

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME III APPENDICES

Appendix 7-1 Baseline Bat Report F-211052 – Cleeves –
2025.09.18 (S)



Baseline Bat Report

Cleeves Riverside Quarter,
Co. Limerick





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Table of Contents

1.		
	INTRODUCTION	
1.1	Purpose of this Report	3
1.2	Site Description	3
1.3	Policy and Legislation	4
1.4	Bat Roosting Behaviour	5
1.5	Statement of Authority	6
2.	METHODOLOGY	9
2.1	Desktop Study	9
2.1.1	Bat Species' Range	9
2.1.2	National Bat Database of Ireland	9
2.1.3	Designated Sites	9
2.1.4	Habitat and Landscape	10
2.1.4.1	Ordnance Survey Mapping	10
2.1.4.2	Geological Survey Ireland	10
2.1.4.3	National Monuments	10
2.1.5	Previous Reports	10
2.2	Field Study	10
	Bat Habitat Appraisal (2016)	10
2.2.1.1	Preliminary Roost Assessment	11
2.3	Bat Activity Surveys	13
2.3.1	Manual Surveys	13
2.3.1.1	Roost Surveys	13
2.3.1.2	Night Vision Aids	14
	Night-time Bat Walkover	14
2.3.2	Static Detectors Surveys	14
2.4	Bat Call Analysis	15
2.5	Assessment of Bat Activity Levels	16
3.	RESULTS	18
3.1	Desktop Study	18
3.1.1	Limerick Co. Development Plan – 2022-2028	18
3.1.2	National Biodiversity Data Centre	18
3.1.3	Designated Sites	19
3.1.4	National Parks and Wildlife Service Records	19
3.1.5	Habitat and Landscape	19
3.1.6	Previous Reports	20
3.2	Bat Habitat Appraisal	20
3.2.1	Preliminary Roost Assessment	21
3.3	Bat Activity Surveys	27
3.3.1	Manual Surveys	28
3.3.1.1	Dusk Emergence and Dawn Re-entry Surveys	28
3.3.1.2	Night Walkover Surveys	32
3.3.2	Static Detectors Surveys	32
4.	DATA EVALUATION	35
4.1.1	Discussion and Interpretation	35
4.1.2	Importance of Bat Population Recorded at the Site	36
4.1.3	Survey limitations	36
5.	CONCLUSION & RECOMMENDATIONS	38
	BIBLIOGRAPHY	40



TABLE OF FIGURES

<i>Figure 2-1 Survey Effort.....</i>	<i>17</i>
<i>Figure 3-1 Survey Results.....</i>	<i>27</i>

APPENDICES

- Appendix 1 – 2022 Bat Report**
- Appendix 2 – 2023 Winter Report**

1. INTRODUCTION

1.1 Purpose of this Report

MKO was commissioned to complete a comprehensive suite of bat surveys at Cleeves Riverside Quarter, Co. Limerick (Grid Ref: R 57051 57119). This report provides details of the bat surveys undertaken, including survey design, methods and results, and recommendations to safeguard bats. The report was first completed in 2024 to help inform the proposed design of the Cleeves Masterplan site. The report has been reviewed and updated in August 2025 to support the Phase II planning application of the phased development proposal for the significant city centre regeneration area. The development phases are detailed in Chapter 1 of the EIAR.

The report presents the ecological baseline recorded within the Masterplan site in relation to bats. The bulk of the surveys was carried out in February, May, July and September 2023. These followed preliminary surveys undertaken in 2021/2022 and presented in **Appendix 1**. 2023 surveys included a roost suitability assessment of buildings not covered during 2022 surveys, as well as seasonal manual activity surveys and ground-level static detectors surveys. The site was revisited in 2024 and 2025, as walkovers and roost inspection surveys were carried out to reconfirm the existing baseline.

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)).*
- *'Bat Workers' Manual' (3rd edn). JNCC, Peterborough (Mitchell-Jones, A.J. & McLeish, A.P. (eds) 2004).*
- *The Lesser Horseshoe Bat Conservation Handbook, Vincent Wildlife Trust (Schofield, HW., 2008).*
- *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn.) (Collins, 2016)*
- *Bat Roosts in Trees (Andrews, 2018)*
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a)*
- *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)*
- *Lesser Horseshoe Bat Species Action Plan 2022-2026 (NPWS & VWT, 2022)*

1.2 Site Description

The Proposed Development site is located in the Docklands of, Co. Limerick (Grid Ref: R 57051 57119) and is accessed via The North Circular Road.

The Proposed Development site is located on the former Cleeves factory site on the northern bank of the River Shannon. The proposed Masterplan will include the redevelopment and revitalisation of the site as a public realm accommodating a mix of uses including proposed residential and office spaces, educational and tourist facilities.

- Where the ‘proposed development’ is referred to, this encompasses the entirety of the Phase II development
- Where ‘the Application site’, or ‘the site’, is referred to, this relates to the primary red line boundary of the proposed development
- Where ‘the Masterplan site’ is referred to, this relates to the wider MS area which has been considered as part of the assessment.

There are six distinct, but yet permeable areas identified within the overall Cleeves Masterplan site, these are detailed in Figure 2.1 of Chapter 2 Project Description and are described as follows:

- ‘Flaxmill Site’ (1.6 hectares) comprises the Flaxmill, perimeter walls, Chimney, Engine House, Water Tank and Steeping Galleries.
- ‘Shipyard Site’ (0.7 hectares) gently sloping towards the river, is located between the North Circular Road and Condell Road, adjoining Fernhill residential development to the north west and St, Michael’s Rowing club to the south east, is currently used for storage and car parking and includes a warehouse.
- ‘Riverfront’ (0.22 hectares) including St Michael’s Rowing Club premises and club facilities, is defined by O’Callaghan Strand to the north and the River Shannon to the south extending from a point defined by the Condell Road and Shannon Bridge to the west.
- ‘Stonetown Terrace Site’ (0.43 hectares) is accessed via the Stonetown Terrace Road and is defined by the Landsdowne Hall apartment block to the east, existing housing in Clanmaurice Gardens to the north, Clanmaurice Avenue to the west and the Quarry Site to the south. The site comprises an Upper Reservoir structure.
- ‘Quarry Site’ (0.61 hectares) is dominated by a cliff face which adjoins the long rear gardens of housing in Clanmaurice Avenue to the north. Part of the southern boundary touches the North Circular Road and extends to include 2 no. Victorian Houses.
- ‘Salesians Site’ (0.9 hectares) is separate to the Cleeves Complex, located to the west of the Quarry site, with the long rear gardens of housing in Clanmaurice Avenue defining the northern boundary, Salesians primary school defining the western boundary and North Circular Road defining the southern boundary. The site comprises a complex of buildings including a former secondary school, currently used for the temporary accommodation of Ukrainian refugees and Fernbank House, a former private dwelling which has been much altered and extended to meet the needs of the school.

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 <i>Pipistrellus pipistrellus</i>	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 <i>Pipistrellus pygmaeus</i>	Favourable	
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>	Unknown	
Leisler's bat <i>Nyctalus leisleri</i>	Favourable	
Daubenton's bat <i>Myotis daubentonii</i>	Favourable	
Natterer's bat <i>Myotis nattereri</i>	Favourable	
Whiskered bat <i>Myotis mystacinus</i>	Favourable	
Brown long-eared bat <i>Plecotus auritus</i>	Favourable	
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Inadequate	

1.3.1 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 1-2 Roost importance at various geographic levels, adapted to Ireland from Table 3.2 of CIEEM guidelines (Reason and Wray, 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 sites rare in the UK]	Local/County [Very large pipistrelle swarming sites appear uncommon in the Ireland]	Unlikely to exceed Local/County importance 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 <i>Myotis</i> , 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. Table 1-3 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 1-3 Level of Importance of Various Roosts in Ireland

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

1.4

Statement of Authority

MKO employs a 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. 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.

Survey scoping was prepared by Sara Fissolo. The daytime walkover survey and inspections were carried out by Sara Fissolo, Kate Greaney, and Nathan Finn. Manual activity surveys were lead by MKO staff detailed below. Data manual ID were carried out by Kate Greaney and David Culleton. This report was prepared by Kate Greaney, was reviewed by Sara Fissolo, and was approved by Pat Roberts. Staff's roles and relevant training are presented in Table 1-4 below.

Table 1-3 Project team qualifications and training.

Staff	Role	Training
Aoife Joyce (B.Sc., M.Sc.)	Project Director	Advanced Bat Survey Techniques – Trapping, biometrics, handling (BCI), Bat Impacts and Mitigation (CIEEM), Bat Tree Roost Identification and Endoscope Training (BCI), Bats in Heritage Structures (BCI), Bats and Lighting (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics).
Sara Fissolo (B.Sc.)	Project Ecologist	Advanced Bat Survey Techniques (BCI), Bat Impacts and Mitigation (CIEEM), Bats in Heritage Structures (BCI), Bat Care (BCT), Bats and Lighting (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics).
Ryan Connors (B.Sc., M.Sc.)	Seasonal Bat Ecologist	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).
Kate Greaney (B.Sc., M.Sc.)	Ecologist	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)
Nathan Finn (B.Sc., M.Sc.)	Seasonal Bat Ecologist.	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).
David Culleton (B.Sc., M.Sc.)	Seasonal Bat Ecologist	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).
Nora Szijarto (B.Sc., M.Sc.)	Seasonal Bat Ecologist	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).
Laura McEntegart (B.Sc.)	Ecologist	Bat Handling Training Course (BCI), Bats: Assessing the Impact of Development on Bats, Mitigation & Enhancement - (CIEEM), Kaleidoscope Pro Analysis (Wildlife Acoustics), 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)
Neil Campbell (BSc.)	Ecologist	Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Kaleidoscope Pro Analysis (Wildlife Acoustics).
Laura Granicz (BSc., MSc.)	Ecologist	Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Advanced Bat Survey Techniques (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics).

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.*
- *Limerick County Development Plan 2022-2028*
- *BCI Database*
- *Review of NPWS Lesser Horseshoe Bat national dataset*

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

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 27/11/2023). 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 27/11/2023).

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 27/11/2023).

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 complete walkover survey of the Masterplan site was carried out during daylight hours on the 9th February 2023. This walkover followed surveys carried out in 2022 and primarily covered areas that were not visited during previous surveys. Walkovers were repeated on the 6th October 2024, the 27th March 2025 and the 5th June 2025.

The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in Bat Conservation Trust (BCT) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th edn.) (Collins, 2023).

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. 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: No suitability (NONE), Further Assessment Required (FAR), and Potential Roosting Feature present (PRF). 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 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 Masterplan site 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.

The site was first visited in February, with following visit carried out in May, July, and September 2023. All structures within the site that were not inspected in 2022 were assessed for their potential to support roosting bats. All other buildings were re-visited where necessary to assess any baseline changes since 2022 surveys, focusing on areas where evidence of roosting bats was previously identified.

On the 9th February, bat droppings were collected at two locations within the Flaxmill building (B9) (IG Ref: R 57058 57145) and Electrical Station (B10) (IG Ref: R 57030 57129) and sent for DNA analysis to SureScreen Scientifics in the UK. Two intact droppings were collected at each location and were stored and labelled in separate lab testing vials, with one acting as reserve for the lab analysis process.

In addition, interior inspections of the Salesians school buildings (BL16, 16b, 16c, 16d), convent and Secondary School (BL16a), St. Micheal's Rowing Club (BL17, 17a, 17b) and a previously occupied semi-detached house (B1b) on the Victorian Terrace on North Circular Road were inspected for hibernacula and potential signs of other roosting.

An updated site visit was carried out on the 6th October 2024 by Sara Fissolo, Colin Murphy and Nora Szijarto, accompanied by LCCC Ecologist Sean Doyle. These primarily focused on the Flaxmill building to facilitate Phase 1 Heritage works on this protected structure. A derogation licence from NPWS has been obtained for the heritage works (DER-BAT-2025-169). Bat monitoring is ongoing at the site as part of Phase 1 Heritage works in line with conditions from the derogation licence.

Another site visit was carried out by Sara Fissolo and David Mesarcik on the 5th June 2025 to reinspect all areas within the site. A thermal camera (Pixfra ARC Thermal Monocular) and an endoscope were used to aid these assessments. The aim of these surveys was to check whether known roosting locations

were still in use, whether any significant changes in the baseline had occurred since undertaking the surveys in 2023, and whether any new evidence of bat roosting activity could be found.

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.

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, including location and species.

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 night-time bat walkovers (NBW). Surveys were carried out throughout the bat activity season, in spring summer and autumn 2023, to assess the use of the site at different times of the year.

For each of the surveys, surveyors were equipped with active full spectrum bat detectors, Batlogger M (Elekon AG, Lucerne, Switzerland). A Pettersson D200 Ultrasound Detector (Wildcare) was used by one surveyor on the 15th of May 2023. 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	Survey Time	Weather
15/05/2023	SF, KG, DC, NF, LM, NS, NC, LG	Dusk Emergence	21:24	21:00 – 23:00	11-13°C, Dry, Calm – Light breeze
24/07/2023	SF, KG, DC, RC, NS, LG assisted by Tom Peters (B.Sc.), NC assisted by Katy Beckett (B.Sc.)	Dusk Emergence	21:40	21:30 – 23:30	16-17°C, Dry, Calm
25/07/2023	SF, KG, DC, RC	Dawn Re-entry & NBW	05:42	04:10 – 06:00	13-15°C, Dry, Calm
26/09/2023	SF assisted by Timothy O'Callaghan (B.Sc.) and Tom Peters, KG assisted by Caitrin Ferren, DC, NF, RC, Stephanie Corkery (B.Sc., M.Sc.)	Dusk Emergence	19:24	19:04 – 21:10	13 - 15°C, Dry, Calm
27/09/2023	SF, KG, DC, NF	Dawn Re-entry & NBW	07:28	05:55 – 06:55	13 - 15°C, Dry – Moderate Breeze, Calm

2.2.2.1.1 Roost Surveys

Any structure identified during the bat habitat appraisal as having potential to host roosting bats was subject to presence/absence surveys in the form of emergence and re-entry surveys. Rationale for survey effort was based on guidelines proposed by Collins in Tables 7.1 and 7.2 (Collins, 2016). Multiple structures were identified within the site and were subject to roost surveys following the initial roost assessment. Where structures had been previously surveyed in 2022, top-up surveys were carried out. The primary objective of the survey scope was to assess the site for the presence of Lesser Horseshoe bats.

Surveyors were located across the site 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), aided the survey effort, as detailed in Section 2.3.1.1.

Surveys were carried out in favourable weather conditions (Table 2-1). Roost emergence surveys commenced at least 15 minutes before sunset and concluded approximately 1.5 hours after sunset. Re-entrance surveys commenced approximately 1.5 hours before sunrise and concluded 15 minutes after sunrise. The dawn re-entry survey, the morning of the 27th of September was cut short due to a heavy downpour of rain.

Night Vision Aids

The use of NVAs is now considered standard best practice for bat activity surveys. MKO employed thermal camera equipment (Thermal Monocular Eye II E6+ V3.0 (InfiRay, UK)). The thermal camera, mounted on a tripod, was used during roost surveys to identify potential roosting hotspots and monitor emergence activity. The camera was fully monitored by a surveyor, who was equipped with a bat detector to record bat echolocation calls.

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

2.2.2.1.2 Night-time Bat Walkover

Manual activity surveys also comprised of nighttime bat walkovers which coincided with dusk emergence and dawn re-entry surveys. The aim of this survey was to observe bat species using the site and visually assess bat behaviour and important features used by bats within the site, as well as to identify a possible commuting corridor for Lesser horseshoe bats. During dawn activity surveys, the aim of the walkover was to spot any swarming behaviour within the site to identify any additional potential roosting areas.

The transects were walked by a surveyor, recording bats in real time. They occurred alongside the manual roost surveys. Surveyors were equipped with an active full spectrum bat detector, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland). The route was prepared with reference to the proposed layout, desktop and walkover survey results, as well as a suspected Lesser horseshoe bat commuting corridor between two known roosting locations. The route is presented in Figure 2-1.

2.2.3 Static Detectors Surveys

Full spectrum SM4 bat detectors (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity across each survey period. Three detectors were deployed on 15th May 2023 and collected on 1st June 2023 to show bat activity during the spring survey period. There were three detectors deployed on the 24th July and collected on 10th August to show bat activity for the summer survey period. Five detectors were then deployed during autumn survey period from the 12th of September until the 27th of September 2023. The locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats as well as to investigate a potential commuting corridor for Lesser horseshoe bats between the Cleeve's site and the adjacent school.

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. Habitats are assessed in line with Fossitt (2000). A detailed description of the habitats within the site is provided in EIAR Chapter 7 Biodiversity.

Table 2-3 Static Detector Location

Detector ID	IG Reference	Habitat	Site	Season	Deployment	Collection
D01	R 56923 57150	BL3	Quarry/Reservoir	Spring	15/05/2023	01/06/2023
D02	R 56901 57173	WL1	Quarry/Victorian Terrace	Spring	15/05/2023	01/06/2023
D03	R 57049 57209	GS1	Stonetown Terrace	Spring	15/05/2023	01/06/2023
D04	R 56996 57164	BL3 FL7	Quarry/Reservoir	Summer	24/07/2023	10/08/2023
D05	R 56920 57245	ER2	Quarry	Summer	24/07/2023	10/08/2023
D06	R 56858 57257	BL3	Salesians	Summer	24/07/2023	10/06/2023
D07	R 56858 57257	BL3	Salesians	Autumn	12/09/2023	27/09/2023
D08	R 56905 57249	BL3/ED3	Quarry	Autumn	12/09/2023	27/09/2023
D09	R 57033 57186	BL3	Flaxmill	Autumn	12/09/2023	27/09/2023
D10	R 56997 57248	GA2/WL1	Stonetown Terrace	Autumn	12/09/2023	27/09/2023
D11	R 56901 57199	ED2/WL1	Quarry/Victorian Terrace	Autumn	12/09/2023	27/09/2023

2.2.4 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 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 (*Plectous 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.

