.1 Manual Surveys

Manual activity surveys included roost surveys of any feature identified as a potential roost, as well as walked transects at dusk. For each of the surveys, surveyors were equipped with active full spectrum bat detectors, Batlogger M (Elekon AG, Lucerne, Switzerland). Where possible, species identification was made in the field and any other relevant information was also noted, e.g., numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications, as detailed in Section 2.4. The survey effort is summarised in Table 2-2 and presented in Figure 2-1.

Table 2-2 Bat Activity survey effort

Date	Surveyors	Type	Sunrise/ Sunset	Weather
14/05/2024	Laura McEntegert, Deepali Mooloo Kieran Sugrue, Niamh Rowan	Night-time Bat walkover	21:25	10-16°C, Dry, Calm
18/06/2024	Laura McEntegert, Kate Greaney David Culleton, Cormac Roberts Charlie Meehan	Dusk Emergence	22:07	14-18°C, Dry, Calm
19/09/2024	Laura McEntegert, Kate Greaney Ryan Connors Fred Mosley, Nathan Finn	Dusk Emergence	19:35	15-19°C, Dry, Calm

2.2.2.1.1 *Roost Surveys*

Three structures identified during the bat habitat appraisal as having potential to host roosting bats was subject to presence/absence surveys in the form of emergence surveys. Rationale for survey effort was based on guidelines proposed by Collins in Tables 7.1 and 7.2 (Collins, 2023). Three structures identified within the site were subject to roost surveys following the initial roost assessment.

Surveyors were located at strategic positions around each strucutre with a focus on potential access point and roosting features identified during the daylight walkover surveys. The purpose was to identify any bat species, numbers, access points and roosting locations within each the PRF structure. Night vision aids (NVAs), in the form of thermal cameras, aided the survey effort, as detailed in Section 2.3.1.2.

Surveys were carried out in favourable weather conditions (Table 2-2). Roost emergence surveys commenced at least 15 minutes before sunset and concluded approximately 1.5 hours after sunset.

Night Vision Aids

The use of NVAs is now considered standard best practice for bat activity surveys. MKO employs thermal camera equipment (InfiRay Eye II V2.0, PIXFRA Ranger R625 Thermal Imaging Monocular). The thermal cameras, mounted on tripods, were used during roost surveys to identify potential roosting

hotspots and monitor emergence activity. The cameras were fully monitored by a surveyor, who was equipped with a bat detector to record bat echolocation calls.

Footage from NVAs was saved and reviewed in office in full, with any instances of emergence marked for future use. The location of the NVAs is presented in Figure 2-1.

2.2.2.1.2 *Night-time Bat Walkover*

Manual activity surveys also comprised walked transects at dusk, which were carried out on the 14th May 2024. The aim of the surveys was to observe bat species using the site and visually assess bat behaviour and important features used by bats within the site.

The night walkovers were walked by two surveyors, recording bats in real time. They commenced at sunset and were concluded a minimum of 2 hours after sunset. The 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, they generally followed existing roads and tracks. Five-minute point counts were performed along the routes to sample different habitats for the presence of bats. The walkover route is presented in Figure 2-1.

2.2.2.2 Static Detectors Surveys

Eight full spectrum SM4 bat detectors (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity for a minimum 2-week period in Spring, Summer and Autumn. The locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats.

For the spring season, detectors were deployed on the 30th April, and collected on 14th May. In summer, the static detectors were deployed on the 25th June and collected on the 12th July. Detectors were deployed in the same locations during the autumn season from the 23rd august until the 9th September.

Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates. Static detector locations are shown in Figure 2-1 and presented in Table 2-3.

Table 2-3 Static Detector Location

Detector ID	ITM Reference	Habitat
D01	X 644214 Y 821170	Wet grassland, Conifer plantation
D02	X 644666 Y 821486	Wet grassland
D03	X 645122 Y 821804	Wet grassland, Buildings and Artificial surfaces
D04	X 645303 Y 821896	Buildings and Artificial Surfaces, mixed broadleaf woodland
D05	X 645533 Y 822034	Wet grassland, Mixed broadleaf woodland

D06	X 646042 Y 822329	Wet grassland
D07	X 646155 Y 822427	Wet grassland
D08	X 646796 Y 822983	Wet grassland

2.3 Bat Call Analysis

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.6.8 (Wildlife Acoustics, MA, USA). The aim of this was to identify, to a species or genus level, what bats were present at the proposed development site. Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also 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. nattereri)*) were considered as a single group, due to the difficulty in distinguishing them based on echolocation parameters alone (Russ, 1999). The echolocation of Soprano pipistrelle *(P. pygmaeus)* and Common pipistrelle *(P. pipistrellus)* are distinguished by having distinct (peak frequency of maximum energy in search flight) peak frequencies of ~55 kHz and ~46 kHz respectively (Jones & van Parijs, 1993). Some overlapping is possible between these species: where no certainty could be achieved, calls were identified to genus level.

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2023). A bat pass was defined as a recording of an individual species/species group's echolocation containing at least two echolocation pulses and of maximum 15s duration. All bat passes recorded in the course of this study follow these criteria, allowing comparison. Due to the volume of bat activity data recorded, where multiple bat passes were recorded within the same registration, rarer or harder to record species were identified. Underreporting of common species is possible using this method, and is accounted for within the assessment.

Echolocation calls by Brown long-eared bats (*Plecotus auritus*) are intrinsically quiet and hard to record by static equipment. All data collected, including Noise files and Auto ID files are checked to ensure all calls for this species have been captured. However, a level of underrepresentation is expected for this species and is accounted for in the assessment of activity levels.

2.4 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 site. This web-based interface, launched in August 2016, allows users to upload activity data and to contrast results with a comparable reference range, allowing objective interpretation. Uploaded data then contributes to the overall dataset to provide increasingly robust outputs. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting levels of bat activity in order to provide objective and consistent assessments. Table 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 2024 data as the platform has been undergoing maintenance since late 2022 with no proposed timeline of a relaunch. Ecobat has since 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.

Following preliminary analysis and manual verification using Kaleidoscope Pro, statistical analysis and visualisation was performed using RStudio (version 2024.09.0+375.) and R (version 4.4.1). RStudio, an integrated development environment for the R programming language, was employed for data cleaning, exploration, and data visualisation. The 'ggplot2' R package was particularly instrumental in creating the data visualisations shown in the results section. Data was standardised into bat pass rates, calculated as bat passes per hour (total bat passes / night length) to account for seasonal changes in night length (Matthews *et al.* 2016). Activity is often variable between survey nights. Therefore, the median Nightly Pass Rate was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). During all calculations, data was rounded to at least three decimal places. When visualising the bat pass rates per season, survey effort was defined as detector hours (sum of recorded hours across all detectors). This was defined to circumvent any issues arising from differences in survey effort between detectors in a season.

The methodology used to assess activity levels across the 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 during the survey period) across the site, divided into tertiles. Widespread pipistrelle species' activity ranges were determined using an average of maximum nightly pass rates (total passes during the survey period) across the site, divided into quartiles. The same process was applied to Leisler's bats. For all other species groups maximum nightly pass rate (bpph) recorded across the 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 brown long-eared bat (*Plecotus auritus*) and Nathusius pipistrelle (*Pipistrellus nathusii*). Median and maximum nightly activity (bpph) at each detector location were then categorized as Low, Medium, or High for each recorded season. Any figure below 25% of the maximum/average maximum nightly pass rate was considered Low activity, while figures above 75% were classified as High. Values falling between these two quartiles were defined as Medium. To prevent skewing the activity threshold towards high levels, any evident outliers recorded across the detectors were excluded. Table 2-6 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 Threshold as Bat Passes per Hour (bpph) for Bat Species				
	Myotis spp.	*Nyctalus spp.*	*Nathusius pipistrelle*	*Pipistrellus spp.*	*Brown long-eared bat*
Low	<5.00	<1.79	<0.90	<12.48	<0.65
Medium	5.00 – 15.00	1.79 – 5.38	0.90 – 2.70	12.48 – 37.45	0.65 – 1.95
High	15.00	5.38	2.70	37.45	1.95

Map Legend

- EIAR Site Boundary
- Static Detector Locations
- Spring Transect Route 1
- Spring Transect Route 2

NVA Locations

- 18/06/2024
- 19/09/2024

N

Drawing Title

Survey Effort

Project Title

Ulster Canal Restoration

Drawn By	Checked By
DC	SF
Project No.	Drawing No.
230914b	X-X
Scale	Date
1:13,500	24.01.2024

MKO
Planning and Environmental Consultants
Tuam Road, Galway

3. RESULTS

3.1 Desktop Study

3.1.1 Monaghan Co. Development Plan – 2019-2025

The Monaghan County Development Plan was searched for references specific to the protection of bats. The following objective was found:

6.15 Trees & Woodlands *Trees, hedgerows and woodlands contribute significantly to Monaghan's natural landscape and biodiversity. They enhance the setting of rural and urban environments, provide shelter for wildlife and people, and perform an important role in regulating pollution by filtering and absorbing airborne particulates and regulate the climate by absorbing carbon dioxide. Hedgerows are important habitats and wildlife corridors for small mammals, birds and bat species.*

8.39 Lighting LP 3: *To require that lighting fixtures should provide only the amount of light necessary for personal safety and should be designed to avoid creating glare or emitting light above a horizontal plane. Lighting fixtures should also have minimum environmental impact and protect light sensitive species such as bats.*

3.1.2 National Biodiversity Data Centre

A review of the National Bat Database of Ireland on the 17/04/2024 yielded results of bats within a 10km hectad of the proposed works. The search yielded 7 bat species within 10km. Table 3-1 lists the bat species recorded within the hectad which pertains to the proposed works site (H42).

A review of the NBDC bat landscape map provided a habitat suitability index of 31 (red). This indicates that the proposed development area has moderate to high habitat suitability for bat species.

Table 3-1 NBDC Bat Records

Hectad	Species	Date	Database	Status
H42	*Brown Long-eared Bat (Plecotus auritus)*	21/07/2012	National Bat Database of Ireland	Annex IV
H42	Natterer's Bat (*Myotis nattereri*)	21/07/2012	National Bat Database of Ireland	Annex IV
H42	Soprano pipistrelle *(Pipistrellus pygmaeus)*	27/04/2018	National Bat Database of Ireland	Annex IV
H42	*Leisler's bat (Nyctalus leisleri)*	27/04/2018	National Bat Database of Ireland	Annex IV
H42	*Daubenton's Bat (Myotis daubentonii)*	27/04/2018	National Bat Database of Ireland	Annex IV
H42	Common Pipistrelle *(Pipistrellus pipistrellus)*	27/04/2018	National Bat Database of Ireland	Annex IV
H42	Nathusius's Pipistrelle (*Pipistrellus nathusii*)	21/07/2011	National Bat Database of Ireland	Annex IV

3.1.3 Designated Sites

The site is situated outside the current known range for Lesser Horseshoe bat and Whiskered bat, the site is within range for all other species. Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs). There are no SACs designated for their protection within 10km of the proposed works site.

No Natural Heritage Areas (NHAs), or proposed NHAs, designated for the protection of bats were identified within 10km of the proposed works.

One Area of Special Scientific Interest (ASSI) designated for the protection of bats was found within 10km of the Proposed Development.

Table 3-2 shows the designated sites for bats within 10km.

Table 3-2 Designated sites within 10km of the Proposed Development

Designated Site	Distance to Site	Species
Upper Lough Erne – Crom ASSI [ASSI071]	5.3km	All bat species

3.1.4 Habitat and Landscape

A review of mapping and photographs provided insight into the habitats and landscape features present at the proposed development site. In summary, the primary land use within the proposed site is agricultural grassland, watercourses, immature plantation forestry, farmland, while the remainder of the proposed site boundary supports marginal treeline and hedgerow habitats.

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

A search of the UBSS Cave Database for the Republic of Ireland found no caves within the proposed site or within 10 km of the study area.

No national monuments are reported within the site.

3.1.5 Previous Reports

A Bat Habitat Assessment was carried out in 2011 as an Environmental Impact Statement by RPS previously at the Proposed Development. Roost sites, feeding area, commuting routes and interactions with the proposed site were recorded. 8 species of bat were recorded on the surveys. Several bat species were recorded in close proximity to the Canal route including Nathusius' pipistrelle and Natterer's bat. Roosts of Natterer's bats were noted within a church and a farm building close to the canal.

3.2 Field Study

3.2.1 Bat Habitat Appraisal

With regard to foraging and commuting bats, the proposed works site is considered of *Moderate* to *High* suitability due to the high habitat diversity and presence of immature woodland, watercourses, hedgerows and treelines throughout the site and surrounding areas. A large number of linear features within the Proposed Development and bordering the original canal footprint includes a network of hedgerows and treelines surrounding the multiple agricultural fields and wet grassland areas. These linear features provide high quality foraging and commuting habitat for bats, due to the high level of connectivity to the wider area and presence of suitable roosting spaces within the vicinity. The west of the site consists of mature hedgerows and conifer plantation bordering agricultural fields. The linear

features present provide habitat connectivity to nearby lakes located to the north (ITM X 644722 Y 821774) and south (ITM X 644530 Y 821122). An area of mixed broadleaf woodland is located at the centre of the site (ITM X 645352 Y 821954), and provides high quality foraging and commuting habitat. The east of the site contains areas of conifer plantation, though mainly consists of gappy hedgerows with intermittent mature trees surrounding agricultural fields and wet grassland and has moderate potential for foraging and commuting bats..

With regard to roosting bats, the existing treelines and woodland areas include mature and immature deciduous trees which present suitable roosting spaces for bats, in varying capacity. A thorough inspection of every tree was not deemed necessary due to no works being planned in some areas, however all trees were assessed and trees showing rooting potential were inspected. Where trees were located within likely felling areas, they were subject to a roost inspection which is described below. In general, trees within the Proposed Development contain roosting suitability of *None* and *PRF- I*, with a small number of *PRF-M* suitability to host roosting bats within the site. Residential dwellings are sparsely located to the north and south of the Proposed Development, with some derelict structures present within the EIAR site boundary.

Details of the assessment of existing man-made structures for their suitability to host roosting bats are presented below in Table 3-2. Trees within the proposed project footprint are also assessed in more detail and are visualized in Figure 3-2.

3.2.2 Preliminary Roost Assessment

A preliminary roost assessment (PRA) was carried out on January 29th and 30th 2024. A total of nine structures were subject to a full interior inspection (Table 3-2). All structures were assessed for their suitability to support roosting bats.

Table 3-3 Roost Inspections carried out on 29th and 30th January 2024

Reference No.	Structure - Watercourse Bridge Type or Building	Survey Results
1 - Bridge 1	Stone Masonry Arch Bridge	*Moderate* - No evidence of bats.
2 - Bridge 2	Stone Masonry Arch Bridge	*Moderate* - No evidence of bats.
3 - Bridge 3	Concrete pipe Bridge	*Negligible* - No evidence of bats.
4 - Structure A	Derelict two-story House	*High* – Oil stains and missing paint indicating likely roost entrance, dropping found on surface.
5 - Structure B	Stone Cottages B1 and B2 with associated Outbuildings	*Moderate* - (B1 & B2) - a number of droppings found.
6 - Structure C	Livestock Shed (C1), Collapsed Shed (C2).	*Negligible* - (C1) - No evidence of bats. *Negligible* - (C2) - No evidence of bats.
7 - Structure D	Small Building Ruins	*Negligible* - No evidence of bats.
8 – Structure E	Building Ruins (near southern bridge)	*Low* - No evidence of bats.
9 – Structure F	Derelict Bungalow and shed	*Low* – Droppings and feeding remains found, likely rats. One bat dropping found on an internal wall.