Echolocation by Lesser horseshoe bats (*Rhinolophus hipposideros*) is directional and can be missed by detectors, particularly manual detectors. MKO employs omni-directional microphones to limit under-recording for the species.

2.2.5 Assessment of Bat Activity Levels

The online database tool Ecobat (mammal.org.uk) is recommended by Collins to assess bat activity levels within a 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.). Ecobat was unavailable for a cross-site analysis of static data at the time of analysis. Therefore, activity levels were assessed based on professional experience gained from performing bat surveys in a wide variety of Irish habitats.



Map Legend

Site outline

Static detectors

15/05/2023

24/07/2024

12/09/2024

Surveyor locations

15/05/2023

26/09/2023

27/09/2023

24/07/2023

25/07/2023

Transect at dawn
- 25.07.2024



Drawing Title

Survey Effort 2023

Project Title

Cleeves

Drawn By

NS

Checked By

SF

Project No.

211052

Drawing No.

Fig.2-1

Scale

1:1,500

Date

2024-05-28



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3. RESULTS

3.1 Desktop Study

3.1.1 Limerick Co. Development Plan – 2022-2028

The Limerick County Development Plan came into effect on 29th July 2022. The plan was searched for references to the protection of bats, in particular lesser horseshoe bat. This species is present in the county but is considered of particular concern due to risk of isolation and the fragmentation of corridors between Cork and Clare populations. The following Objective was found in relation to the conservation of the lesser horseshoe bat:

Objective EH O2: *It is an objective of the Council to require all developments in areas where there may be Lesser Horseshoe Bats, to submit an ecological assessment of the effects of the development on the species. The assessment shall include mitigation measures to ensure that feeding, roosting or hibernation sites for the species are maintained. The assessment shall also include measures to ensure that landscape features are retained and that the development itself will not cause a barrier or deterrent effect on the species.*

The following Objective was found in relation to the conservation of other Irish bat species:

Objective EH O3: *It is an objective of the Council to require all developments where there are species of conservation concern, to submit an ecological assessment of the effects of the development on the site and nearby designated sites, suggesting appropriate mitigation measures and establishing, in particular, the presence or absence of the following species: Otter, badger, bats, lamprey and protected plant species such as the Triangular Club Rush, Opposite Leaved Pond Weed and Flora Protection Order Species generally.*

3.1.2 National Biodiversity Data Centre

A review of the National Bat Database of Ireland on the 27/11/2023 yielded results of bats within a 10km hectad of the proposed works. The search yielded 5 bat species within 10km. Table 3-1 lists the bat species recorded within the hectad which pertains to the proposed works site (R55).

A review of the NBDC bat landscape map provided a habitat suitability index of 37.11 (red). This indicates that the proposed development area has high habitat suitability for bat species.

Table 3-1 NBDC Bat Records

Hectad	Species	Date	Database	Status
R55	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)	27/01/2015	National Lesser Horseshoe Bat Database of Ireland	Annex II & IV
R55	Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	16/06/2014	National Bat Database of Ireland	Annex IV
R55	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	16/06/2014	National Bat Database of Ireland	Annex IV
R55	Leisler's bat (<i>Nyctalus leisleri</i>)	07/06/2007	National Bat Database of Ireland	Annex IV
R55	Daubenton's Bat (<i>Myotis daubentonii</i>)	29/08/2009	National Bat Database of Ireland	Annex IV

3.1.3 Designated Sites

Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs) and the site is situated within the current known range of this species.

A search of all Designated Sites within a 15km radius of the site found two sites designated for the conservation of bats. The Lesser horseshoe bat roosts for which the SACs have been designated, are significantly outside the core foraging range (2.5km) of Lesser Horseshoe bat (NPWS, 2013). There is therefore no potential for significant effect on the Lesser horseshoe bat population for which the SACs have been designated. Table 3-2 shows the designated sites within 15km.

Table 3-2 European and National and proposed National Sites Designated to Bats

Designated Site	Distance to Site	Species	Roost Type
Ratty River Cave SAC	14.4km	Lesser horseshoe bat	Hibernacula
Danes Hole Poulnalecka SAC	14.7km	Lesser horseshoe bat	Hibernacula

3.1.4 National Parks and Wildlife Service Records

The results of the information request received from the NPWS scientific data unit of Rare and Protected Species is detailed in Table 3-3. This includes Lesser horseshoe roost records within a 10km radius of the Proposed Development site (IG Ref: R 57051 57119). No roost records were found within 1km of the site. One roost record was found within 2.5km of the proposed development site.

Table 3-3 Lesser horseshoe bat records within 10km of the Proposed Development

Most Recent Count	Species	Location	Roost Type	Distance from Site
n/a	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Doonass House	Night	5-10km
2020	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Mountshannon House	n/a	5-10km
2012	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Ardnacrusha	n/a	5-10km
2020	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Limerick Canal	n/a	1-2.5km

3.1.5 Habitat and Landscape

A review of mapping and photographs provided insight into the habitats and landscape features present at the proposed development site. The site is primarily surrounded by residential housing but is connected to the wider landscape through a series of tree and hedgerows. In addition, the Shannon Estuary is located approximately 50m to the southeast of the site.

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

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.

3.1.6 Previous Reports

Surveys were carried out by MKO ecologists in July 2022 to assess the suitability of the site for roosting bats.

In summary, all buildings present within the proposed development site were found to have some potential to host roosting bat species. Evidence of bats, including feeding remains, small accumulations of droppings, and scattered droppings, were identified in several buildings. Suggesting the use of the site by a small number of bats. No evidence of hibernacula or maternity roosts was identified.

The 2022 report prepared by MKO is presented in **Appendix I**.

Ecology Ireland Ltd. EcIA – Summary of May 2021 Results

A preliminary site assessment was carried out in April 2021 by Ecology Ireland, following initial observations made in October 2020. Ground level site inspections as well as passive detector surveys were carried out. No roosting locations were identified, though a dropping found in building 9 was DNA analysed and identified as pertaining to lesser horseshoe bat.

An SM4 bat detector, deployed to the west of the reservoir over 10 nights in April 2021, recorded high levels of activity (15,000+ passes) by all species found in Ireland except Natterer's bat, while another deployed to the north of St. Micheal's rowing club recorded a total of 25 passes, mostly common pipistrelles with some soprano pipistrelles and Leisler's bat passes. Regular lesser horseshoe bat passes were recorded within the proposed development site, with early dusk activity times suggesting potential roosting nearby or within the buildings on site.

3.2 Bat Habitat Appraisal

The latest appraisals were conducted in 2025, with previous walkovers undertaken since 2021. Habitats within the study area were assessed for their suitability for bats to roost, forage and commute. Connectivity with the wider landscape was also considered to determine habitat suitability.

With regard to foraging and commuting bats, the Masterplan Site is considered of *Moderate* suitability, particularly in relation to presence of the reservoir within the Quarry Site, its connectivity to the wider area, as well as identified roosts.

The site is in limited but regular use as a storage facility, and occasionally hosts drills and one-off events. This low usage has created an uncommon environment for bats in a mostly urbanised area, with limited artificial lighting in the Quarry Site and no human disturbance at night, with the exception of the Salesians school, which is in full time use as temporary accommodation.

Built and open areas, such as artificial surfaces around the Flaxmill, and the Salesians, and open grassland in Stonetown Terrace are considered of *Low* suitability; however, they are surrounded by green infrastructure and do not limit connectivity within the site. The areas directly adjacent to existing roads, including the Shipyard, sections of the site near O'Callaghan Strand and the North Circular Road, are considered of negligible suitability due to the levels of artificial surfaces and lighting present.

The River Shannon in itself is considered a commuting corridor for bats to travel between suitable foraging habitats outside of Limerick City centre.

With regard to roosting bats, the existing buildings on site generally present a *Moderate* suitability to host roosting bats. A thorough inspection of every accessible building on the site was completed. Details of the finding of each inspection is described in Table 3-4 below, this accounts for all findings across all inspections.

3.2.1 Preliminary Roost Assessment

Multiple structures were identified and inspected as part of the roost assessment effort. Figure 3-1 refers to the buildings on site and will be referenced throughout the roost assessment and results. The Masterplan site has been visited by MKO in November 2021, July 2022, February 2023, May 2023, July 2023, September 2023, October 2024, March and June 2025. Small areas of the site were inaccessible: the upstairs of building 15 has been deemed unsafe due to asbestos. Building 11 was accessible in 2021 and 2022 but has since been deemed structurally unsound and internal access was restricted. Buildings 16 and 17, in the Salesians, were previously inaccessible, but as of February 2023 access was granted and thorough internal inspections completed.

Results from SureScreen Scientifics DNA analysis were received on Monday 6th March 2023. Lesser horseshoe bat (*Rhinolophus hipposideros*) was confirmed using the air vents on the ground floor of the main Cleeves building (B9). The results from the Electrical Station (B10) were inconclusive – indicating potential use by multiple bat species.

A more detailed account of the inspections carried out throughout 2022 and 2023 can be found in Appendix 1 and Appendix 2 of this report. Any structures assigned *Moderate* or *High* roosting suitability were also the subject of roost emergence surveys throughout 2023. Details of the emergence surveys are presented in Section 4.4.1. Any update from this baseline as a result of the inspections carried out in 2024 and 2025 is presented below for each area within the Masterplan site.

Flaxmill Site

The Flaxmill and associated buildings (Coldstore and its extension, Dairy Building, Engine House) were last revisited in 2025. Fresh droppings were found at three previously identified LHB roosting locations: in a dark section at the top floor of the Dairy Building, which is closely associated to the Flaxmill; under unused air conditioning units on the ground floor of the Flaxmill, behind the section of the building which has been used for public consultations; and scattered within the Coldstore building (B11). No evidence of roosting (i.e. accumulations) were found in the Coldstore. Other roosting locations previously identified, including on the first floor under a staircase and within the adjacent room, did not show any signs of recent use.

Quarry Site

No baseline changes were reported in the quarry walls, where a soprano pipistrelle roost was identified in 2023. The Quarry Site remained the most suitable foraging location for bats, due to the existing vegetation along the quarry walls and surrounding the reservoir.

Stonetown Terrace Site

No baseline changes were reported in Stonetown Terrace. No roosting was previously identified in this area, which is considered suitable for commuting and foraging.

Salesians Site

The likely roost found within the interior courtyard of the Salesian convent was revisited and inspected. The location was identified in 2023 and a dusk emergence survey was performed, with no bats observed emerging or heard during the survey. Activity by a small number of pipistrelle bats was recorded during a subsequent survey (see Section 3.3.1.1).

The roosting location appeared to be an external pipe wrapped in insulation, which was connected to the boiler room of the convent (Plate 3-1 and Plate 3-2). The boiler is still in use and serves the adjacent school buildings, which since 2023 host an accommodation centre. Fresh droppings were seen on walls above a door near the pipe (Plate 3-3), on two separate sections of the pipe itself, and under the insulation. The thermal camera or endoscope did not reveal presence of bats during the inspection. Based on the evidence found and the previous surveys undertaken, the location consistently hosts a small pipistrelle summer roost (*Pipistrellus sp.*).



Plate 3-1 Salesian convent internal yard



Plate 3-2 Droppings above door by heating pipe



Plate 3-3 Heating pipe wrapped in insulation

The classroom where LHBs were found roosting in 2023 was also revisited, a small amount of droppings were found above a cupboard located under a previously identified hanging location, however usage of the building seems to have diminished. Since previous surveys in 2023, the school has been closed down and the buildings have been put to use as emergency accommodation for Ukrainian refugees. The school buildings are therefore always occupied and it is likely that noise and lighting disturbance in the school yard in front of the roost has increased.

O'Callaghan Strand

No evidence of roosting was identified within the buildings adjacent to O'Callaghan Strand (B4, B5, B6). The buildings are in an advanced state of dereliction, with water ingress and light penetration making them unsuitable for significant roosting.

Infiltration Gallery & NCR

No baseline changes were reported in the infiltration and NCR buildings (B14b, B14a, B14 and B15). The only buildings which were not reaccessed in 2025 were the Victorian terraces along NCR.

Shipyards Zone

No baseline changes were reported in the Shipyards Zone, the open area is still a carpark and the existing warehouse is in use.

Roost Inspection Findings per Building

Table 3-4 Roost inspection Findings per Building

Buildings	Site	Description of the Findings Within the Site	Bat use Evidence
B1 – Occupied & Unoccupied Dwelling	Quarry – Victorian Houses	- Some cracks under the windowsill on the northern elevation with multiple access points through broken windows. - Rotting timber fascia. - Ivy cover on the northern and eastern elevations.	No evidence of bat use
B2 – Garage/ Storage unit	Shipyards	- Galvanised roof and brick walls. - Some cracks under the led flashing on the roof. - Regularly used and bright during the day.	No evidence of bat use
B3 – Offices/ Storage Unit	Flaxmill Site / O’Callaghan Strand	- Tar flat roof and brick walls approximately 70 metres long. - Exposed timber roof beams. - Cavity wall created on the southern elevation between the old stone wall and an installed inner Fiberglass Reinforced Panels (FRP) wall. - Light penetration throughout.	No evidence of bat use.
B4 – Offices	O’Callaghan Strand	- Attic space with exposed timber roof beams and felt underlining. - Multiple access points through gaps in the windows and doors. - Slates missing on the northern and southern facing sides to the roof. - Lead flashing with gaps present around the chimney. - Large roof overhang with an exposed soffit on the eastern elevation. - Light penetration throughout.	No evidence of bat use
B5 – Storage unit	O’Callaghan Strand	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Exposed metal beams hanging from the roof. - Dark areas to the building throughout.	No evidence of bat use
B6 – Cold Store	O’Callaghan Strand / Flaxmill	- Fiberglass Reinforced Panels (FRP) on the floor and ceiling in the eastern section. - Exposed stone walls to the west and exposed timber roof beams with a galvanised roof. - Dark during the daytime with multiple gaps in the stone walls. - Gaps lead all the way through to the outside.	No evidence of bat use
B7 – Cold Store	O’Callaghan Strand / Flaxmill Site	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Light penetration throughout.	No evidence of bat use

B8 – Dairy Factory	Flaxmill Site	• Light penetration throughout. • Roof tiles missing and broken in places revealing the exposed timber roof beams above. • Concrete walls.	• Feeding remains found • Second floor: small amounts of droppings found in 1 location.
B9 – Flaxmill	Flaxmill Site	• Four-storey building with attic space. • Multiple access points. • Stone wall building with slate roof. • Dark areas to the building throughout. • Collapsed ceiling tiles and exposed timber roof beams.	• Ground floor: droppings found in 2 locations, in small numbers, as well as feeding remains. • Third floor: feeding remains throughout, some droppings found in 1 location.
B10 – Electrical station/Storage Unit	Flaxmill Site	• Concrete walled building with galvanised roof. • Large access points on the east and west elevation. • Light penetration throughout. • Some gaps in the walls.	• Feeding remains found. • Droppings found in electrical station.
B11 – Coldstore	Flaxmill Site	• Bright during the daytime and exposed due to the partial roof. • Inner rooms present within the building are dark and sheltered. • Access points in the windows and door.	• Droppings found in an inner room. • Feeding remains found
B12 – Storage Unit	Flaxmill / Stonetown Terrace	• No roof on the southern half of the building – exposed. • Some small gaps in the stonework in the southern section • Northern section has an intact roof. • Northern section is dark	• Scattered droppings found on floor.
B13 – Workshop Storage	Flaxmill / Quarry Reservoir	• Large storage area. • Multiple access points. • Western section is dark and the eastern section is bright during daytime.	• Feeding remains found. • Small amount of dropping found in the back of the building
B14 – Storage unit/ Offices	North Circular Road	• Large storage room. • Fiberglass Reinforced Panels (FRP) on the floor and ceiling. • Dark during the daytime.	• Small amount of droppings found under galvanised sheeting and in front room.
B15 – Offices	North Circular Road	• Two-story building with concrete walls and a tile roof. • Light penetration throughout. • Top floor inaccessible due to questionable structural integrity	• No evidence of bat use.
B16 – Salesians School and Convent	Salesians	• Two-story school building with concrete walls and a tile roof – in regular use since 2023 as temporary accommodation. • Unused Salesian sister's convent - multistorey building with attic and basement spaces • Unused prefab buildings with attic and chimney spaces.	• Evidence of bat dropping in the courtyard of the convent. • Deceased bat found in basement of the convent

			• Droppings and feeding remains found in unused prefab building north of the school – LHB roost confirmed in used by two individuals
B17 – St Micheals Rowing club	St Micheals Rowing club	• Two-story building with concrete walls and a tile roof – in regular use • Well lit externally.	• No evidence of bat use.



Map Legend

 Building Outline



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Drawing title

2023 Buildings Numbered

Project Title

Cleeves Riverside Quarter

Drawn By	KG	Checked By	SF
Project No.	211052	Drawing No.	1
Scale	1:1500	Date	03/11/2023



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3.3 Bat Activity Surveys

3.3.1 Manual Surveys

3.3.1.1 Dusk Emergence and Dawn Re-entry Surveys

Dusk Emergence 15th May 2023

An emergence survey was carried out on the 15th of May by eight surveyors positioned across the proposed development site. An emergence survey was performed by two surveyors on Salesian Sisters Convent. Two surveyors were located at the front and back of terraced house B1a to survey potentially emerging bats and observe any bats commuting into the site from that area. The other surveyors were located around the central reservoir to observe activity at this location and better understand commuting routes into the site. Table 3-5 shows the location and species composition results of each surveyor.

No bats were observed emerging from the convent, with very limited activity recorded throughout the survey at this location.

High activity was recorded at the reservoir with one surveyor detecting Lesser horseshoe bats. These were recorded outside the known roost emergence times for the species. Their commuting route was not identified. The thermal camera was utilised to monitor the reservoir's arches. No signs of roosting were identified.