3.2.2.1 Structures

3.2.2.1.1 *Bridges*

Three bridge structures were identified and inspected as part of the walkover and desk study. These structures are included in the canal design footprint and will be updated as part of the Proposed Development. Bridges within the Proposed Development are shown in Figure 3-2.

1) Bridge 1 - Stone Masonry Arch Bridge

One structure, Kelly's Bridge, was a Stone Masonry Arch bridge (IG Ref: H 45347 21884). The structure is located at the centre of the site. No evidence of roosting bats was found within the structure; however, a number of gaps and cracks suitable for potential crevice dwelling bats was identified within the bridge stonework. It was assigned a *Moderate* roosting potential (Plate 3-1 to 3-6). The bridge was subjected to dusk emergence surveys on the 18th June and the 19th September 2024 and a roost was identified. The adjoining broadleaf woodland present high quality foraging and commuting habitat, and connectivity to the wider area.

Plate 3-1 Arch bridge east side view.

Plate 3-2 Gaps between the stonework and small amount of ivy growth of the external wall.

Plate 3-3 Stone blocks are sealed with cement with a small amount of ivy growth, some water leakage through the stonework.

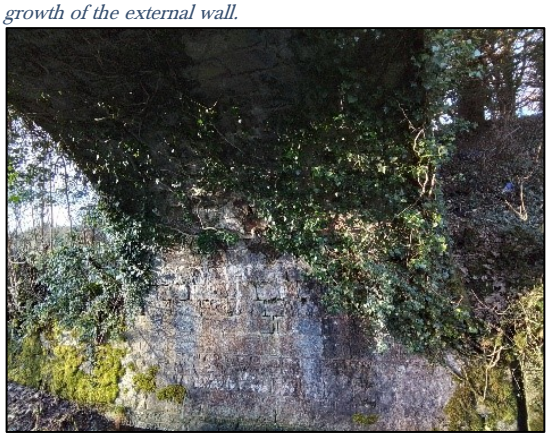

Plate 3-4 Ivy growth on the underside of the bridge.

Plate 3-5 Northern aspect.

Plate 3-6 Canal edge and woodland section to be removed.

2) Bridge 2 - Stone Masonry Arch Bridge

The second Stone Masonry Arch Bridge located toward the northern section of the site (IG Ref: H 45350 21883). The arch of the bridge is plastered with a long crack running through the centre of the arch and is visible on the roadway while on the top of the bridge (**Error! Reference source not found.** & P

late 3-8). Many suitable roosting spaces were identified, cracks, gaps and fissures are visible in the bridge walls and stone wall on the bridge top. It is assigned a *Moderate* roosting potential. The stone wall is partially overgrown. No evidence of bat use such as droppings or grease marks were identified.

Plate 3-7. Bridge 2 Stone masonry bridge with ivy cover and a pipe along one side.

Plate 3-8 Southern aspect showing the plastered underside of the bridge.

3) Bridge 3 - Concrete Pipe

A bridge with internal concrete pipe structure located to the south of the site (IG Ref: H 44718 21466). The exterior inspection of the bridge showed access was limited due to the presence of scrub and briars on both sides. The pipe sits in a dry drain where water has been previously diverted away from the south with to a nearby drainage ditch to the north. The previous canal has been grazed by cattle and remains wet ground, scrub and a treeline grows within the proposed canal north of Bridge 3. There was a small crack found in the external wall. No evidence of roosting was found. There is no suitability for roosting bats present, it was assessed as *Negligible* suitability (Plate 3-9 & Plate 3-10).

Plate 3-9 Bridge 3 Concrete pipe, with ivy cover and lime plaster over solid block bridge walls

Plate 3-10 Bridge 3 Concrete pipe habitat, briar and scrub growth, the no water contained in the drain base.

3.2.2.1.2 Other structures

Six other structures were identified within or in proximity to the Proposed Development footprint and were subject to an internal and external inspections as a part of the walkover survey.

1) Structure A - Derelict two-storey House

A derelict two-storey stone plastered building (Irish Grid ref: H 46651 22738) was inspected on 30th January and a follow up inspection was undertaken on 9th April 2024 (Plate 3-11 to Plate 3-16). Potential bat access areas include an open doorway and nine open windows with missing windowpanes, as well as vent grates at the back and front of the building which are cracked and broken. The first floor was made of a small entrance hall, two rooms - a kitchen and sitting room area, one with a fireplace and open chimney. The roof is slate with wooden rafters and a separate ceiling area. The roof has extensive damage as a result of a fallen tree, ivy growth and weather erosion.

The entire building is in an advanced state of disrepair, with structural damage, ivy cover and vegetation growth throughout. There is a small wooden staircase leading to upstairs, but was inaccessible due to health and safety concerns..

Livestock can also access the building, and rubbish is discarded throughout. The ground floor ceiling consists of wooden panel boards in the sitting room and plastered ceiling in the kitchen. A single chimney breast and stove occurs in the centre of the building. Potential roost features included cavities within the walls and ceiling of the building (Plate 3-15 and 3-16). It was assigned *High* roosting potential.

The ground floor ceiling was dry, showing gaps and cracks in the wood (Plate 3-16). A small number of droppings could be seen on the camera, but not accessed due to the size of the gap.

Plate 3-11. Derelict two-story house with collapsing damaged roof.

Plate 3-12. Interior view with partially collapsed staircase.

Plate 3-13 View of first floor ceiling with damage visible.

Plate 3-14 Gap between window frame and ceiling.

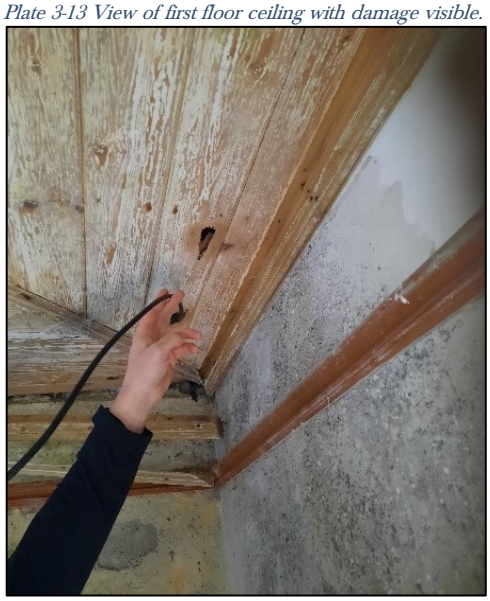

Plate 3-15 Endoscope use on the small gap in ceiling.

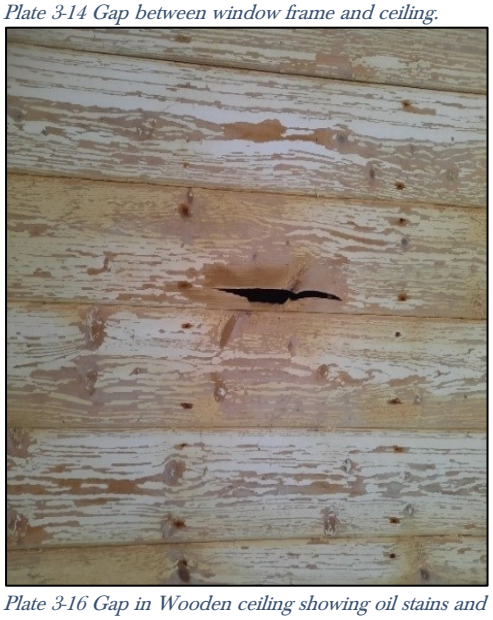

Plate 3-16 Gap in Wooden ceiling showing oil stains and missing paint showing a potential 'entry point'.