Records from the two surveyors located at the terraced house suggest potential roosting within the southern roof aspect – no visual of the roof was possible from the house's yard. As for commuting and foraging activity, pipistrelle bats were observed commuting across the road from the nearby estate and into the site.

Table 3-5 Manual activity survey 15th May

Batlogger	IG Ref.	Building	Soprano pipistrelle	Common pipistrelle	Leisler's bat	Brown long-eared bat	Myotis spp.	Lesser horseshoe bat
B	R 56819 57214	16	9	4	2	-	-	-
D	R 56914 57181	14a North	152	366	7	-	1	-
E	R 56901 57160	14a South	51	82	8	-	-	-
F	R56904 57184	14b	53	123	6	-	-	-
G	R 57001 57136	10	2	25	2	-	-	-
H	R 56797 57261	16b	132	12	-	-	-	-
J	R 56950 57230	Quarry	48	223	14	1	-	-
Heterodyne	R 56998 57176	Arches	1	11	-	-	-	2

Dusk Emergence 24th July 2023

An emergence survey was carried out on the 24th of July 2023 by eight surveyors positioned across the proposed development site to provide coverage of all buildings identified as potential roosts. Each surveyor was allocated a Batlogger with specific ID. Table 3-6 shows the location and species composition results of each surveyor.

The rowing club presented no bat activity, with no bats observed emerging from the building and no bats recorded during the survey by the two surveyors.

High bat activity was recorded by each of the surveyors at the quarry site. Up to six bats were observed potentially emerging from the ivy along the western quarry wall. Common and soprano pipistrelle bats were recorded foraging and commuting at both locations.

No bats were observed emerging from buildings 1a and 1b, though regular commuting and foraging activity was recorded. Surveyors at the old primary school building observed no bat emergences and bat activity was low.

Table 3-6 Manual activity survey 24th July

Batlogger	IG Ref.	Building	Soprano pipistrelle	Common pipistrelle	Leisler's bat	Myotis spp.
A	R 56991 57160	Arches	34	298	1	-
E	R 56921 57244	Western Quarry	407	271	-	-
F	R 57022 57027	17b	2	9	-	-
G	R 56856 57263	16b East	9	18	1	-
H	R 56832 57261	16b West	8	18	1	1
I	R 57105 57039	17	12	9	-	-
J	R 56976 57216	Eastern Quarry	48	287	5	-
K	R 56892 57147	1a	67	256	3	-

Dawn Re-entry survey 25th July 2023

A re-entry survey was undertaken on the 25th of July 2023 by four surveyors positioned in different locations across the proposed development site to survey potential areas where roosting was anticipated. One surveyor was located outside of buildings 1a in order to observe potential bats re-entering the buildings and to detect any possible commuting routes from the site. One surveyor was positioned at the north-west side of the quarry, with the thermal scope, to confirm the observations of the previous evening. Another surveyor was located in proximity of the reservoir and its arches to survey any potential re-entries and commuting behaviour. A fourth surveyor walked across the main Cleeves site to assess activity throughout and to identify any swarming behaviour around the factory buildings. Table 3-7 shows the location and species composition results of each surveyor.

No re-entries were observed at buildings 1a and little activity was recorded. Three soprano pipistrelle bats were observed re-entering the ivy on the western wall of the quarry. A single Lesser horseshoe bat was observed entering building 9. No other re-entries were observed. High pipistrelle activity was recorded throughout the quarry and reservoir areas.

Table 3-7 Manual Activity Survey 25th July

Batlogger	IG Ref.	Building	Soprano pipistrelle	Common pipistrelle	Leisler's bat	Brown long-eared bat	Lesser horseshoe bat
E	R 56921 57244	Western Quarry	22	109	-	-	-
G	NBW	NBW	21	152	1	-	6
J	R 56991 57160	Arches	11	199	-	1	-
K	R56892 57144	1a	13	10		-	-

Dusk Emergence 26th September 2023

An emergence survey was carried out on the 26th September 2023 by eight surveyors positioned across the proposed development site to provide coverage of all buildings identified as potential roosts. Table 3-8 shows the location and species composition results of each surveyor.

Consistent foraging bat activity was recorded by each of the surveyors at Stonetown Terrace. However, no bats were seen emerging from this location.

The Quarry also had high activity with pipistrelle bats were observed potentially emerging from the ivy along the western quarry wall. These were confirmed following review of thermal footage (Plate 3-4). Both common and soprano pipistrelle bats were recorded foraging and commuting at this location.

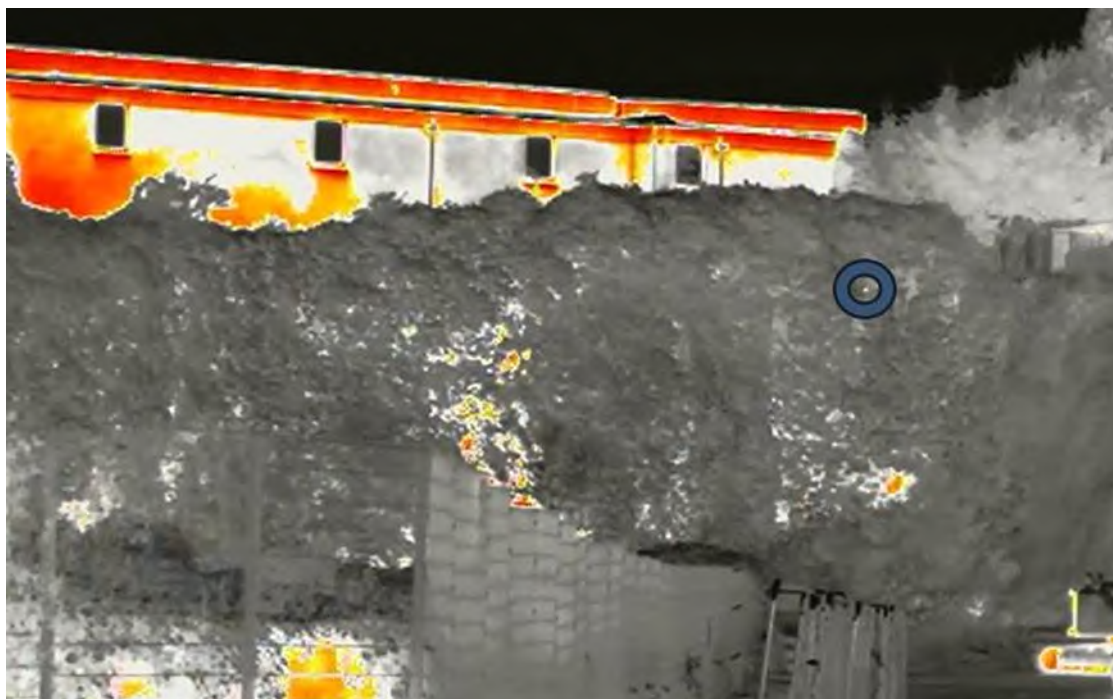


Plate 3-4 Circled, heat signature of bat emerging at 19.43

No bats were observed emerging from building 11, though activity commuting and foraging activity was high. One unidentified bat was observed entering Building 10.

Common and soprano pipistrelle were observed flying above the school internal yard for a long time after sunset, suggesting roosting activity within the area. Presence of roosting was recorded at this site during inspections, but no activity had been recorded in previous seasons. The number of individual bats was estimated between 4 and 8, as bats were flying around the school yard in and out of sight and were difficult to count. A lot of the activity recorded by surveyors A and L consists in the same pipistrelle passes, as surveyors were quite close to each other.

Two Lesser horseshoe bats were observed flying within and then emerging from Building 16b, and soon later were spotted commuting east towards the Cleeves site. The bats are thought to have been roosting either within the ventilation stack or chimney to the east of the structure, as these were the only sections of the building where a complete inspection was not possible due to lack of full visibility from the ground. No other surveyor recorded the species during the manual survey.

Table 3-8 Manual Activity Survey 26th September

Batlogger	Location (IG)	Building	Myotis spp.	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Lesser horseshoe bat
A	R 56833 57255	School Courtyard			133	131	
C	R 57002 57214	Stonetown Terrace		2	303	41	
D	R 57015 57222	Stonetown Terrace	1	2	195	29	
E	R 56918 57242	Quarry	1	2	519	226	
F	R 56858 57261	16b East	1		13	26	6
H	R 57013 57168	B11			179	10	
J	R57045 57230	Stonetown Terrace		2	264	98	
L	R 56837 57264	B16b		1	118	88	28

Dawn Re-entry 27th September 2023

A re-entry survey was undertaken on the 27th of September 2023 by four surveyors positioned in different locations across the proposed development site at areas of likely roost re-entry. Two surveyor was located outside of building 16b in order to observe potential bats re-entering the buildings and to detect any possible commuting routes from the site. Another surveyor was located at the building 11 to survey any potential re-entries and commuting behaviour. A fourth surveyor walked across the main Cleeves site to assess activity throughout and to identify any swarming behaviour around the factory buildings. Table 3-9 shows the location and species composition results of each surveyor.

No re-entries were observed at any of the locations and little activity was recorded. A faint Lesser horseshoe bat call was recorded in front of Building 16b approximately 10 minutes after the start of the survey, however it was not seen by surveyors. Weather conditions deteriorated throughout the survey, which was stopped due to heavy rain conditions approximately 20 minutes before sunrise, as bat activity had stopped.

Table 3-9 Manual Activity Survey 27th September

Batlogger	Location (IG)	Building	Common pipistrelle	Soprano pipistrelle	Lesser horseshoe bat
D	NBW	NBW – Flaxmill Site	1	1	
H	R 57013 57168	11	9	3	
J	R 56832 57261	16b	2	1	1
L	R 56833 57255	16b		1	

3.3.1.2 Night Walkover Surveys

Manual activity surveys also comprised night walkover transects at dusk. Night walkover surveys took place on the 24th and 25th of July and the 26th of September 2023. The main purpose of the walkover surveys was to see how different bat species utilise the site. Bat activity was recorded on the surveys, and there was a particular focus on Lesser horseshoe bat activity. The transects took place alongside the dawn reemergence along a chosen route which linked two suspected Lesser horseshoe bat roosts together.

The same nighttime bat walkover was repeated on each date and was used to observe the bat activity on the main Cleeves site. Common pipistrelles dominated the species composition of the surveys, and this species continuously utilises the site for both commuting and foraging. On the 25th of July one single Lesser horseshoe bat was seen re-entering building 9.

3.3.2 Static Detectors Surveys

SM4 static detectors were deployed on the site each survey period. Locations were chosen to represent areas of likely bat activity and to cover a potential commuting corridor between the school site and the Cleeves site which was suspected to be used by Lesser horseshoe bats for commuting.

The detectors at D09 and D11 stopped recording during the night of the 19th of September as their memory cards had reached full capacity.

In total 75,697 bat passes were recorded. Analysis of the detector recordings positively identified six bats to species level with *Myotis* genus also present. Common pipistrelle (*Pipistrellus pipistrellus*) made up the vast majority of the activity recorded within the site (n=54,381), followed by Soprano pipistrelles (*Pipistrellus pygmaeus*) (n=18,290). Leisler's bat (*Nyctalus leisleri*) was the next most common recorded species (n=1,785). Followed by Lesser horse bat (*Rhinolophus hipposideros*) (n=780). There was fewer instances of *Myotis* spp. (n=232) and Brown long eared bat (*Plecotus auritus*) (n=117) recorded on the site across all seasons. Nathusius' pipistrelle calls (*Pipistrellus nathusii*) (n=112) were recorded in autumn, both in isolation or foraging with other pipistrelle species. Plate 3-1 shows total bat species composition recorded at the site.

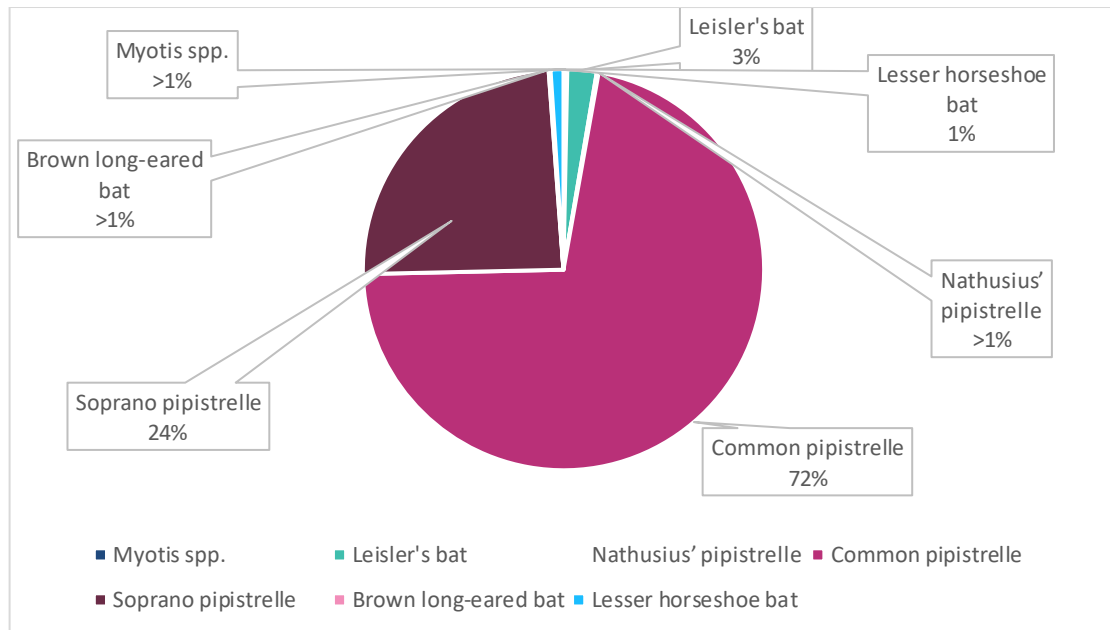


Plate 3-1 Total bat species composition.

Plate 3-2 shows total bat passes per detector, which are summarised in Table 3-10.

Table 3-10 Static detector results, total bat passes.

Detector	Common Pipistrelle	Soprano Pipistrelle	Leisler's Bat	Nathusius' pipistrelle	Brown Long-eared Bat	Myotis spp.	Lesser Horseshoe Bat
D01	10,237	3,348	83	-	3	13	82
D02	2,292	2,029	152	-	4	10	21
D03	2,833	3,217	287	-	11	13	15
D04	14,935	581	189	-	33	29	21
D05	9,886	2,381	184	-	16	20	189
D06	680	1,259	242	-	10	7	109
D07	330	1,456	153	1	7	29	119
D08	9,194	1,333	152	62	6	45	135
D09	1,715	1,346	89	14	28	36	17
D10	1,511	852	160	3	25	13	12
D11	732	488	94	32	5	17	60

Species composition varied across detectors. Common pipistrelles were the most frequently recorded species on all detectors. Myotis species were recorded in similar numbers across all detectors, as were Soprano pipistrelles and Leisler's bats. Brown long-eared bats were most commonly recorded on D08 and D09. Nathusius' pipistrelles were recorded in higher numbers on D08. Lesser horseshoe bats were

recorded in similar number for the spring and summer deployments. The counts on D06, deployed in the summer and D07, deployed in the autumn were similar as the detectors were placed in the same location. High counts of Lesser horseshoe bats were also seen on D05 and D08.

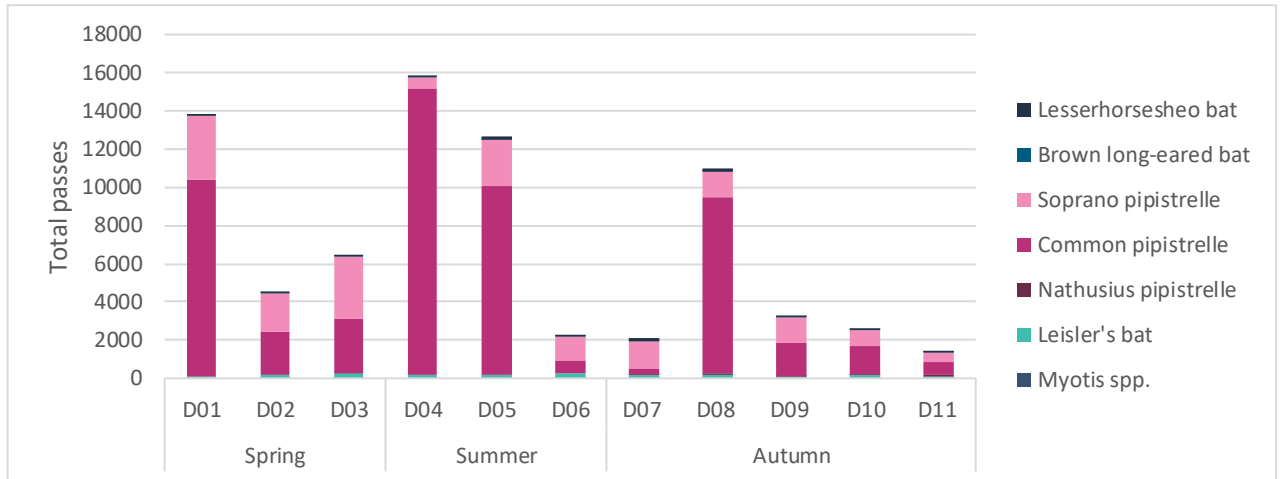


Plate 3-2 Total bat passes per detector

Plate 3-3 shows the Lesser horseshoe bat activity across all detectors. The detectors were placed with the hopes of confirming a commuting corridor for this species. D06 and D07 were placed in the same location but at different seasons and species count was similar both times. Based on the timestamps and the results of manual activity surveys, it is likely that this commuting corridor exists for Lesser horseshoe bats between the two confirmed roosting locations. Bats were picked up at slightly different times, minutes apart, as if a bat were to commute along the route. In total 780 passes of Lesser horseshoe bat were recorded across all detectors.

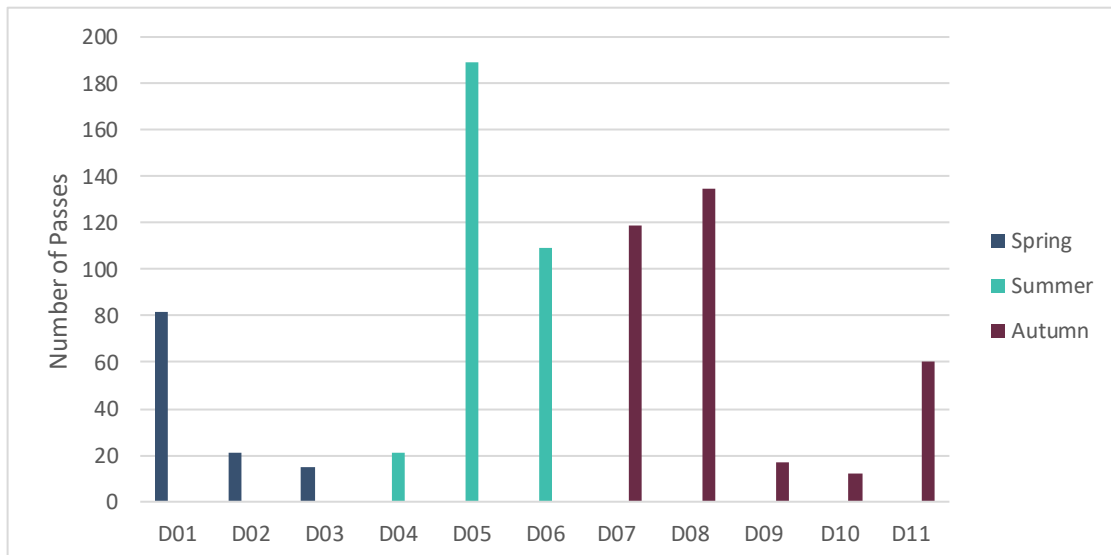


Plate 3-3 Lesser horseshoe bat count per detector

4.

DATA EVALUATION

4.1.1

Discussion and Interpretation

Out of the six species recorded within the site, Nathusius' pipistrelle is the only one recorded outside their known range. The species was recorded only during the static surveys carried out in Autumn. Whilst significant to record outside of its range, the species is often underreported and is known to occur Limerick County.

Despite the extensive survey effort, no large roosts or maternity roosts were identified within the site. Notably, no significant accumulations of droppings indicative of regular roosts were found. Instead, evidence suggested opportunistic use of structures by bats, with droppings and feeding remains observed in seven buildings across the proposed development area. The majority of buildings surveyed exhibit characteristics conducive to supporting bat roosts, in particular accessibility and some dark, mostly undisturbed locations. However, the quality of the buildings, with water ingress, light ingress and lack of unexposed and warm roosting locations make it largely unsuitable for significant roosts to establish. The site is completely accessible to bats and is likely to present other resting sites (i.e. night perches/opportunistic roosting), but there is no likelihood that significant roosts were missed during the surveys undertaken.

Four active roosts were identified within the site. A small (8no.) soprano pipistrelle roost was recorded within the rock face of the site's quarry. A Lesser horseshoe bat roost was confirmed in building B9 when an individual was observed entering the building from the ground floor during a dawn re-entry survey. The precise location within the structure remains unconfirmed due to the building's extensive interior connectivity, and it was not found at known perches. Two lesser horseshoe bats were seen re-entering the derelict classroom building located at the rear of the school. Droppings discovered during inspections at the Salesians' convent also confirmed the presence of roosting bats within piping ducts in the internal yard. Continuous monitoring will be necessary to ensure no baseline changes occur.

The Quarry Site represents the focal point for commuting and foraging activity on the site, with the rest of the Masterplan site presenting limited suitability for any significant activity, in particular as mostly disturbed by artificial lighting. This assessment was confirmed by the surveys undertaken, which recorded small numbers of bats foraging continuously around the Reservoir and on occasion across the rest of the site. In particular, very little activity was recorded at the Riverfront and in the Salesians front yard. The reservoir and quarry represent the only diversion within the site from the surrounding urban matrix and as such represent a suitable habitat for the local bat populations, even attracting light-sensitive species such as LHB and Myotis species.

A commuting corridor utilized by LHB was identified traversing the site, connecting at least the two known roosting locations and using the quarry walls and above private gardens outside the site to navigate. This suggests that the site serves as a vital foraging ground and regular roosting site by a small number of individuals of this species. No evidence of maternity roosts or hibernating behaviour was observed for this species. No evidence of an influx into the site was recorded for this species, however pipistrelles were observed commuting into the site across North Circular Road. It is likely that bats use the existing green infrastructure surrounding the site to move to and from highly suitable foraging locations, in particular the Westfield Wetlands located to the south-west of the site. No evidence that bats are moving into the site directly from the River Shannon was recorded, and whilst this is likely to happen on occasion, this is not considered to be the most likely route into the site due to the lighting on O'Callaghan Strand presenting a connectivity barrier. Little to no bat activity was recorded in this area during the manual activity surveys.

This detailed overview provides a comprehensive understanding of the bat ecology within the Masterplan site.

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 lesser horseshoe bat population recorded within the site was assigned **National Importance**. Even though a small number of bats was recorded, which would be normally assessed as County Importance at most, this small population has the potential to have national importance due to the need to maintain a viable corridor between populations present in the counties surrounding Limerick, and particularly as it is located in an urban location of Limerick City, which records very low numbers of lesser horseshoe bats.

The Proposed works site has the potential to support a roosting site of ecological significance, however no evidence of large roosts was found within the inspected structures. No roosting site of National Importance was recorded within the site. No hibernacula or maternity roosts were identified within the site during the surveys undertaken in winter and summer.

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.

- No significant access issues were encountered with the Site during static deployments, as the detectors were deployment where intended.
- Access was limited in two buildings due to the presence of asbestos in the attic space of building 15 and the structural integrity of building 11. Access was gained throughout the remainder of the buildings within the site.
- Good survey coverage of the site has been achieved, with 11 detectors being deployed in across the site, throughout multiple survey seasons, covering the range of habitats present at the site.
- The dawn survey on the 27th of September had to be cut short due to weather conditions. Good survey coverage of the site has previously been attained and bats would likely have re-entered the roosts due to the weather.
- 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 – The detectors at D09 and D11 stopped recording during the night of the 19th of September as their memory cards had reached full capacity.
- 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.
- 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, as under maintenance. 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.

CONCLUSIONS

The following points set out the main conclusions following the completion of the surveys described above:

- Six bat species, as well as *Myotis* sp. were recorded commuting and foraging across the proposed works site during the bat surveys carried out, including Soprano pipistrelle, Common pipistrelle, Leisler's bat, Brown long-eared bat, Nathusius' pipistrelle and Lesser horseshoe bat (LHB).
- Most of the buildings located within the Masterplan site have the potential to support bat roosts. However, no dropping accumulations indicative of large regular roosts were found. The small accumulations of bat droppings and feeding remains recorded suggest that the structures on site are used with likely regularity by a small number of bats. Droppings were found in seven buildings within the proposed development site, either scattered or accumulated under likely LHB perches. One of these LHB perches were confirmed using DNA analysis. Despite multiple revisits, no LHBs were ever noted roosting at these locations during the daytime.
- Four active roosts were identified within the site:
 - One lesser horseshoe bat was observed entering the Coldstore building, west of the Flaxmill, from the ground floor during a dawn re-entry survey, however no confirmation of its day roosting location was possible: the entrance is well connected to the whole interior.
 - A small soprano pipistrelle roost counting approx. 6-8 bats was identified within the western rock face of the Quarry Site.
 - Two lesser horseshoe bats were found to be roosting within a derelict classroom building at the back of the Salesians School.
 - Another active roost was found within the Salesians, in the interior yard of the convent. Based on the evidence found in 2025 and the previous surveys undertaken in 2023, the location consistently hosts a small pipistrelle summer roost (*Pipistrellus* sp.).
- Baseline conditions present lighting disturbance around the Flaxmill site near O'Callaghan Strand, where security lighting operates all night, along the NCR and site boundaries, where road illumination spills onto the site, and in the Salesians, where the school currently operated as an accommodation centre. The central Quarry Site, with the Reservoir, present the darkest environments on the site, and the northern boundary, along the quarry walls between the Flaxmill and into the Salesians, was identified as a regular commuting corridor for LHB. This species is particularly sensitive to light pollution and represents the benchmark towards which all impacts on bats need to be assessed.
- The commuting corridor for lesser horseshoe bats was confirmed during static and manual surveys to run between at least two identified roosting locations, one at the Salesians and one within the Flaxmill. The species utilises the site for foraging purposes and for roosting. No evidence of maternity roost or hibernating behaviour was identified for this species. It is unusual to find lesser horseshoe bats regularly utilising an urban environment. As such, due to the available roosting opportunities, the site is potentially a significant outpost for the species, despite the low numbers of individuals recorded.
- Soprano and common pipistrelles were observed commuting into the site by crossing NCR towards the Reservoir. This location and the westernmost section of the site, by the Salesians, are considered the most likely entry and exist points into the site. This is as a result of existing, but suboptimal, green infrastructure including treelines and private gardens located outside the MS in these areas.
- With regard to foraging and commuting bats, the reservoir and quarry areas are of Moderate suitability. Built and open areas, such as open yards and open grassland are considered of Low

suitability. This assessment was confirmed by the surveys undertaken, which recorded small numbers of bats foraging continuously around the Reservoir and on occasion across the rest of the site. The Quarry Site was confirmed to be the focal point of bat activity around the Masterplan site, with low activity levels recorded at all other sites. In particular, very little activity was recorded at the Riverfront and in the Salesians front yard.

BIBLIOGRAPHY

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

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

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.

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.

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.) (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.

DAFM (2019). Felling & Reforestation Standards (v.Oct2019). Department of Agriculture, Food & the Marine. See Forest Service Circular 14 / 2019, www.agriculture.gov.ie/forests-service/grants-and-premiums-schemes/2014-2020/schemecirculars/2019circulars/.

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.

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.

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

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.

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.

Reason, P.F. and Wray, S. (2023). UK mitigation Guidelines, CIEEM

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.

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

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

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



APPENDIX 1

2022 BAT REPORT

Bat Report

Cleeves Riverside Quarter,
Co. Limerick





DOCUMENT DETAILS

Client: **Limerick Twenty Thirty (LTT)**

Project Title: **Cleeves Riverside Quarter, Co. Limerick**

Project Number: **211052**

Document Title: **Bat Report**

Document File: **BR D1 – 211052 – 2023.01.16**

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Table of Contents

1. INTRODUCTION.....	3
1.1 Policy and Legislation	3
1.2 Bat Roosting Behaviour	5
1.3 Statement of Authority	6
2. METHODS.....	7
2.1 Desktop Study	7
2.1.1 National Bat Database of Ireland	7
2.1.2 National Parks and Wildlife Service Records.....	7
2.1.3 Designated Sites	7
2.1.4 Habitat and Landscape	8
2.1.5 Previous Reports.....	8
2.2 Field Study.....	8
2.2.1 Ecological Appraisal (Bats).....	8
2.2.2 Summer Roost Assessment	8
2.2.3 Bat Activity Surveys	9
2.2.3.1 Emergence/Re-entry Surveys	9
2.2.3.2 One-Night Static Detectors Surveys	9
2.2.3.3 Two-week Static Detectors Surveys	9
2.3 Survey Limitations	10
3. RESULTS.....	12
3.1 Desktop Study	12
3.1.1 Limerick County Development Plan 2022-2028.....	12
3.1.2 National Biodiversity Data Centre.....	12
3.1.3 National Parks and Wildlife Service Records.....	12
3.1.4 Designated Sites	13
3.1.5 Habitat and Landscape	13
3.1.6 Previous Reports.....	13
3.2 Bat Habitat Appraisal.....	14
3.3 Summer Roost Assessment	15
3.4 Emergence Survey.....	19
3.5 Re-Entry Surveys	21
3.5.1 One-night Static Detectors.....	23
3.5.2 Two-weeks Static Detectors	23
3.6 Summary of Summer 2022 Surveys Results.....	25
3.6.1 Importance of Bat Population Recorded at the Site	25
4. CONCLUSION & RECOMMENDATIONS	27
5. BIBLIOGRAPHY	28

TABLE OF TABLES

<i>Table 1-1 Bat Roost Types and Definitions.....</i>	<i>5</i>
<i>Table 1-2 Level of Importance of Various Building Roosts.....</i>	<i>5</i>
<i>Table 2-1 Bat Activity survey effort.....</i>	<i>9</i>
<i>Table 3-1 NBDC Bat Records.....</i>	<i>12</i>
<i>Table 3-2 NPWS Lesser horseshoe bat records within 10km of the Proposed Development.</i>	<i>13</i>
<i>Table 3-3 Habitats recorded within the proposed development site.....</i>	<i>14</i>
<i>Table 3-4 Suitability to roosting bats of each building within the proposed development site</i>	<i>14</i>

<i>Table 3-5 – Winter vs. Summer Roost Inspection Results.....</i>	<i>17</i>
<i>Table 3-6 Dusk Emergence Survey Results by Surveyor.....</i>	<i>19</i>
<i>Table 3-7 Dawn Re-entry Survey Results by Surveyor.....</i>	<i>21</i>
<i>Table 3-8 Species recorded by Song Meter Mini detectors over one night, 7th July 2022.....</i>	<i>23</i>

TABLE OF PLATES

<i>Plate 3-1 Overall map layout, all buildings numbered.....</i>	<i>15</i>
<i>Plate 3-2 Interior of Building 14.....</i>	<i>15</i>
<i>Plate 3-3 Cleeves Factory main building.....</i>	<i>16</i>
<i>Plate 3-4 Cleeves factory attic space – roof lining.....</i>	<i>16</i>
<i>Plate 3-5 Bat Species Composition.....</i>	<i>24</i>
<i>Plate 3-6 Total bat passes per detector across 8 nights.</i>	<i>24</i>
<i>Plate 3-7 Total Bat Passes per Night.....</i>	<i>25</i>

TABLE OF FIGURES

<i>Figure 1-1 Site Location.....</i>	<i>4</i>
<i>Figure 2-1 Survey Effort.....</i>	<i>11</i>
<i>Figure 3-1 Dusk Survey Results.....</i>	<i>20</i>
<i>Figure 3-2 Dawn Survey Results.....</i>	<i>22</i>

1.

INTRODUCTION

MKO was commissioned to undertake a summer bat survey at Cleeves Riverside Quarter, Co. Limerick (Grid Ref: R 57051 57119) (Figure 1-1). The project will include the redevelopment and revitalisation of the Cleeves site as a public realm accommodating a mix of uses including proposed residential and office spaces, educational and tourist facilities.

This survey follows a winter bat survey MKO undertook in February 2022, within the site of the proposed development. The summer survey, carried out in July 2022, included a daytime inspection of the proposed development buildings and bat activity surveys. Manual dusk and dawn surveys were carried out and passive static detectors were deployed onsite for 15 nights. The main objective of the surveys was to gather information on roosting bats and inspect the structures for potential roosts, including maternity roosts. The bat surveys were designed to establish the nature, scale and locations of potential bat activity in each of the buildings on site and involved an extensive interior and exterior inspection of the buildings. As per the winter surveys, for the purposes of this report the buildings have been divided into blocks and are numbered 1-16 (Plate 3-2).

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 hOidhreacht, Church Lane, Kilkenny (Aughney, T., Kelleher, C. & Mullen, D., 2008).*
- *'Bat Workers' Manual' (3rd edn). JNCC, Peterborough (Mitchell-Jones, A.J. & McLeish, A.P. (eds) 2004).*
- *The Lesser Horseshoe Bat Conservation Handbook, Vincent Wildlife Trust (Schofield, HW., 2008).*
- *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn.) (Collins, 2016)*
- *Bat Roosts in Trees (Andrews, 2018)*
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a)*
- 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)*
- *Guidance Note 08/18: Bats and Artificial Lighting in the UK (ILP, 2018)*

1.1

Policy and Legislation

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

In addition, Irish species are further protected by national legislation (Wildlife Acts 1976-2022). 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.



Map Legend

 Site Boundary



Drawing Title

Site Location

Project Title

Cleeves Riverside Quarter, Limerick

Drawn By

SF

Checked By

AJ

Project No.

211052

Drawing No.

Fig 1-1

Scale

1:40,000

Date

01.12.2022



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1.2

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 1-1 provides a summary of different types of bat roosts.

Table 1-1 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.

There are currently no clear guidelines to determine the significance of a bat roost. All the largest roosts of 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). Table 1-2 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).

Table 1-2 Level of Importance of Various Building 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

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.

1.3

Statement of Authority

The summer bat surveys were undertaken by MKO ecologists that are professionally trained in bat survey techniques and are qualified in undertaking surveys to this level. The daytime inspection survey was carried out by licenced ecologists Aoife Joyce (BSc., MSc., DER-BAT-2022-06), Laura McEntegart (BSc., DER-BAT 2022-62) and Sara Fissolo (BSc., DER-BAT-2022-30) accompanied by Stephanie Corkery (BSc., MSc.). They were joined by Neil Campbell (BSc., MSc.), Laura Gránicz (BSc., MSc.), Kate Greaney (BSc., MSc.), Kevin McElduff (BSc.) and Patrick O'Boyle (BSc., MSc.) for the bat activity surveys.

This report was prepared by Sara Fissolo and was reviewed by Aoife Joyce and Pat Roberts (BSc., MCIEEM). Sara has two years' experience in ecological assessments and has completed CIEEM courses in Bat Impacts and Mitigation and Kaleidoscope Pro Analysis. Aoife has over three years' experience in ecological assessments and has completed CIEEM and BCI courses in Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training and Kaleidoscope Pro Analysis. Pat has over 13 years' experience in ecological assessment.

2.