2) Structure B - Stone Cottages B1 & B2 with Associated outbuildings

Two stone cottages and a number of farm buildings and stables located at the south of the site (Northern Cottage B1 - IG Ref: H 45171 21761, & Southern Cottage B2 - IG Ref: H 45171 21733) (Plate 3-17 to Plate 3-21). Inspections of the structure was carried out on 30th January and 8th April 2024.

Cottages B1 and B2 consist of stone walls, concrete floors, wooden rafter frames, a separate attic space, lime plaster on the exterior walls and slate roof. All buildings contain weather erosion, have water damage, ivy growth or a section of collapsed roof.

Cottage B1 has more damage as a result of rotten wood, damaged slates and open doorways and windows. Cottage B1 is brighter with open attic space with sections of missing ceiling and gaps in the slates.

Evidence of potential bat use was found with a small number of droppings in Cottage B2 (Plate 3-22) and the shed north of Cottage B1. Suitable potential access points were identified along the fascia as well as within gaps in the roof slates and via open windows in Cottage B2.

Cottage B1 can be accessed through the roof, open doors and windows. The interior of the buildings was inspected, where health and safety allowed it. They were both assigned *Moderate* roosting potential. A hole with oil stains behind a wardrobe into the structures wall of the adjoining cow shed was found. An endoscope showed bird droppings in the entrance, and nesting material. No live bats were found.

Plate 3-17 Southern Cottage B2 with corrugated iron roofed cowshed attached to the north.

Plate 3-18 Southern Cottage B2 with cowshed attached to the north.

Plate 3-19 Cottage B2 internally with open chimney.

Plate 3-20 Southern facing aspect of cottage B2 showing cow shed (near), outside shed (far) and two chimney breasts.

Plate 3-21 Northern Cottage B1 with missing windows, open doors and missing and damaged slates.

Plate 3-22 Droppings found in shed to the north of cottage B1, droppings were also found in southern cottage.

3) Structure C - Livestock Shed, Collapsed shed and tree

The structure was a single storey concrete block shed with galvanised roof, and wooden rafters with two internal livestock standing/ feeding/handling areas accessible from the exterior (Plates 3-23 and 3-24). There were small cracks and gaps in the block work, with high light presence inside the small structure,

it is unlikely to provide a roost resource for bats, No evidence of bats were recorded. The Livestock shed was assigned *Negligible* roosting potential, while the collapsed shed positioned to the North contained *Negligible* features (Plates 3-25). A single Ash tree was assigned a *Moderate* potential for roosting bats (Plates 3-26).

Plate 3-23 Double cow shed with a high level of light within and no doors.

Plate 3-24 Tree to the south of the cow shed with roosting features (PRF-I).

Plate 3-25 Collapsed shed roof with corrugated iron roof and briars covering the structure.

Plate 3-26 Ash trees with minimal ivy cover adjacent, present on the canal location.

4) Structure D - Small Building Ruins

Three structures are located in a central area of the site in various state of ruin. Two small structures located at (Irish Grid Ref: H 45767 22085.) They consist of hallow block bricks and are missing some wall sections and roof material (Plate 3-28). The buildings are in a dilapidated state with thick ivy growth, a missing door and small missing window in the smaller structure (Plate 3-27).

A ruin, south of the above-mentioned structures, consisting of a red brick chimney over 6 foot high with thick ivy growth is located at (Irish Grid Ref: H 45559 22017). This structure is surrounded by trees.

The structures were assessed as having a *Negligible* potential for roosting bats I.e. 'No obvious habitat features on site likely to be used by bats, however a small element of uncertainty remains as bats can use small and apparently unsuitable features in occasion.'

Plate 3-27 Small shed with Negligible suitability for opportunistic roosting, located adjacent to the canal.

Plate 3-28 Derelict shed with missing roof.

5) Structure E - Building ruins to the south

A red brick building ruin was located to the north of the Bridge 3 and adjacent to the small lake, located at (Irish Grid Ref: H 44665 21631). It consists of four high standing red brick walls and a collapsed roof within immature broadleaf woodland (Plate 3-31 3-32). Vegetation, thick ivy and trees grow within the confines of the structure. The gaps between the brick, small gaps and crack on the walls of the structure and around the windows and doorways plaster provide roosting potential (Plate 3-31).

It is possible bats may utilise the building opportunistically or to commute to other areas (i.e. *Low* potential); therefore, the structure was assessed as having a *Low* potential for roosting bats.

Plate 3-29 Northern Aspect showing brick wall, ivy growth and missing roof.

Plate 3-30 Internal view of the structure, with ivy growth and many gaps and cracks.

Plate 3-31 Old ruin with red brick and plaster that is separating from the brick leaving a large gap.

Plate 3-32. The ruin consists of brick, thick ivy growth and chimney remains with gaps in between crumbling mortar

6) Structure F- Derelict Bungalow and sheds

A derelict bungalow and sheds located at (Irish Grid Ref: H 46423 22458) (Plate 3-31 3-38). The bungalow structure is in relatively good condition with intact windows and doors at the front of the property. Three chimneys and a separate enclosed attic space exist within the structure. To the rear, a large missing window and structural damage allows access to the interior of the property.

Rough grazing grassland for livestock and scrub grows around the property. The building is derelict with few items in the house. Its three chimneys were inspected with no evidence of bats found (Plate 3-36). Large accumulations of rat droppings were found on the ground floor of one room and were also found in the attic. One potential bat dropping was found on an internal wall. The external sheds were bright inside with open/missing windowpanes and doors; however, showed no evidence of bats (Plate 3-38).

It is possible bats may utilise the building opportunistically or to commute to other areas (i.e. *Low* potential). As such, the structure was assessed as having a *Low* potential for roosting bats.

Plate 3-33 Derelict Bungalow with Low bat roosting suitability.

Plate 3-34 Butterfly feeding remains, likely from rats found within the building.

Plate 3-35 Fireplace full of bird nesting material.

Plate 3-36 Empty fireplace inspected for bat droppings, no evidence of live bats were found.

Plate 3-37 Extension to the rear of the derelict bungalow.

Plate 3-38 Shed adjacent to the derelict bungalow.

3.2.2.2 PRF Trees

The Proposed Development comprises a section of the decommissioned ulster canal network. Small areas of immature conifer plantation and broadleaf woodland were also found bordering sections of the site. The trees contained no potential roosting features or were immature. These were identified as having a roosting potential of *None*.

Deciduous treelines identified throughout the site were assessed for their potential to host roosting bats. The majority of linear features comprised mixed broadleaf hedgerows with sparse, immature trees with no potential roosting features. Trees to the north of the proposed canal were assessed as having a roosting suitability of *None*. The central area of the Proposed Development showed more mature trees, hedgerows and treelines with sections of broadleaf woodland (Plates 3-39 to Plate 3-42).

97 trees with roosting suitability of varying degrees were assessed and are visualised in Figure 3-2.

Plate 3-39 Mature Treelines within site providing good foraging and commuting for bats.

Plate 3-40 Mature sycamore tree with moderate roosting features.

Plate 3-41 Treeline within close vicinity of the canal and Bridge 1.

Plate 3-42 Mature Treeline along roadway at Bridge 1.

3.2.3 Bat Activity Surveys

3.2.3.1 Manual Surveys

3.2.3.1.1 *Dusk Emergence Surveys*

Three structures with roosting potential were manually surveyed on multiple occasions in 2024. Table 3-3 summarises the survey effort in relation to dusk emergence carried out to identify and classify potential roosts. Individual surveys are described below.

Table 3-4 Manual activity surveys at PRFs.