METHODS

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.*
- *Review of the Limerick County Development Plan 2022-2028*

2.1.1

National Bat Database of Ireland

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

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

2.1.2

National Parks and Wildlife Service Records

The NPWS maintains all lesser horseshoe bat roost monitoring datasets and roost locations. As the proposed development is within the known distribution range of lesser horseshoe bat, the NPWS were consulted to provide any records of lesser horseshoe roosts within 10km of the proposed development. An information request was sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 12th September 2022. A response was received on the 16th September 2022.

2.1.3

Designated Sites

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 4.1.2 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. The potential for effects on these designated sites is fully considered.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered.

2.1.4 Habitat and Landscape

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.

2.1.5 Previous Reports

The results obtained during the surveys carried out by MKO in winter 2021-2022 were used to inform the field work methodology and survey effort for the summer assessment. As part of the desktop study, a previous ecological report prepared by Ecology Ireland in 2021 for the proposed development was also consulted in reference to bats.

2.2 Field Study

2.2.1 Ecological Appraisal (Bats)

A walkover survey of the Study Area was carried out during daylight hours on the 7th July 2022. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High*, *Moderate*, *Low* and *Negligible*.

The summer surveys were preceded by surveys carried out in winter 2021-2022. A summary of results obtained during the winter survey is presented in Section 3.1.5 below. The full winter report is available in **Appendix I**.

2.2.2 Summer Roost Assessment

A search for roosts was undertaken within the boundary of the proposed development by three licenced ecologists and a graduate ecologist. The aim was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

The search comprised a detailed inspection of the exteriors and interiors of the buildings inspected in winter to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises (Collins, 2016).

A walkover was carried out during daylight hours on the 7th of July 2022 and all accessible buildings were inspected. A systematic search of all accessible interiors, including all attic spaces, was undertaken. The exterior of the building was inspected first from ground level and included all accessible windowsills, walls, eaves, roof ridge and roof slates.

Trees within the site were visually assessed from ground level, for natural features of high value to roosting bats including knot holes, trunk hollows, splits/cracks in branches and areas of flaking bark and also for signs indicating possible bat use including droppings, staining and scratching of bark and any other potential roost features (i.e., PRFs) identified by Andrews (2018).

2.2.3 Bat Activity Surveys

2.2.3.1 Emergence/Re-entry Surveys

A dusk emergence survey was carried out by nine surveyors the evening of the 7th July 2022, followed by a dawn re-entry survey on the morning of the 8th July carried out by eight surveyors. All 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.

Surveyors were located across the site 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 the structure. The location of all surveyors is presented in Figure 2-1.

Conditions were suitable for both bat surveys (Table 2-1). Emergence surveys commenced 15 minutes before sunset and concluded 1hr 15min after sunset. Re-entrance surveys commenced 2 hours before sunrise and concluded 15 minutes after sunrise.

Table 2-1 Bat Activity survey effort

Date	Surveyor	Type	Sunrise/ Sunset	Weather
7 th July 2022	Aoife Joyce, Laura McEntegart, Sara Fissolo, Stephanie Corkery, Neil Campbell, Laura Gránicz, Kate Greaney, Kevin McElduff and Patrick O'Boyle	Dusk	21:58	17-18°C, Dry, Light-gentle breeze
8 th July 2022	Laura McEntegart, Sara Fissolo, Stephanie Corkery, Neil Campbell, Laura Gránicz, Kate Greaney, Kevin McElduff and Patrick O'Boyle	Dawn	05:21	14-15°C, Dry/light drizzle, Calm

2.2.3.2 One-Night Static Detectors Surveys

Two full spectrum bat detectors, Song Meter Mini (Wildlife Acoustics, Maynard, MA, USA), were deployed within the proposed development site on the night between the 7th and 8th of July 2022, the same night the emergence and re-entry surveys were carried out. 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 detectors were located in the interior space of two buildings to complement bat activity surveys which were carried out outside the structures in the form of emergence and re-entry surveys. The locations were selected based on findings of the daylight inspection surveys. The deployment of static detectors for a single night allowed for additional monitoring of bat activity within the buildings, which might not have been picked up by surveyors located outside, and to identify any potential night roosts within the areas in which the detectors were deployed.

The Song Meter Mini, dual-channel acoustic recorder is capable of the long-term acoustic monitoring of bats. Static detector locations can be found in Figure 2-1.

2.2.3.3 Two-week Static Detectors Surveys

Full spectrum SM4 bat detectors (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity at two fixed locations over a 2-week period in July 2022. The two locations

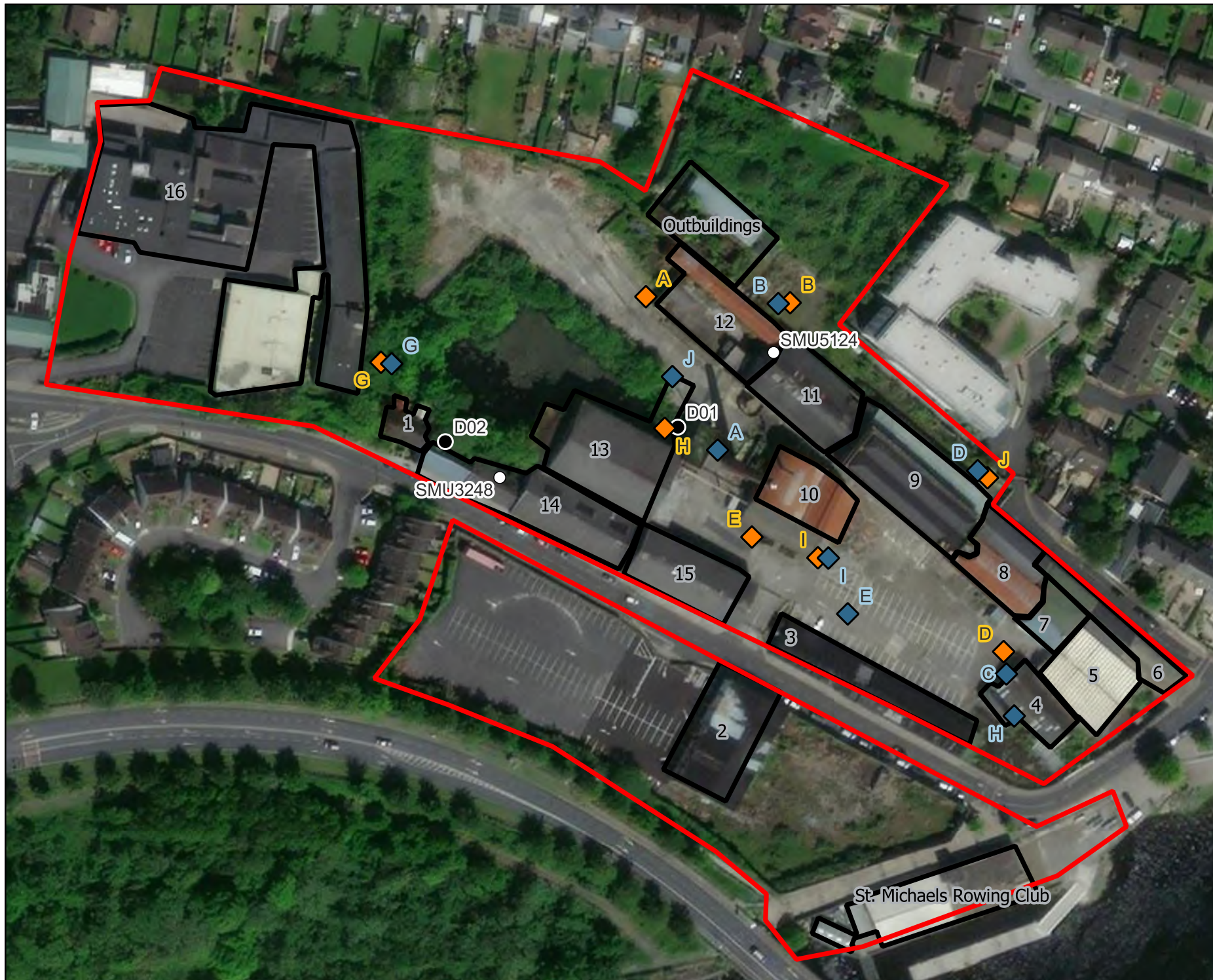
of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats. Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

The survey was designed to utilise two static detectors to monitor bat activity. Two SM4 detectors were deployed on site on the 7th July 2022 and collected on 22nd July 2022. Static detector locations can be found in Figure 2-1.

2.3

Survey Limitations

Survey design and effort was created in accordance with the most current best practice guidelines for surveying bats (Collins, 2016). July is within the optimal survey period for summer bat surveys (Collins, 2016). In addition, there were no limitations associated with weather conditions. While access to a small number of interior areas was restricted due to structural integrity and health and safety, a thorough assessment was carried out. Overall, there were no limitations in the scope, scale or context of the assessment.



Map Legend

Site Boundary

Dusk Surveyors
07.07.2022

Dawn Surveyors
08.07.2022

Static Detectors

SM Mini - one night

SM4 - two weeks



Drawing Title

Survey Effort

Project Title

Cleeves Riverside Quarter

Drawn By

SF

Checked By

AJ

Project No.

211052

Drawing No.

Figure 2-1

Scale

1:1500

Date

07.09.2022



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3. RESULTS

3.1 Desktop Study

3.1.1 Limerick County Development Plan 2022-2028

The Limerick County Development Plan came into effect on 29th July 2022. The plan was searched for references to the protection of bats, in particular lesser horseshoe bat. This species is present in the county but is considered of particular concern due to risk of isolation and the fragmentation of corridors between Cork and Clare populations. The following Objective was found in relation to the conservation of the lesser horseshoe bat:

Objective EH O2: *It is an objective of the Council to require all developments in areas where there may be Lesser Horseshoe Bats, to submit an ecological assessment of the effects of the development on the species. The assessment shall include mitigation measures to ensure that feeding, roosting or hibernation sites for the species are maintained. The assessment shall also include measures to ensure that landscape features are retained and that the development itself will not cause a barrier or deterrent effect on the species.*

The following Objective was found in relation to the conservation of other Irish bat species:

Objective EH O3: *It is an objective of the Council to require all developments where there are species of conservation concern, to submit an ecological assessment of the effects of the development on the site and nearby designated sites, suggesting appropriate mitigation measures and establishing, in particular, the presence or absence of the following species: Otter, badger, bats, lamprey and protected plant species such as the Triangular Club Rush, Opposite Leaved Pond Weed and Flora Protection Order Species generally.*

3.1.2 National Biodiversity Data Centre

A review of the National Bat Database of Ireland on the 1st March 2022 yielded results of bats within a 10km radius of the proposed development. The search yielded 5 bat species within 10km. Table 3-1 lists the bat species recorded within the hectad which pertains to the current Study Area (R55).

Table 3-1 NBDC Bat Records

Hectad	Species	Date	Database	Status
R55	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)	27/01/2015	National Lesser Horseshoe Bat Database	Annex II & IV
R55	Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	16/06/2014	National Bat Database of Ireland	Annex IV
R55	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	16/06/2014	National Bat Database of Ireland	Annex IV
R55	Leisler's bat (<i>Nyctalus leisleri</i>)	07/06/2007	National Bat Database of Ireland	Annex IV
R55	Daubenton's Bat (<i>Myotis daubentonii</i>)	29/08/2009	National Bat Database of Ireland	Annex IV

3.1.3 National Parks and Wildlife Service Records

The results of the information request received from the NPWS scientific data unit of Rare and Protected Species is detailed in Table 4-2. This includes Lesser horseshoe roost records within a 10km

radius of the Proposed Development site (IG Ref: R 57051 57119). No roost records were found within 1km of the site. One roost record was found within 2.5km of the proposed development site.

Table 3-2 NPWS Lesser horseshoe bat records within 10km of the Proposed Development.

Most Recent Count	Species	Location	Roost Type	Distance from Site
n/a	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Doonass House	Night	5-10km
2020	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Mountshannon House	n/a	5-10km
2012	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Ardnacrusa	n/a	5-10km
2020	Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Limerick Canal	n/a	1-2.5km

3.1.4 Designated Sites

Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs) and the site is situated within the current known range of this species.

A search of all Designated Sites within a 15km radius of the site found two sites designated for the conservation of bats; Ratty River Cave SAC (14.4km) and Danes Hole, Poulnalecka SAC (14.7km). The Lesser horseshoe bat roosts for which the SACs have been designated, are significantly outside the core foraging range (2.5km) of Lesser Horseshoe bat (NPWS, 2013). There is therefore no potential for significant effect on the Lesser horseshoe bat population for which the SACs have been designated.

3.1.5 Habitat and Landscape

A review of OSI maps and aerial photography revealed the site is connected to the wider landscape through a series of treelines, hedgerows and woodlands. The site is primarily surrounded by residential housing. In addition, the Shannon Estuary is located approx. 50m to the south-east.

3.1.6 Previous Reports

Ecology Ireland – May 2021

A preliminary site assessment was carried out in April 2021 by Ecology Ireland, following initial observations made in October 2020. Ground level site inspections as well as passive detector surveys were carried out. No roosting locations were identified, though a dropping found in building 9 was DNA analysed and identified as pertaining to lesser horseshoe bat.

An SM4 bat detector, deployed to the west of the reservoir over 10 nights in April 2021, recorded high levels of activity (15,000+ passes) by eight bat species (all but Natterer's bat), while another deployed to the north of St. Micheal's rowing club recorded a total of 25 passes, mostly common pipistrelles with some soprano pipistrelles and Leisler's bat passes. Regular lesser horseshoe bat passes were recorded within the proposed development site, with early dusk activity times suggesting potential roosting nearby or within the buildings on site.

MKO - Winter Report Summary – 2021/2022

Winter surveys were carried out by MKO ecologists in November 2021 and February 2022 to assess the suitability of the site for roosting and hibernating bats.

In summary, all buildings present within the proposed development site were found to have some potential to host roosting bat species. Evidence of bats, including feeding remains, small accumulations of droppings, and scattered droppings, were identified in seven buildings (B3, B8, B9, B10, B11, B12 and B13), suggesting the use of the site by a small number of bats. No evidence of hibernacula or large maternity roosts was identified.

The winter report prepared by MKO is presented in **Appendix I**.

3.2

Bat Habitat Appraisal

A walkover survey, assessing bat habitat suitability for summer roosts, was conducted on the 7th July 2022. The results of this walkover survey build upon the assessment provided in the winter survey report. A summary of habitats identified in winter is presented in Table 3-2.

Table 3-3 Habitats recorded within the proposed development site

Habitat	Fossit (2000) Code
Buildings and Artificial Surfaces	BL3
Dry meadows and grassy verges	GS2
Spoil and bare ground	ED2
Scrub	WS1
Marsh	GM1
Reservoir	FL8

An overall view of the site is presented in Plate 3-1. Each building is listed in Table 3-3, together with their suitability to host roosting bats.

Structures with *High* roosting potential present 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 (Collins, 2016). Structures with *Moderate* roosting potential could be used by bats due to their size, shelter, protection, conditions and surrounding habitat, but are unlikely to support a roost of high conservation status. Structures with *Low* potential present one or more potential roost sites that could be used by an individual bat opportunistically.

Table 3-4 Suitability to roosting bats of each building within the proposed development site

Building Number	Building Name	Bat Roosting Suitability
B1	Occupied & Unoccupied Dwelling	Moderate
B2	Garage/ Storage Unit	Low
B3	Office space & Storage unit	Moderate
B4	Offices	Moderate
B5	Storage Unit	Low
B6	Cold Store	Low
B7	Cold Store	Low
B8	Dairy Factory	Low
B9	Cleeves Factory	High
B10	Electrical station/ Storage Unit	Moderate
B11	Storage Unit	Moderate
B12	Storage Unit	Low
B13	Workshop	Low
B14	Storage Unit & Offices	Moderate
B15	Offices	Low

B16	School Buildings	Low
-----	------------------	-----



Plate 3-1 Overall map layout, all buildings numbered.

3.3 Summer Roost Assessment

The daytime inspection surveys carried out in July 2022 did not identify any additional substantial evidence of bats within the proposed development site. All locations where small amounts of droppings were observed during the surveys carried out in winter were revisited, and no or little additional signs of bats were found. Scattered droppings were found within Building 14, where no evidence of bat use was previously identified. The building is very dark during the daytime and presents suitable roosting habitat for bats.



Plate 3-2 Interior of Building 14.

The Cleeves factory building was re-confirmed as having a *High* roosting potential. Evidence of one or two fresh droppings were observed throughout the building; however, no large accumulations of fresh droppings were recorded. Additional broken windows were identified along the eastern staircase of the main Cleeves factory building, providing further potential access points for bats in addition to those previously identified (i.e. collapsed roof tiles, gaps in barred windows, gaps under flashing).

The attic of the Cleeves factory building (Plate 3-3) was not fully accessible for inspection due to health and safety concerns. No evidence of bats was observed during the inspection, but it was deemed suitable to host roosting bats, including maternity roosts, due to the availability of access and the favourable conditions provided by the intact roof, with interior lining and wooden beams (Plate 3-4).



Plate 3-3 Cleeves Factory main building



Plate 3-4 Cleeves factory attic space – roof lining

Fresh droppings were also identified in the boiler room in front of the electrical station (B10), where a small accumulation had already been recorded in winter.

No roosting bats were observed during the daylight inspection. Table 3-4 below presents a summary of results by building inspected, for winter and summer.

Table 3-5 – Winter vs. Summer Roost Inspection Results

Buildings	Description of the Findings Within the Site	Winter Results	Summer Results
Inspection Survey			
B1 – Occupied & Unoccupied Dwelling	- Some cracks under the windowsill on the northern elevation with multiple access points through broken windows. - Rotting timber fascia. - Ivy cover on the northern and eastern elevations.	No evidence of bat use	No evidence of bat use
B2 – Garage/Storage unit	- Galvanised roof and brick walls. - Some cracks under the led flashing on the roof. - Regularly used and bright during the day.	No evidence of bat use	No evidence of bat use
B3 – Offices/Storage Unit	- Tar flat roof and brick walls approximately 70 metres long. - Exposed timber roof beams. - Cavity wall created on the southern elevation between the old stone wall and an installed inner Fiberglass Reinforced Panels (FRP) wall. - Light penetration throughout.	Feeding remains found in the western section of the building at two separate locations.	No additional evidence.
B4 – Offices	- Attic space with exposed timber roof beams and felt underlining. - Multiple access points through gaps in the windows and doors. - Slates missing on the northern and southern facing sides to the roof. - Lead flashing with gaps present around the chimney. - Large roof overhang with an exposed soffit on the eastern elevation. - Light penetration throughout.	No evidence of bat use	No evidence of bat use
B5 – Storage unit	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Exposed metal beams hanging from the roof. - Dark areas to the building throughout.	No evidence of bat use	No evidence of bat use
B6 – Cold Store	- Fiberglass Reinforced Panels (FRP) on the floor and ceiling in the eastern section. - Exposed stone walls to the west and exposed timber roof beams with a galvanised roof. - Dark during the daytime with multiple gaps in the stone walls. - Gaps lead all the way through to the outside.	No evidence of bat use	No evidence of bat use
B7 – Cold Store	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Light penetration throughout.	No evidence of bat use	No evidence of bat use

B8 – Dairy Factory	- Light penetration throughout. - Roof tiles missing and broken in places revealing the exposed timber roof beams above. - Concrete walls.	Feeding remains found	Feeding remains found
B9 – Cleeves Factory	- Four-storey building with attic space. - Multiple access points. - Stone wall building with slate roof. - Dark areas to the building throughout. - Collapsed ceiling tiles and exposed timber roof beams.	- Ground floor: Droppings found in 4 locations - First floor: Droppings found in 1 location. - Second floor: Feeding remains found in 2 locations. - Third floor: Droppings found in 1 location.	- Ground floor: fresh droppings found in 2 locations, in small numbers, as well as feeding remains. - Second floor: small amounts of fresh droppings found in 1 location. - Third floor: feeding remains throughout, some fresh droppings found in 1 location.
B10 – Electrical station/ Storage Unit	- Concrete walled building with galvanised roof. - Large access points on the east and west elevation. - Light penetration throughout. - Some gaps in the walls.	- Feeding remains found - Droppings found	- Feeding remains found - Small amount of fresh droppings found in electrical station, same as winter
B11 – Storage Unit	- Bright during the daytime and exposed due to the partial roof. - Inner rooms present within the building are dark and sheltered. - Access points in the windows and door.	- Droppings found in an inner room - Feeding remains found	No additional evidence.
B12 – Storage Unit	- No roof on the southern half of the building – exposed. - Some small gaps in the stonework in the southern section - Northern section has an intact roof. - Northern section is dark	Feeding remains found in the northern section	Scattered droppings found on floor.
B13 – Workshop	- Large storage area. - Multiple access points. - Western section is dark and the eastern section is bright during daytime.	Feeding remains found	No additional evidence.
B14 – Storage unit/ Offices	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Dark during the daytime.	No evidence of bat use	Small amount of fresh droppings found under galvanised sheeting and in front room.
B15 – Offices	- Two-story building with concrete walls and a tile roof. - Light penetration throughout. - Top floor inaccessible due to questionable structural integrity	No evidence of bat use	No evidence of bat use.
B16 – School Buildings	- Two-story building with concrete walls and a tile roof. - Light penetration throughout. - In regular use	No evidence of bat use on exterior	No evidence of bat use on exterior.

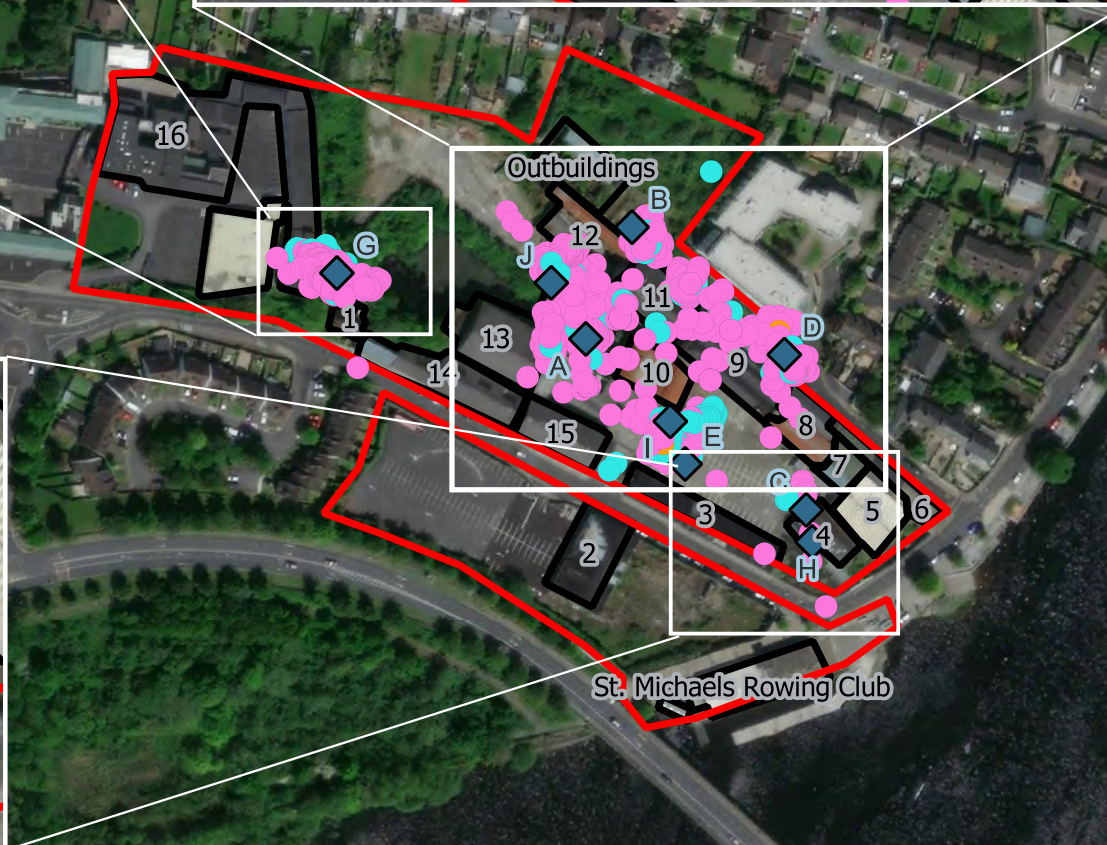
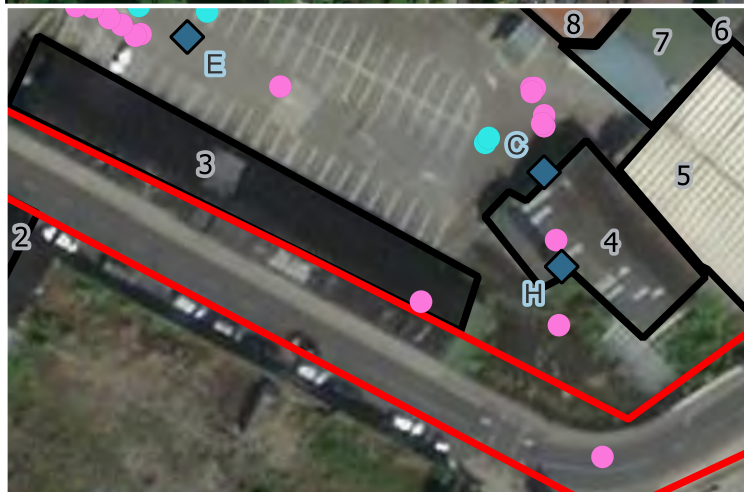
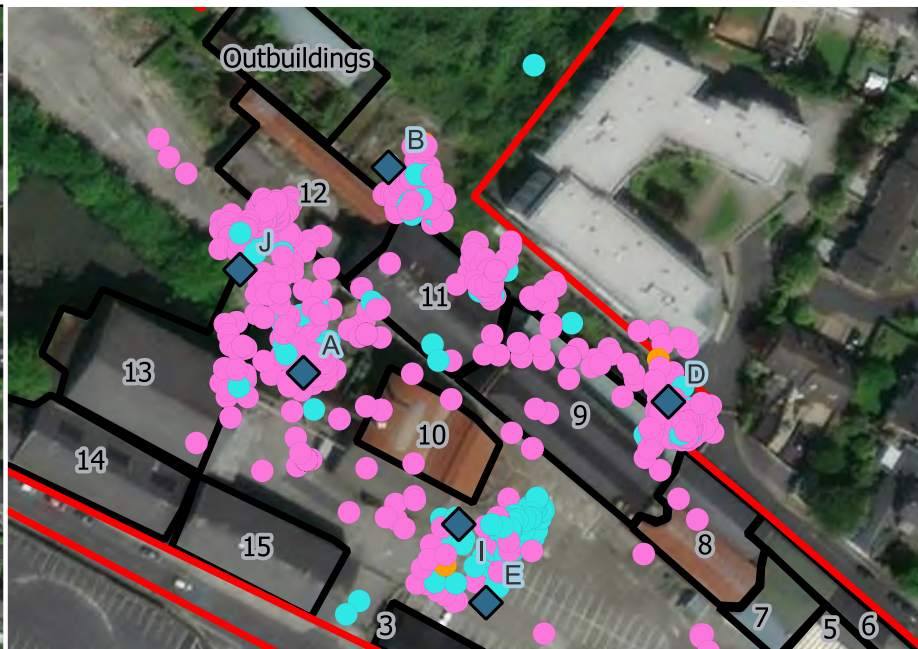
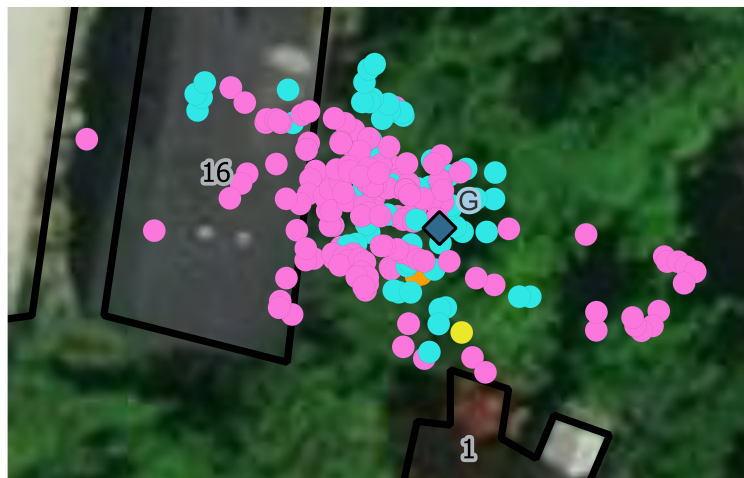
3.4

Emergence Survey

An emergence survey was carried out on the 7th of July 2022 by nine surveyors. Surveyors were positioned across the proposed development site to provide coverage of all buildings identified during the daylight surveys as potential roosts. Particular focus was given to potential access areas in buildings where signs of bats were identified. Table 3-6 presents the survey results per surveyor. Each surveyor was allocated a Batlogger with specific ID. Figure 3-1 presents the results of the manual dusk survey.

Table 3-6 Dusk Emergence Survey Results by Surveyor

Batlogger	Location (IG)	PRF Focus	Results	Species Recorded & Number of Passes
A	R 57008 57153	B13, B14, B15	No emergence. Some foraging activity. Social calls recorded.	Soprano (24) & Common pipistrelle (144).
B	R 57030 57198	B9, B11, B12	No emergence. Activity concentrated above B12.	Soprano (27) & Common pipistrelle (139), Leisler's bat (2).
C	R 57095 57092	B4, B5, B7, B8	No emergence. Very few bats recorded.	Soprano (2) & Common pipistrelle (9).
D	R 57090 57145	B9, B11	No emergence. Limited activity.	Soprano (20) & Common pipistrelle (202).
E	R 57049 57087	B3	No emergence. Limited activity.	Soprano (11) & Common pipistrelle (44).
G	R 56906 57180	B1 unoccupied, B16 east.	No emergence. Foraging within back garden.	Soprano (63) & Common pipistrelle (136), Leisler's bat (2), Lesser horseshoe bat (1).
H	R 57098 57073	B4	No emergence. Common pipistrelle foraging within building. Very few bats recorded.	Soprano (11) & Common pipistrelle (37), Leisler's bat (1).
I	R 57038 57121	B9, B10	No emergence. Some foraging activity.	Soprano (75) & Common pipistrelle (68).
J	R 56994 57176	B11, B12, B13	No emergence. High activity. Foraging activity within building 11 and above 12. Continuous commuting and foraging around the reservoir.	Soprano (37) & Common pipistrelle (276), Brown long-eared bat (1).



Map Legend

Site Boundary

Surveyor Locations
07.07.2022

Bat Species

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



Drawing Title

Dusk Survey Results

Project Title

Cleeves Riverside Quarter

Drawn By

SF

Checked By

AJ

Project No.

211052

Drawing No.

Figure 3-1

Scale

1:3000

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3.5

Re-Entry Surveys

Re-entry surveys were carried out the morning of the 8th of July 2022 by eight surveyors. Consideration was given to the results of the dusk emergence surveys to confirm surveyor positions. Most surveyors maintained their positions from the previous surveys. Where little activity was recorded at highly illuminated areas, surveyors moved to concentrate on different access points. Table 3-7 presents the survey results by surveyor, which are identified by their Batlogger ID. Figure 3-2 presents the results of the manual dawn survey.

Table 3-7 Dawn Re-entry Survey Results by Surveyor

Batlogger	Location	PRF Focus	Results	Species Recorded & Number of Passes
A	R 57018 57127	B13 arches & B11	Potential re-entry B11. Social calls recorded.	Soprano (22) & Common pipistrelle (196), Leisler's bat (7).
B	R 57030 57198	B9, B11, B12 Back	No re-entry. Few bats recorded.	Soprano (18) & Common pipistrelle (39), Leisler's bat (2).
D	R 57095 57092	B4, B5, B7, B8	No re-entry. Very few bats recorded.	Soprano (4) & Common pipistrelle (5).
E	R 57029 57143	B10	No re-entry. Foraging activity within the building.	Soprano (2) & Common pipistrelle (37), Leisler's bat (2).
G	R 56906 57180	B1 unoccupied, B16 east	No re-entry. Mainly 2-3 common pipistrelles foraging within garden.	Soprano (157) & Common pipistrelle (392), Leisler's bat (5).
H	R 56992 57160	B11, reservoir arches	Potential ~3 common pipistrelle re-entry at arches. Foraging activity and social calling by pipistrelles.	Soprano (27) & Common pipistrelle (673), Leisler's bat (6).
I	R 57038 57121	B9, B10	No re-entry. Foraging activity within B10. Building left before dawn.	Soprano (3) & Common pipistrelle (39).
J	R 57090 57145	B9, B11	No re-entry. Limited activity.	Soprano (1) & Common pipistrelle (38), Leisler's bat (1).

3.5.1 One-night Static Detectors

Two SM-mini bat detectors were deployed within the site at Building 14 and Building 9, where small accumulations of droppings were recorded during the daylight surveys. The detectors were set to record bat activity within the two buildings from sunset until sunrise. No bat calls were recorded on the detector SMU7119 deployed within Building 9. Five individual passes were recorded by the detector SMU3248 deployed within Building 14. Table 3-8 shows a summary of the results obtained.

Table 3-8 Species recorded by Song Meter Mini detectors over one night, 7th July 2022

Detector	Species	Date	Time	Evidence of Potential Day/Night Roosting
SMU3248	Common pipistrelle	07/07/2022	21:39:42	Yes
SMU3248	Lesser horseshoe bat	07/07/2022	22:07:12	Yes
SMU3248	Soprano pipistrelle	08/07/2022	01:35:51	No
SMU3248	Soprano pipistrelle	08/07/2022	02:25:38	No
SMU3248	Lesser horseshoe bat	08/07/2022	05:23:10	Yes

The pass times recorded by the detector located within Building 14 suggest potential roosting activity by a common pipistrelle bat (*Pipistrellus pipistrellus*), which was active 19 minutes before sunrise, and a lesser horseshoe bat, which was active 9 minutes after dusk and then again after sunrise. Lesser horseshoe bats (*Rhinolophus hipposideros*) are a late emerging species known to fly within the structures they roost in before eventually emerging. According to the results obtained on the static detector, it is possible that individual bats are roosting within Building 14 on occasion.

3.5.2 Two-weeks Static Detectors

Two SM4 static detectors were deployed on the site at two different locations (D01 and D02) from the 7th to the 22nd of July 2022, for a total of 15 nights. These detectors allowed a specified look into species composition, commuting and foraging activities within the site. Locations were chosen to represent areas of likely bat activity. High activity was recorded on the two detectors, with the memory cards (64GB + 64GB) on detector D01 reaching full capacity after 9 nights and detector D02 after 11 nights.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.2 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total 26,604 bat passes were recorded.

Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Common pipistrelle (*Pipistrellus pipistrellus*) made up the majority of the activity recorded within the site (n=22,961), followed by Soprano pipistrelles (*Pipistrellus pygmaeus*) (n=3,389). Leisler's bat (*Nyctalus leisleri*) (n=146) and lesser horseshoe bat (n=80) were recorded less frequently. *Myotis* spp. (n=27) and Brown long-eared bat (*Plecotus auritus*) (n=1) was rarely encountered, with 1% or less of total bats recorded (Plate 3-5).