PRF	IG Ref.	Date	Survey Type	Results
Structure A	H 46651 22738	18th June	Dusk Emergence	3 pipistrelle emergences from western aspect, 1 pipistrelle emergence from northern roof aspect
		19th September		3 pipistrelle emergences from western aspect
Bridge 1	H 45347 21884	18th June	Dusk Emergence	4 *Myotis* spp. emergences
		19th September		2 *Myotis* spp. emergences
Bridge 2	H 45350 21883	18th June	Dusk Emergence	No roosting bats.
		19th September		No roosting bats.

Structure A

Two dusk emergence surveys were carried out at Structure A, a derelict two-storey dwelling at the east of the site on the 18th June and 19th September 2024. During the first survey, four soprano pipistrelles were observed emerging from the structure, with three individuals emerging from the western aspect and one from the eastern aspect. Three soprano pipistrelles were observed emerging from the western aspect during the second survey also.

Bridge 1

Two emergence surveys were conducted on the 18th June and 19th September 2024 at Bridge 1. Surveyors were located at the east and west aspects of the bridge, with clear views of the exterior wall and beneath the arch. Moderate bat activity was observed throughout the surveys, and four *Myotis* spp. individuals were observed emerging from underneath the bridge arch during the first survey. Two *Myotis* spp. bats were observed emerging from the same location during the second survey.

Plate 3-43 Emergence location at Bridge 1

Bridge 2

Two surveys were carried out at Bridge 2 on the same dates as Bridge 1 and Structure A. Night vision aids were used during both surveys at this location. No bats were observed emerging from the bridge during either survey.

3.2.3.1.2 *Night Walkover Surveys*

Manual activity surveys also comprised night bat walkovers. These surveys took place on the 14th May 2024. Bat activity was recorded on both surveys, with a total of 342 bat passes (Table 3-4).

Table 3-5 Night Walkover survey results

Date	Route	Km	Common pipistrelle	Soprano pipistrelle	Leisler's bat	Brown long-eared bat	*Myotis* spp.
14/05/2024	Route 1	3.8km	23	75	7		5
	Route 2	4.5km	43	158	20	4	7

Bats were recorded across the entire proposed canal layout, with the exception of small areas to the east with little hedgerows or treelines present. Bat activity was dominated by soprano pipistrelles during both transects, with most of this taking place along the treelines bordering the local roads. The highest bat activity was recorded in proximity of Structures A, B and C. *Myotis* spp. and Leisler's bat activity was highest at the east of the site (Figure 3-1). Brown long-eared bats were recorded only at the east of the site during manual surveys.

Figure 3-1 presents the spatial distribution of bat activity across the night walkover surveys.

Map Legend

- EIAR Site Boundary
- Spring Transect Route 1
- Spring Transect Route 2

Species

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

N

rawing Title

Manual Survey Results

roject Title

Ulster Canal Restoration

rawn By	Checked By
DC	SF
roject No.	Drawing No.
230914b	X-X
cale	Date
1:13,500	24.01.2024

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
[redacted]

Map Legend

- EIAR Site Boundary
- Bridges
- Structures

Tree Assessment

- PRF-M
- PRF-I
- FAR

N

Drawing Title
Preliminary Roost Assessment

Project Title
Ulster Canal Restoration

Drawn By	Checked By
DC	SF
Project No.	Drawing No.
230914b	X-X
Scale	Date
1:13,500	24.01.2024

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84

3.2.4 Static Detectors Surveys

Eight SM4 static detectors were deployed across the site in Spring, Summer and Autumn for a minimum 2-week period. The detectors allowed a specified look into species composition, commuting and foraging activities within the site. Locations were chosen to represent the variety of habitats within the site, along with areas of likely bat activity. The location of the static detectors is shown in Figure 2-1.

In total 135,077 bat passes were recorded over the three seasons. Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Soprano pipistrelle (*Pipistrellus pygmaeus*) made up the vast majority of the activity recorded within the site (n=86,932), followed by Common pipistrelle *(Pipistrellus pipistrellus*) (n=33,261). Leisler's bat (n=6,347) and *Myotis* spp. (n=6,217) were less frequently recorded, followed by brown long-eared bats (n=1,322) and Nathusius' pipistrelles (n=998). Plate 3-43 shows total bat species composition recorded at the site. Table 3-5 shows total bat passes per detector.

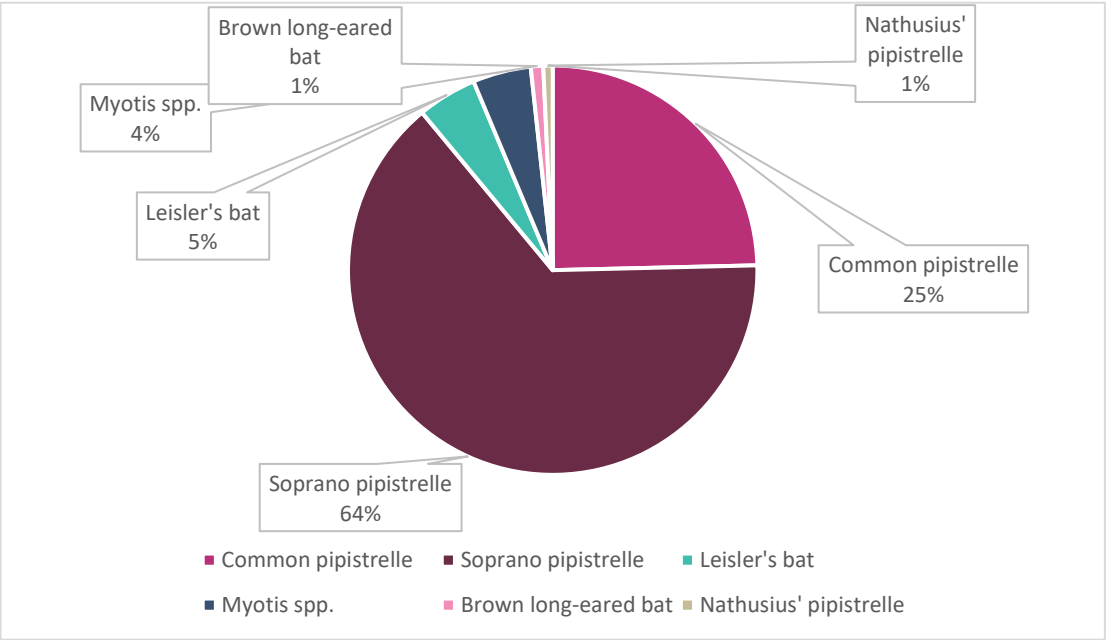

Plate 3-44 Total bat species composition.

Table 3-6 Static detector results, total bat passes.

Detector	Common Pipistrelle	Soprano Pipistrelle	Leisler's Bat	Nathusius' pipistrelle	Brown Long-eared Bat	*Myotis* spp.
D01	4779	9448	823	75	189	906
D02	2520	7408	504	48	69	258
D03	2672	19243	787	107	230	432
D04	6260	19141	455	77	211	2593
D05	7097	13936	510	72	268	881
D06	3485	5456	736	153	100	180

D07	3641	5498	681	70	85	690
D08	2807	6802	1851	396	170	277

Analysis of the detector recordings also highlighted the bat passes per hour surveyed during the static detector surveys (Plate 3-45). Species composition was similar across each of the seasons, though activity levels were highest in spring. Soprano pipistrelles were recorded most frequently during each season, with common pipistrelles also frequent. *Myotis* spp. activity was highest during the summer period, compared to spring and autumn. Brown long-eared bat activity was highest during the spring season.