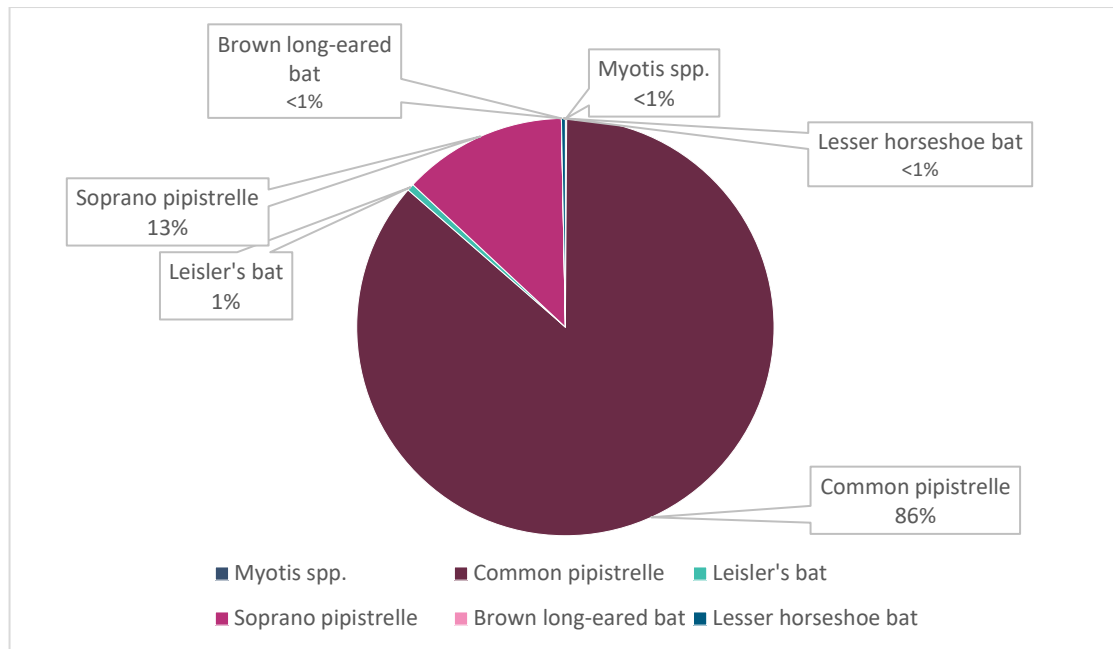


Plate 3-5 Bat Species Composition.

Plate 3-6 shows total bat passes per detector. Activity was compared between days where both detectors were active (8 nights). Detector D01 was located in the centre of the site, east of the existing reservoir, near the reservoir arches. Detector D02 was located south of the reservoir, near Building 1. Both areas presented vegetation and suitable foraging habitats for bats. Activity was high at both locations, with a higher number of passes recorded at D02 for all species. While activity at both detectors was high, it was noted during the dusk and dawn surveys that a small number of bats were feeding continuously around the reservoir. The high activity could be attributed to the same bats flying back and forth for extended periods and may not be representative of high numbers of bats utilising the site.

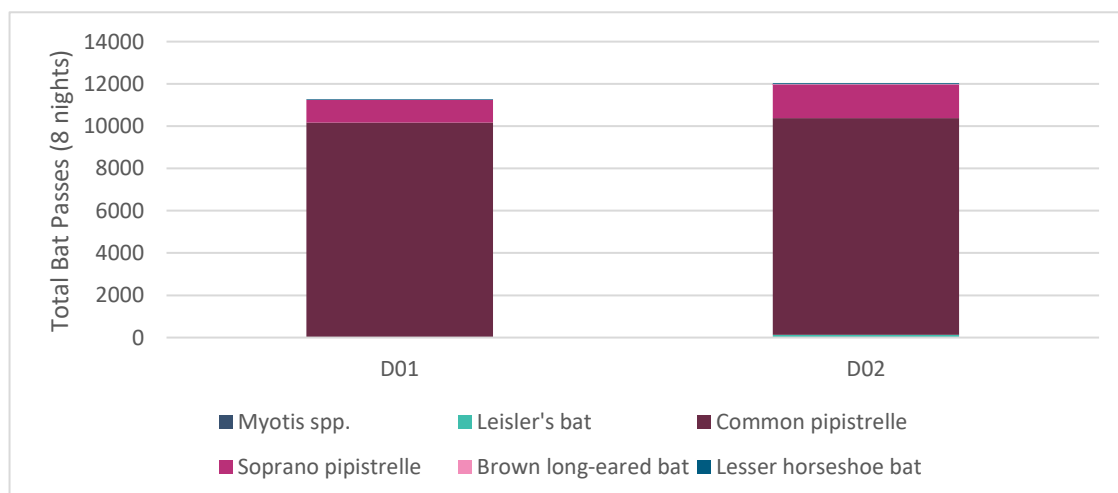


Plate 3-6 Total bat passes per detector across 8 nights.

Analysis of the detector recordings also highlighted the total bat passes per night. Species composition per night is shown in Plate 3-6. Activity was uniform throughout the deployment. Activity was lower after night 8 as one detector (D01) was full and no longer recording additional data. Both detectors were full by night 11 (17/07/22). Common pipistrelle and soprano pipistrelle bats were most commonly recorded during the survey periods. These species are common and widespread across Ireland.

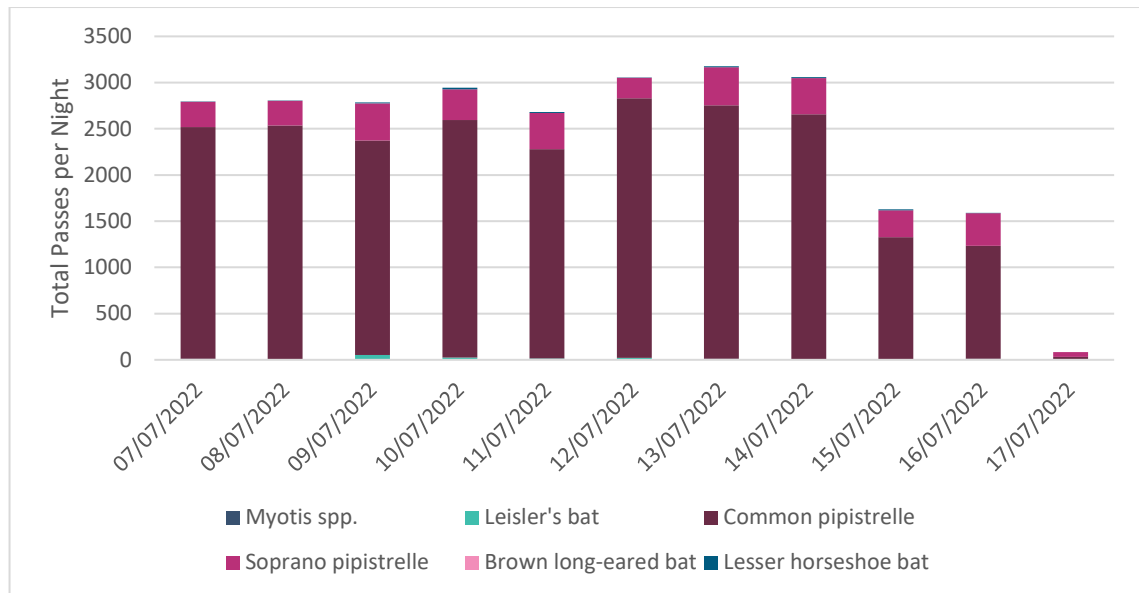


Plate 3-7 Total Bat Passes per Night

3.6

Summary of Summer 2022 Surveys Results

All buildings surveyed within the proposed development site are accessible to bats due to their state of disrepair. The majority provide suitable habitat for roosts, as outlined in Table 3-3 above.

No roosting bats were identified during the daytime inspection of the structures within the site; however, small accumulations of fresh droppings or feeding remains were noted in Buildings 3, 8, 9, 10, 12 and 14.

No bats were observed emerging or re-entering any of the structures during the dusk and dawn emergence and re-entry surveys. However, the potential of a small common pipistrelle roost located under the reservoir arches was reported during the dawn re-entrance survey. Bats were observed commuting and foraging throughout the site, with some commuting through the structures, feeding for a short time and emerging again.

Commuting and foraging activity was concentrated around the reservoir where artificial light levels were at a minimum. It was noted that activity was significantly lower in areas where street and security lights were illuminating the site i.e. the southern section of the site had higher levels of artificial lighting than the northern section of the site and thus fewer bats were recorded.

The static detectors recorded high levels of bat activity near the reservoir. However, it was noted during the dusk/dawn surveys that a small number of bats were observed feeding for extended periods in the same locations around the reservoir.

Emergence times recorded by static detectors (Section 3.5.1) suggest that there could be roosts present within or in proximity to the proposed development site.

3.6.1

Importance of Bat Population Recorded at the Site

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

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

Bats as an Ecological Receptor have been assigned ***Local Importance (Higher value)*** on the basis that the habitats within the study area are utilized by a regularly occurring bat population of Local Importance. The population of lesser horseshoe bat recorded during the surveys was assigned ***National Importance*** due to the need to maintain a viable corridor between populations present in the counties surrounding Limerick.

No hibernacula or maternity roosts were identified within the site during the surveys undertaken in winter and summer 2022. However, it is likely that the site is used opportunistically by individual bats with possible day/night/feeding/satellite roosts present.

4.

CONCLUSION & RECOMMENDATIONS

The following points set out the main conclusions following the completion of the surveys described above:

- Six bat species were recorded commuting and foraging across the proposed development site during the bat surveys carried out in July 2022, including Common pipistrelle, Soprano pipistrelle, Leisler's bat, Lesser horseshoe bat, *Myotis spp.* and Brown long-eared bat.
- Most of the buildings surveyed have the potential to support bat roosts. No dropping accumulations indicative of large regular roosts were found. The small accumulations of bat droppings and feeding remains recorded suggest that the structures on site support opportunistic use by bats. Droppings were found in five buildings within the proposed development site.
- No large permanent or maternity roosts were recorded during the 2022 summer surveys.
- More information is needed to ensure the proposed works will not have significant effects on the local bat populations.
- A derogation licence from the NPWS will be required in order to restore/demolish buildings where evidence of bats was identified, as well as to block any potential access points to these buildings.

The following recommendations relate to the preparation of the licence application:

- It is likely that the licence would require that any loss of roosting habitat would be compensated for with the provision of alternative roosting locations. This could be achieved by creating bespoke roosting habitat within the roof spaces of the buildings to be retained, the main factory building (B9) and the southern storage unit building (B14) in particular. Purpose-built access points within these roof spaces may also be required.
- Purpose-built access points within these roof spaces may also be required.
- The proposed development has the potential to be beneficial to bats. If the proposed development site falls into disrepair, its value as a habitat for roosting bats is likely to diminish. The sympathetic and well-designed renovation of the factory roof, as well as any other building to be retained, has the potential to enhance its value for bats and to prevent their likely decline. Landscaping proposed in open habitats can also encourage bat activity, by creating tall linear features such as treelines and hedgerows for connectivity across the site and with the surrounding habitats; by planting native, diverse vegetation to attract insect preys; and by providing dark, secure areas for foraging, as well as diverse habitats to suit different bat species.
- Further surveys will be required in advance of specific development proposals to determine the likely effects on bats resulting from any such works and to enable the design and implementation of specific and effective mitigation. Interior inspections of buildings not accessed in 2022 will be carried out in 2023.

Summary of proposed additional surveys:

- Winter hibernacula survey
- Spring dusk & dawn & statics
- Summer dusk & dawn & statics
- Autumn dusk & dawn & statics

5.

BIBLIOGRAPHY

- Andrews, H. (2018) *Bat Roosts in Trees*. AEcol, Bridgewater.
- Aughney, T., Kelleher, C. & Mullen, D. (2008) *Bat Survey Guidelines: Traditional Farm Buildings Scheme*. The Heritage Council, Áras na hOidhreachta, Church Lane, Kilkenny.
- Aughney, T., Langton, S. & Roche, N. (2011) *Brown long-eared bat roost monitoring scheme for the Republic of Ireland: synthesis report 2007 - 2010. Irish Wildlife Manual s, No. 56*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Bontadina, F., Schofield, H. and Naef-Daenzer, B. (2002) *Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland*. Journal of Zoology 258: 281–290.
- ILP (2018) Guidance Note 08/18: Bats and Artificial Lighting in the UK. *Bats and the Built Environment Series*. Institute of Lighting Professionals, Warwickshire, UK.
- Boye, P., & Dietz, M. (2005). *Development of good practice guidelines for woodland management for bats*. English Nature.
- CIEEM (2013) *Competencies for Species Surveys: Bats*. Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM (2021) *Good Practice Guidance for Habitats and Species (Version 3)*. Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins, J. (ed) (2016) *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, England.
- Fossitt, J. A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council Dublin Ireland.
- Kelleher, C. & Marnell, F. (2006) *Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25*. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Limerick CoCo, (2022) Limerick Development Plan 2022-2028, available online at <https://www.limerick.ie/>.
- Mitchell-Jones, A.J. & McLeish, A.P. (eds) (2004) *'Bat Workers' Manual' (3rd edn)*. JNCC, Peterborough.
- Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.
- National Roads Authority (2006) *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes*. National Roads Authority, Dublin Ireland.
- National Roads Authority (2006b) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes*. National Roads Authority, Dublin, Ireland.
- Russ, J.M. (2012) *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, Exeter.
- Stone, E. L., Jones, G., & Harris, S. (2009). *Street lighting disturbs commuting bats*. Current biology, 19(13), 1123-1127.

Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*. The Bat Conservation Trust, England.

Schofield, H.W. (2008) *The lesser horseshoe bat: conservation handbook*. Vincent Wildlife Trust.

Wildlife Act 1976 and Wildlife (Amendment) Act 2000.



APPENDIX 1

WINTER BAT REPORT

Bat Report

Cleeves Riverside Quarter,
Co. Limerick.





DOCUMENT DETAILS

Client: **Limerick Twenty Thirty (LTT)**

Project Title: **Cleeves Riverside Quarter, Co. Limerick.**

Project Number: **211052**

Document Title: **Bat Report**

Document File Name: **BR F – 211052 - 2022.04.12**

Prepared By: **MKO
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Rev	Status	Date	Author(s)	Approved By
01	Draft	28/02/2022	TM	AJ
02	Final	12/04/2022	TM	AJ

Table of Contents

1.	INTRODUCTION.....	3
1.1	Policy and Legislation.....	3
1.2	Bat Roosting Behaviour	5
1.3	Statement of Authority	6
2.	METHODS.....	7
2.1	Desktop Study	7
2.1.1	National Bat Database of Ireland	7
2.1.2	Designated Sites.....	7
2.1.3	Habitat and Landscape	7
2.2	Ecological Appraisal (Bats)	7
2.3	Winter Roost Assessment.....	8
2.4	Survey Limitations	8
3.	RESULTS.....	9
3.1	Desktop Study	9
3.1.1	National Biodiversity Data Centre.....	9
3.1.2	Designated Sites.....	9
3.1.3	Habitat and Landscape	9
3.2	Bat Habitat Appraisal.....	9
3.3	Winter Roost Assessment.....	14
4.	OVERALL FINDINGS	18
6.	CONCLUSION	19
7.	BIBLIOGRAPHY	20

TABLE OF TABLES

<i>Table 1-1 Bat Roost Types and Definitions.....</i>	5
<i>Table 1-2 Level of Importance of Various Building Roosts.....</i>	5
<i>Table 3-1 NBDC Bat Records.....</i>	9
<i>Table 3-2 – Roost Inspection Results</i>	16

TABLE OF PLATES

<i>Plate 3-1 Southern Elevation of the Cleeves Factory within the site to the left of the image and Building B8 to the right of the image. Temporary HSE prefab units in the foreground of the image.</i>	10
<i>Plate 3-2 – Office buildings and storage units, B3 & B4, in the foreground & the rowing club building in the background– facing southeast.....</i>	11
<i>Plate 3-3 – Workshop, office and storage unit buildings, B13 & B14, to the left of the image and the reservoir to the right of the image– facing west.....</i>	11
<i>Plate 3-4 – Electrical station/Storage Unit, B10, in the foreground & offices and workshop buildings, B15 & B13, in the background– facing southwest.....</i>	11
<i>Plate 3-5 – Storage Unit, B11 to the left of the image– southern elevation.....</i>	11
<i>Plate 3-6 – Southern elevation of Unoccupied and Occupied Dwelling, B1 – left of the image.....</i>	12
<i>Plate 3-7 – Southern & eastern elevation of Unoccupied Dwelling, B1.....</i>	12

<i>Plate 3-8 – Scrub WS1 to the west of the site & Office and cold store building, B14, to the right of the image, western elevation of workshop building, B13, in the background & a portion of the reservoir to the left of the image.</i>	<i>12</i>
<i>Plate 3-9 – Northern elevation of the Arch tunnel within the site</i>	<i>12</i>
<i>Plate 3-10 Overall Map Layout with buildings numbered.....</i>	<i>13</i>
<i>Plate 3-11 Interior inspection – Sample feeding remains (Building B9 & B3, respectively).....</i>	<i>14</i>
<i>Plate 3-12 Interior inspection – Sample roosting sites (Building B9 First Floor & B9 Ground Floor, respectively)....</i>	<i>15</i>

TABLE OF FIGURES

<i>Figure 1-1 Site Location</i>	<i>4</i>
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1. INTRODUCTION

MKO was commissioned to undertake a winter bat survey at Cleeves Riverside Quarter, Co. Limerick. (Grid Ref: R 57051 57119) (Figure 1-1). The project will include the redevelopment and revitalisation of the Cleeves site as a public realm accommodating a mix of uses including proposed residential and office spaces, educational and tourist facilities.

MKO undertook a winter bat survey in February 2022 (Collins, 2016), within the site of the proposed development works. The main objective of the survey was to gather information on roosting bats and inspect the structures for hibernacula. The bat surveys were designed to establish the nature, scale and locations of potential bat activity in the building on site. The bat surveys were designed to establish the nature, scale and locations of potential bat activity in each of the buildings on site and involved an extensive interior and exterior inspection of the buildings. For the purposes of this report the buildings have been divided into blocks and are numbered 1-16 (Plate 3-10). Lesser horseshoe bat will be referred as LHB throughout the report.