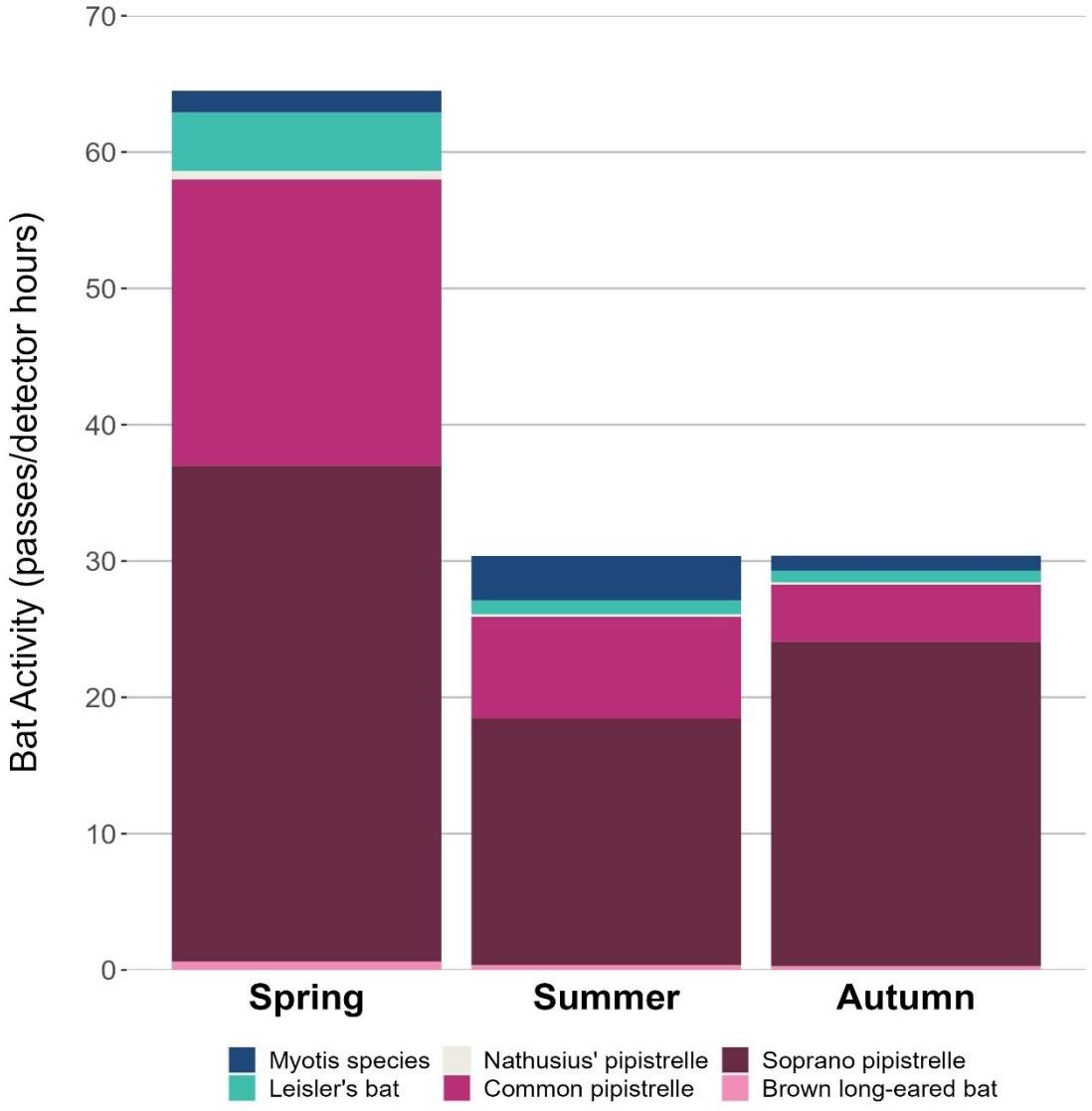

Plate 3-45 Bat activity per species, per season.

Static detector analysis also presented the bat passes per hour, per night. Species composition per night is shown in **Error! Reference source not found.**46. Activity varied between locations and between nights d uring seasons, but species composition was always dominated by soprano pipistrelles. Occasional increases in activity were recorded for all other species. Bat activity, including that of soprano pipistrelle was recorded at its highest on the 30th April, the first night of the spring deployment. Activity across the spring deployment was consistently high, with the 4th of May being the single exception. Bat activity during the summer and autumn deployment was more varied, though very similar. Leisler's bat and Nathusius' pipistrelle activity were highest at the end of the spring deployment. *Myotis* spp. activity was highest during the first 10 days of the summer deployment.

The median bat passes per hour, per detector, per species is presented in Plate 3-46. The median soprano pipistrelle activity was highest at all detectors, with the exception of D06 during the spring season, during which common pipistrelle as more prevalent. D03 recorded similar median activity during all seasons. The spring deployment recorded highest median activity at D04 and D05. However, during the summer ad autumn deployments, D03 and D04 recorded the highest median bat activity. D04, during all seasons, had the highest median *Myotis* spp. activity. Detectors located at the east of the site (D06, D07 and D08) recorded lower bat activity than that of D03, D04 and D05.

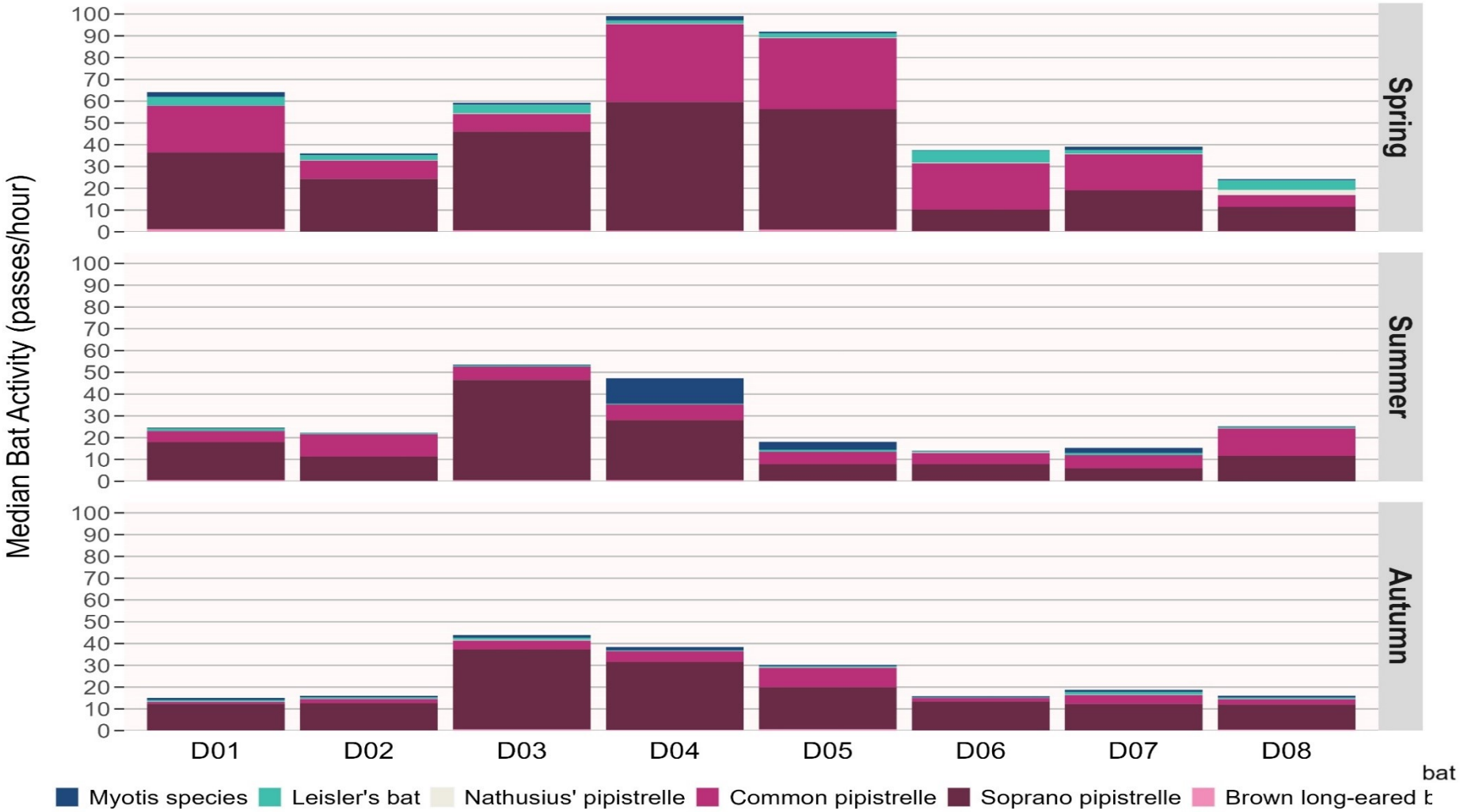

Plate 3-46 Median bat activity per species per detector per night

Table 3-7 presents values for minimum, median and maximum bat passes per hour recorded across the deployment nights at each detector. High median bat passes per hour were recorded for Leisler's bat at D06 Spring. High levels of median soprano pipistrelle passes per hour were recorded at D03 in spring and summer, and at D04 and D05 in spring. Moderate median activity for *Myotis* spp. was recorded at D04 during the summer season.

Table 3-7 Median and maximum pat passes per hour per season, per species, per detector

Species	Season	Bat activity (bpph)	D01	D02	D03	D04	D05	D06	D07	D08
Myotis sp.	Spring	Median	2.1	0.8	0.9	2.0	0.7	0.2	1.6	0.6
		Maximum	15.4	3.4	2.6	8.4	7.3	1.8	4.4	1.5
	Summer	Median	0.4	0.1	0.3	11.7	3.7	0.3	2.3	0.3
		Maximum	6.5	0.7	2.3	50.6	20.0	1.0	5.8	1.1
	Autumn	Median	1.0	0.7	1.2	1.5	0.6	0.6	1.0	0.9
		Maximum	15.3	1.6	2.8	5.4	4.9	0.9	2.9	1.8
Leisler's bat	Spring	Median	4.1	2.4	4.0	1.5	2.1	5.6	1.8	4.5
		Maximum	7.9	4.8	11.9	5.0	4.5	11.5	5.9	57.6
	Summer	Median	1.2	0.6	0.6	0.4	0.9	0.4	1.0	0.6
		Maximum	2.6	1.3	1.9	4.5	2.6	3.9	7.3	16.4
	Autumn	Median	0.8	0.7	1.1	0.4	0.6	0.3	1.3	0.7
		Maximum	2.1	2.0	2.4	3.8	2.3	0.7	4.3	4.9
Nathusius' pipistrelle	Spring	Median	0.1	0.2	0.3	0.2	0.2	0.3	0.2	2.4
		Maximum	0.7	0.5	1.3	2.3	1.1	1.5	0.7	8.4
	Summer	Median	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1
		Maximum	0.3	0.1	0.3	0.4	0.1	3.6	0.4	1.3
	Autumn	Median	0.1	0.1	0.3	0.0	0.1	0.0	0.2	0.1
		Maximum	0.6	0.6	0.7	0.5	0.6	0.4	0.5	0.6
Common pipistrelle	Spring	Median	21.4	8.4	8.1	35.8	32.6	21.3	16.6	5.4
		Maximum	104.9	19.9	16.1	58.5	85.1	51.9	36.1	33.3
	Summer	Median	5.0	10.2	6.1	7.2	5.7	5.2	6.1	12.5
		Maximum	11.5	20.9	22.1	16.7	25.4	13.5	27.9	22.1
	Autumn	Median	0.9	1.9	4.0	4.9	9.0	1.6	4.1	2.4
		Maximum	3.4	6.4	13.0	22.2	38.3	4.6	10.0	16.2
Soprano pipistrelle	Spring	Median	35.3	24.2	45.3	59.1	55.3	9.8	18.6	11.2
		Maximum	108.8	53.2	117.9	124.6	136.0	59.7	49.6	33.6
	Summer	Median	17.4	11.3	46.1	27.4	7.5	7.5	5.8	11.7
		Maximum	40.0	31.6	81.7	76.3	73.5	32.1	15.1	89.8
	Autumn	Median	12.2	12.6	36.8	31.3	19.3	13.3	12.2	11.5
		Maximum	45.6	39.1	88.8	129.2	156.5	39.4	20.9	73.6
Brown long-eared bat	Spring	Median	1.2	0.1	0.7	0.5	1.1	0.4	0.5	0.4
		Maximum	2.4	0.5	1.8	2.6	2.0	0.8	1.2	1.8
	Summer	Median	0.6	0.1	0.4	0.6	0.3	0.3	0.1	0.0
		Maximum	1.5	0.7	2.0	1.8	1.2	0.8	0.3	0.6
	Autumn	Median	0.1	0.1	0.6	0.3	0.6	0.1	0.1	0.5

		Maximum	0.3	0.3	0.8	0.6	1.2	0.4	0.3	1.5

3.2.5 Summary of Surveys Results

Five bat species, as well as *Myotis* sp. were recorded commuting and foraging across the Proposed Development during the bat surveys carried out in 2024, including soprano pipistrelle, common pipistrelle, Leisler's bat, brown long-eared bat and Nathusius' pipistrelle. The existing landscape and abundance of linear features occurring within the corridor of the Proposed Development provides high quality habitats for commuting and foraging bats, especially the mixed broadleaf woodland at the centre of the Proposed Development. High activity was recorded within the mixed broadleaf woodland during static surveys.

Bats were observed commuting and foraging throughout the site during manual transect surveys, in particularly along the various linear features throughout. Low bat activity was recorded in open habitats during manual transect surveys.

Most of the buildings surveyed have the potential to support roosting bats, in varying degrees. Droppings and/or feeding remains were found within Structures A, B and F. However, no dropping accumulations indicative of large active roosts were found. Active roosts were recorded during the 2024 surveys. A *Myotis* spp. roost was found within Bridge 1, and a soprano pipistrelle roost was identified in Structure A. No large permanent, or maternity roosts were recorded. The presence of bat droppings and feeding remains recorded suggest that the structures on site could still support use by bats. A number of trees within the site provided roosting potential of varying degrees, but primarily provide potential opportunistic shelter.

4. DATA EVALUATION

4.1.1 Discussion and Interpretation

The Proposed Development site is located within the known range of seven species of Irish bats. Bats were recorded using the site during every day of the seasonal static deployments, and during each manual survey. Soprano pipistrelle activity was higher than any other species throughout the site, while Common pipistrelle was the second most recorded species at all locations. Activity was highest during the spring season. Detectors located in proximity of suitable habitats (D03, D04 and D05) recorded the highest activity across the three seasons. Bat activity was lowest at D06, D07 and D08. Soprano pipistrelle median activity was recorded as high at D03 during spring and summer, and at D04 and D05 during the spring season. These areas are consistently used by foraging/commuting bats.

The habitat of the Proposed Development is dominated by wet grassland, improved agricultural grassland, hedgerows and scrub, with a notable area of mixed broadleaf woodland at the centre of the Proposed Development. Linear features provide high quality foraging and commuting habitat for bats, due to the high level of connectivity to the wider area and presence of suitable roosting spaces within the vicinity. In particular, the area of mixed broadleaf woodland at the centre of the Proposed Development provides excellent foraging and commuting habitat, in part due to its proximity to a confirmed roost. During the night-time bat walkovers on the 14th May 2024, bats were observed throughout the site. The highest concentrations of activity were recorded near locations D01, D03 and D05, with *Myotis* spp. recorded near D01 and D03. D03 is located approximately 200m west of Bridge 1, a confirmed *Myotis* spp. roost. This indicates that a commuting/foraging route between this roost and location D03 likely exists, and therefore should be retained during the Proposed Development. Location D01 is approximately 700m southwest of a known Natterer's bat roost at St Alphonsus, Connons Church to the north. Locations D06, D07 and D08 recorded little bat activity during the transects. This is likely due to the limited linear habitats and exposed nature of the locations.

Two bat roosts were identified within the site during 2024 surveys, in a bridge and a derelict structure. Bridge 1 was confirmed as being a *Myotis* spp. roost and Structure A was confirmed as a soprano pipistrelle roost. Despite the low numbers of bats observed emerging, Structure A provides roosting suitability for a large number of bats. As per Section 1.4.1 above, both of the roosts identified are considered significant at a site level only. Other known roosts in proximity of the site, located outside the study area, include two Natterer bat (*Myotis nattereri*).

Myotis spp. activity was highest at location D04, which is in proximity of the identified roost at Bridge 1. Activity was particularly high in summer at this location, indicating potential for the roost to host a maternity colony. Brown long-eared bats (n=1,322) and Nathusius' pipistrelle (n=998) were also recorded in substantial numbers. Brown long-eared bats are often under recorded during manual and static surveys. This is due to their quiet echolocation calls. It is likely that there is a higher level of activity for this species in the area. Woodland habitats like the ones present within the site are often associated with these species.

In general, bat activity was higher at the centre of the Proposed Development compared to that of the east or western areas. This activity is attricbuted to the presence of the established broadleaf woodland and mature treelines within this area. The woodland has been identified as an important feature for foraging and commuting bats. It is also in proximity to Structure B, a group of farm buildings located outside of the Proposed Development that presented evidence of roosting bats and was identified as a roost in previous studies.

4.1.2 Importance of Bat Population Recorded at the Site

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

All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts 1976 (as amended). Bats as an Ecological Receptor have been assigned ***Local Importance (Higher value)*** on the basis that the habitats within the study area are utilized by a regularly occurring bat population of Local Importance.

The site has the potential to support a roosting site of ecological significance, however no evidence of large roosts was found within the inspected structures. Despite this, two bat roosts were identified during 2024 surveys. No roosting site of National Importance (i.e. site greater than 100 individuals) was recorded within the site. It is likely that the structures are used by a small number of bats as possible day roosts, with the bridge potentially being used as a small maternity colony. No evidence of a large maternity colony was recorded onsite. Based on the above results the roosts identified are considered significant at a site level. Roosting suitability is also present in the trees located throughout the site. While no trees with significant roosting potential were identified, the roost resource present within the site in the form of PRF-Is is considered significant at a site level, and is likely to serve the local bat population opportunistically.

4.1.3 Survey limitations

A comprehensive suite of bat surveys were undertaken at the Proposed Development site. The surveys undertaken in accordance with BCT Guidance, provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Development on bats receptors.

Access limitations can relate to static deployments and roost inspections:

- No significant access issues were encountered with the Site during static deployments, as the detectors were deployment where intended.
- Access was gained throughout the site and within all structures identified.

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

- Good survey coverage of the site has been achieved, with eight detectors being deployed in across the site covering the range of habitats present at the site.
- MKO employs data storage redundancy methods to ensure no data is lost from the field to final analysis - no data was lost.
- SD card corruption or fill-up can prevent data from being collected during deployments – no issues with data on-site data storage were encountered.
- Bat detector's microphones are checked before every season to ensure they have good sensitivity for data collection, and detectors' software updates are installed as soon as they become available - no issues related to equipment were encountered during the surveys.
- Incidents during deployments, such as tampering or livestock interference, can prevent data from being collected effectively - no incidents were reported during the surveys.

Activity assessment limitations can relate to data analysis procedures and a lack of standardised and Ireland-based assessment methods:

- MKO's data analysis methods include manually checking of 100% of bat passes identified by Auto ID Software, as well as noise and no ID files. Where multiple species, or multiple individuals of the same species, are identified within the same call, only one is reported, prioritising hard to detect species. This is due to the large volumes of data collected. While this method is likely to introduce a bias, it is not believed to affect the overall conclusions of the assessment, as only commonly recorded species might be underreported.

- No activity threshold currently exists for Irish bat species to objectively assess bat activity within a certain habitat, and no standardised assessment method has been proposed across the country. Ecobat software recommended by existing guidelines was not available for use at the time of the assessment. MKO experience surveying habitats similar to those present within the site aided with the assessment.

No significant limitations in the scope, scale or context of the assessment have been identified.

5. CONCLUSION & RECOMMENDATIONS

A full assessment of the potential impacts on bats as a result of the proposed development is presented in the Biodiversity Chapter of the EIAR which will accompany the planning application. Consideration have been given to the following measures to mitigate for potential impacts:

- Structure A will be avoided as part of the Proposed Development. No works are currently proposed at Structure A. If this should change and works are required, a bat derogation licence will be obtained from NPWS, and further mitigation prescribed by a licenced ecologist.
- A derogation licence from the NPWS will be required in order to undertake works on, or in proximity to, Bridge 1 (Kelly's Bridge).
- As a bat roost was confirmed at Bridge 1 (Kelly's Bridge), a pre-commencement survey is recommended to re-assess the structure prior to any works. The requirement for a pre-commencement survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2024 and to carry out a detailed inspection of the bridge once scaffolding/MEWPs are in place to allow it.
- The roost identified at Bridge 1 will be retained in situ, and although works are required to repoint the bridge arch, the identified roost will not be directly affected by these works. This crevice will be retained and repair / repointing will be around this identified roost.
- Supervision by a qualified ecologist, under licence, is recommended during each work phase (i.e. vegetation removal, arch cleaning, repointing) to monitor roost health and limit disturbance.
- During the pre-commencement bat surveys if additional bat roosts are identified, these will be retained, unless a variation to the derogation licence is required. Furthermore, if potential suitable roosting features are identified (i.e. deep crevices) these will be retained, where structurally possible. Suitable crevices which cannot be retained for structural reasons will be blocked by a qualified ecologist under licence, following the pre-commencement surveys (i.e. with bubble wrap) to ensure no bats are harmed or entombed during works.
- Vegetation treatment on the bridge will occur between October and February inclusive to comply with the Wildlife Act 1976 (Amendment) 2000. The use of herbicide spraying, such as Glyphosate, should be avoided. All vegetation close to the structure should be removed using hand tools.
- Alternative roosting locations can be provided as part of the development to improve the quality of the roosting resources within the development. Alternative roosting locations could be achieved by creating bespoke roosting habitat within the potential roosting locations of the most suitable structures, or the implementation of bat boxes at various locations throughout the Proposed Development.
- Where possible, the felling of trees should be avoided. Should any felling of trees with PRF-I features be required, felling will be carried out with the assumption that bats may be present:
    - Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow potentially roosting bats to wake and move.
    - Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape (National Roads Authority, 2006).
    - Any tree felling will be undertaken outside the main bat vulnerability periods (including maternity season & hibernating season) (Marnell, Kelleher, & Mullen, 2022).
- No lighting is proposed as part of the development. However, any lighting plan for the operational phase of the proposed works, will be designed with consideration of the following guidelines: Bat Conservation Ireland guidelines; Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/23 Bats and Artificial Lighting at night (ILP, 2023), to minimise light spillage, thus reducing any potential disturbance to bats.
- Landscaping favourable to bats will involve the retention and enhancement of linear features and woodland habitats. No tree felling should result in the severing of commuting corridors

along the proposed canal footprint, especially within the mixed broadleaf woodland at the centre of the Proposed Development.

The surveys undertaken provide a good understanding of the use of the site by bats and the report provides an comprehensive overview with regard to the likely challenges faced and constraints associated with the proposed works.

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