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)).*
- *'Bat Workers' Manual' (3rd edn). JNCC, Peterborough (Mitchell-Jones, A.J. & McLeish, A.P. (eds) 2004).*
- *The Lesser Horseshoe Bat Conservation Handbook, Vincent Wildlife Trust (Schofield, HW., 2008).*
- *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn.) (Collins, 2016)*
- *Bat Roosts in Trees (Andrews, 2018)*
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a)*
- *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. Irish Wildlife Manuals, No. 25. (Kelleher & Marnell, 2006)*
- *Guidance Note 08/18: Bats and Artificial Lighting in the UK (ILP, 2018)*

1.1 Policy and Legislation

All Irish bats are protected under European legislation, namely the Habitats Directive (92/43/EEC). All Irish species are listed under Annex IV of the Directive, requiring strict protection for individuals, their breeding sites and resting places. The Lesser horseshoe bat (*Rhinolophus hipposideros*) is further listed under Annex II of the Directive, requiring the designation of conservation areas for the species. Under this Directive, Ireland is obliged to maintain the favourable conservation status of Annex-listed species. This Directive has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011.

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



Map Legend

 Site Boundary



Drawing Title

Site Location

Project Title

Cleeves Riverside Quarter, Limerick

Drawn By

TM

Checked By

AJ

Project No.

211052

Drawing No.

Fig 2.1

Scale

1:40000

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1.2

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 1-1 provides a summary of different types of bat roosts.

Table 1-1 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.

There are currently no clear guidelines to determine the significance of a bat roost. All the largest roosts of 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).

Table 1-2 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).

Table 1-2 Level of Importance of Various Building 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
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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.

1.3

Statement of Authority

The winter bat survey was undertaken by MKO ecologists Aoife Joyce (BSc., MSc.), Tim Murphy (BSc.) and Kevin McElduff (BSc.). MKO ecologists are professionally trained in bat survey techniques and are experts in undertaking surveys to this level.

This report was prepared by Tim Murphy and was reviewed by Aoife Joyce and John Hynes. Tim has over one years' experience in ecological assessments and has completed CIEEM courses in Bat Impacts and Mitigation. Aoife has over three years' experience in ecological assessments and has completed CIEEM and BCI courses in Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training and Kaleidoscope Pro Analysis. John Hynes (BSc., MSc., MCIEEM) who has over 9 years' experience in ecological assessment.

2.

METHODS

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.

2.1.1

National Bat Database of Ireland

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

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

2.1.2

Designated Sites

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 4.1.2 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. The potential for effects on these designated sites is fully considered.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered.

2.1.3

Habitat and Landscape

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.

2.2

Ecological Appraisal (Bats)

A walkover survey of the Study Area was carried out during daylight hours on the 15th December 2021 and 22nd February 2022. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High*, *Moderate*, *Low* and *Negligible*.

2.3

Winter Roost Assessment

A search for roosts was undertaken within the boundary of the proposed development by two licenced ecologists. The aim was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

This was undertaken by inspecting the structures on site to look for and identify hibernating bats or any evidence of bat occupation (i.e. droppings, urine stains or dead specimens) (Collins, 2016). Roost disturbance license conditions for wintering bats were adhered to in order to reduce the potential disturbance, on hibernating bats, caused by surveyors on site.

A walkover was carried out during daylight hours on the 15th December 2021 and 22nd February 2022 and all accessible buildings were inspected. A systematic search of all accessible interiors, including all attic spaces, was undertaken, checking all cracks, crevices and voids for hibernating bats using binoculars, torches and endoscopes. The exterior of the building was inspected first from ground level and included all accessible windowsills, walls, eaves, roof ridge and roof slates.

Trees within the site were visually assessed from ground level, for natural features of high value to roosting bats including knot holes, trunk hollows, splits/cracks in branches and areas of flaking bark and also for signs indicating possible bat use including droppings, staining and scratching of bark and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

2.4

Survey Limitations

Survey design and effort was created in accordance with the most current best practice guidelines for surveying bats (Collins, 2016). February is within the optimal survey period for winter bat surveys, (Collins, 2016). In addition, there were no limitations associated with weather conditions. While access to a small number of interior areas was restricted due to structural integrity and health and safety an assessment was carried out. Overall, there were no limitations in the scope, scale or context of the assessment.

3. RESULTS

3.1 Desktop Study

3.1.1 National Biodiversity Data Centre

A review of the National Bat Database of Ireland on the 1st March 2022 yielded results of bats within a 10km radius of the proposed development. The search yielded 3 bat species within 10km. Table 3-1 lists the bat species recorded within the hectad which pertains to the current Study Area (R55).

Table 3-1 NBDC Bat Records

Hectad	Species	Date	Database	Status
R55	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)	27/01/2015	National Lesser Horseshoe Bat Database	Annex II & IV
R55	Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	16/06/2014	National Bat Database of Ireland	Annex IV
R55	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	16/06/2014	National Bat Database of Ireland	Annex IV

3.1.2 Designated Sites

Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs) and the site is situated within the current known range of this species.

A search of all Designated Sites within a 15km radius of the site found two sites designated for the conservation of bats; Ratty River Cave SAC (14.4km) and Danes Hole, Poulnalecka SAC (14.7km). The Lesser horseshoe bat roosts for which the SACs have been designated, are significantly outside the core foraging range (2.5km) of Lesser Horseshoe bat (NPWS, 2013). There is therefore no potential for significant effect on the Lesser horseshoe bat population for which the SACs have been designated.

3.1.3 Habitat and Landscape

A review of OSI maps and aerial photography revealed the site is well connected to the wider landscape through a series of treelines, hedgerows and woodlands. The is surrounded by agricultural fields and residential housing. In addition, The Shannon Estuary is located approx. 50 m to the South East.

3.2 Bat Habitat Appraisal

A walkover survey, assessing bat habitat suitability, was conducted on the 15th December 2021 and 22nd February 2022.

The survey area is dominated by **Buildings and Artificial Surfaces (BL3)** with small areas of **Dry meadows and grassy verges (GS2)**, **Spoil and bare ground (ED2)** and **scrub (WS1)** occurring throughout. A small strip of stony riverbank with marsh vegetation (**GMI**) occurs along the banks of the Shannon along with an artificial pond (**FL8**) located in the middle of the site complex.

The majority of habitat within the site was classified as **Buildings and Artificial Surfaces (BL3)** (Plate 3-1 and 3-2). The buildings and hardstand, predominantly used as car parking, are located throughout the site. Small patches of dry grassland (**GS2**) occur within the survey area, where areas of shallow soil occur. The grassland areas are often found in mosaic with scrub (**WS1**), and it appears that most areas

of grassland are being slowly colonized by scrub. Along the stony shore of the River Shannon marsh vegetation (**GMI**) is developed. This lies to the southeast of the site. The reservoir (**FL8**) located centrally within the site boundary is bordered by the **GS2** and **BL3** habitats.

With regard to foraging and commuting bats, areas of Buildings and Artificial Surfaces **BL3** and dry grassland **GS2** considered *Low* suitability, i.e. habitats that could be used by small numbers of commuting bats (Collins, 2016). Scrub (**WS1**) and Marsh (**GMI**) habitats provide connectivity to the surrounding landscape. As such, they were assessed as having *Moderate* suitability i.e. Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens (Collins, 2016).

The Cleeves factory (Grid Ref; R 57063 57143) (Plate 3-1) was assessed as having *High* roosting potential i.e. A structure with one or more potential roost sites that are obviously suitable for use by larger 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 (Collins, 2016).

The associated warehouses, offices, workshops, dairy factory, cold store buildings and school buildings (Plate 3-10 & Plate 3-2 – 3-7) around the site were assessed as having *Low to Moderate* roosting potential i.e. A structure with one or more potential roost sites that could be used by a bats due to their size, shelter, protection, conditions and surrounding habitat but are unlikely to support a roost of high conservation status (Collins, 2016).

The reservoir (Plate 3-8 & Plate 3-9) and associated arched tunnels assessed as having *Low* roosting potential due to there being no visible gaps in the store work i.e. A structure with one or more potential roost sites that could be used by an individual optimistically. However, these potential roosts do not provide enough size, shelter, protection, conditions and surrounding habitat to be used on a regular basis by a large number of bats. (Collins, 2016).

The mosaic of grassland and scrub within the site were assessed as having *Negligible* roosting potential for bats due to the lack of potential roost features.



Plate 3-1 Southern Elevation of the Cleeves Factory within the site to the left of the image and Building B8 to the right of the image. Temporary HSE prefab units in the foreground of the image.



Plate 3-2 – Office buildings and storage units, B3 & B4, in the foreground & the rowing club building in the background– facing southeast



Plate 3-3 – Workshop, office and storage unit buildings, B13 & B14, to the left of the image and the reservoir to the right of the image– facing west



Plate 3-4 – Electrical station/ Storage Unit, B10, in the foreground & offices and workshop buildings, B15 & B13, in the background– facing southwest



Plate 3-5 – Storage Unit, B11 to the left of the image– southern elevation



Plate 3-6 – Southern elevation of Unoccupied and Occupied Dwelling, B1 – left of the image



Plate 3-7 – Southern & eastern elevation of Unoccupied Dwelling, B1



Plate 3-8 – Scrub WS1 to the west of the site & Office and cold store building, B14, to the right of the image, western elevation of workshop building, B13, in the background & a portion of the reservoir to the left of the image.



Plate 3-9 – Northern elevation of the Arch tunnel within the site



B1	Occupied & Unoccupied Dwelling
B2	Garage/ Storage Unit
B3	Office space & Storage unit
B4	Offices
B5	Storage Unit
B6	Cold Store
B7	Cold Store
B8	Dairy Factory
B9	Cleeves Factory
B10	Electrical station/ Storage Unit
B11	Storage Unit
B12	Storage Unit
B13	Workshop
B14	Storage Unit & Offices
B15	Offices
B16	School Buildings

Plate 3-10 Overall Map Layout with buildings numbered

3.3 Winter Roost Assessment

This section describes the findings of the internal, external and roost surveys conducted at Cleeves Riverside Quarter in 2022. Following the presentation of these results, a summary of the findings of all the surveys as they apply to each building is provided in Section 4 below.

Exterior Inspection

The exteriors of the existing buildings within the site, numbered in Plate 3-10, were inspected from ground level to search for signs of bat activity, including potential access points to the building such as broken windows or cracks in the walls and roofs, and potential roosting locations.

All buildings surveyed within the site contained some potential roost features, including gaps in roof slates, fascias, soffits, flashing and gaps in the stone walls. No evidence of bat use was identified during the exterior inspection of the structures. However, recent rain conditions may have removed any external evidence of bat use. Buildings B1, B3, B4, B8, B9, B10 and B11 contained multiple potential access points and all other buildings contain at least one access point.

Interior Inspection

Interior access was gained to all buildings within the site, with the exception of St. Michaels rowing club, the school buildings and two derelict buildings to the north of the site. In addition, access to the upper floors of office building, B15, (Plate 3-10) were restricted due to the structural integrity of the building.

Buildings where interior access could not be gained were subject to an exterior inspection, as outlined above. A total of fifteen buildings were inspected internally for evidence of roosting bats (Plate 3-11 – 3-12). This number is excluding St. Michaels Rowing Club, the school buildings and the outbuildings, to the north of the site. This is due to restricted due to the structural integrity of the building. There were signs of bat activity, i.e. droppings and feeding remains, observed in a number of buildings and is described in Table 3-2 below. No hibernacula or observations of bats were found during the interior inspection.

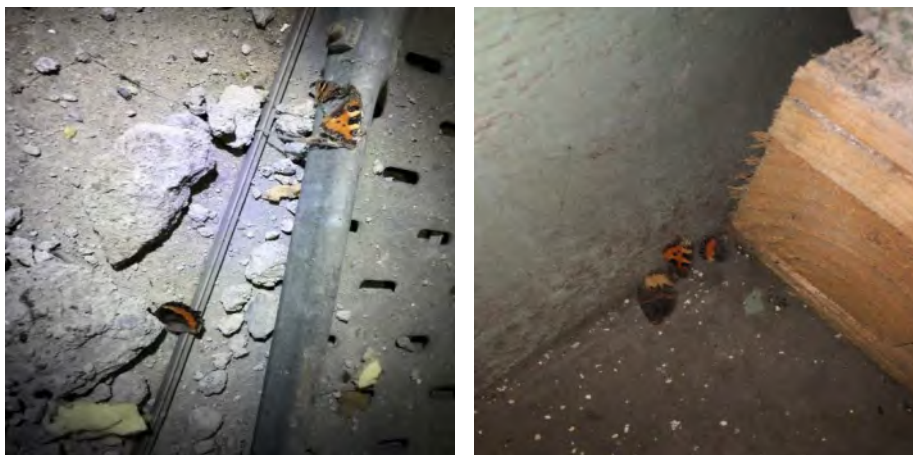


Plate 3-11 Interior inspection – Sample feeding remains (Building B9 & B3, respectively)



Plate 3-12 Interior inspection – Sample roosting sites (Building B9 First Floor & B9 Ground Floor, respectively)

Table 3-2 – Roost Inspection Results

Buildings	Description of the Findings Within the Site	Evidence of bats and Potential entry/exit locations	Overall Potential Roosting Suitability
Interior Inspection Survey			
B1 – Occupied & Unoccupied Dwelling	- Some cracks under the windowsill on the northern elevation with multiple access points through broken windows. - Rotting timber fascia. - Ivy cover on the northern and eastern elevations.	No evidence of bat use	Moderate
B2 – Garage/Storage unit	- Galvanised roof and brick walls. - Some cracks under the led flashing on the roof. - Regularly used and bright during the day.	No evidence of bat use	Low
B3 – Offices/Storage Unit	- Tar flat roof and brick walls approximately 70 metres long. - Exposed timber roof beams. - Cavity wall created on the southern elevation between the old stone wall and an installed inner Fiberglass Reinforced Panels (FRP) wall. - Light penetration throughout.	Feeding remains found in the western section of the building at two separate locations.	Moderate
B4 – Offices	- Attic space with exposed timber roof beams and felt underlining. - Multiple access points through gaps in the windows and doors. - Slates missing on the northern and southern facing sides to the roof. - Lead flashing with gaps present around the chimney. - Large roof overhang with an exposed soffit on the eastern elevation. - Light penetration throughout.	No evidence of bat use	Moderate
B5 – Storage unit	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Exposed metal beams hanging from the roof. - Dark areas to the building throughout.	No evidence of bat use	Low
B6 – Cold Store	- Fiberglass Reinforced Panels (FRP) on the floor and ceiling in the eastern section. - Exposed stone walls to the west and exposed timber roof beams with a galvanised roof. - Dark during the daytime with multiple gaps in the stone walls. - Gaps lead all the way through to the outside.	No evidence of bat use	Low
B7 – Cold Store	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling.	No evidence of bat use	Low

	Light penetration throughout.		
B8 – Dairy Factory	- Light penetration throughout. - Roof tiles missing and broken in places revealing the exposed timber roof beams above. - Concrete walls.	Feeding remains found	Low
B9 – Cleeves Factory	- Four-storey building with attic space. - Multiple access points. - Stone wall building with slate roof. - Dark areas to the building throughout. - Collapsed ceiling tiles and exposed timber roof beams.	- Ground floor: Droppings found in 4 locations - First floor: Droppings found in 1 location. - Second floor: Feeding remains found in 2 locations. - Third floor: Droppings found in 1 location.	High
B10 – Electrical station/ Storage Unit	- Concrete walled building with galvanised roof. - Large access points on the east and west elevation. - Light penetration throughout. - Some gaps in the walls.	- Feeding remains found - Droppings found	Moderate
B11 – Storage Unit	- Bright during the daytime and exposed due to the partial roof. - Inner rooms present within the building are dark and sheltered. - Access points in the windows and door.	- Droppings found in an inner room - Feeding remains found	Moderate
B12 – Storage Unit	- No roof on the southern half of the building – exposed. - Some small gaps in the stonework in the southern section - Northern section has an intact roof. - Northern section is dark	Feeding remains found in the northern section	Low
B13 – Workshop	- Large storage area. - Multiple access points. - Western section is dark and the eastern section is bright during daytime.	Feeding remains found	Low
B14 – Storage unit/ Offices	- Large storage room. - Fiberglass Reinforced Panels (FRP) on the floor and ceiling. - Dark during the daytime.	No evidence of bat use	Low
B15 – Offices	- Two-story building with concrete walls and a tile roof. - Light penetration throughout. - Top floor inaccessible due to questionable structural integrity	No evidence of bat use	Low
B16 – School Buildings	- Two-story building with concrete walls and a tile roof. - Light penetration throughout. - In regular use	No evidence of bat use	Low

4.

OVERALL FINDINGS

The following points set out the main conclusions following the completion of the winter survey described above:

Each of the buildings surveyed has the potential to support one or more roosts of a variety of bat species. Evidence of bats were identified in 7 buildings. Although no large accumulations of droppings or evidence of bat use was identified, it is likely that small numbers of bats are regularly utilising the buildings since their abandonment.

In addition to direct loss of roosts, lighting and noise disturbance should be considered in the design of any development. There are additional surveys agreed to take place during the bat activity season (April-October), in advance of any proposed development works, to determine the current status of the roosts and the likely effects on bats resulting from any proposed works. Surveys are proposed for the summer period to gather information on potential maternity roosts within the buildings. Additional surveys, in combination with the winter bat survey results, will allow for the design and implementation of site specific and effective mitigation.

Successfully providing replacement roosts for LHB populations presents a significant challenge. As such, it is common practice for post construction monitoring to be required by NPWS on granting of a derogation licence. This will likely involve additional surveys, on completion of any development, to determine the effectiveness of any prescribed mitigation measures and to ensure bats are still utilising the area.

6.

CONCLUSION

All buildings within the site contained some potential roost features including gaps in roof slates, fascias, soffits, flashing and gaps in the stone walls. No evidence of bat use was identified during the exterior inspection of each of the structures. However, buildings B1, B3, B4, B8, B9, B10 and B11 contained multiple potential roosting features to the exterior and all other buildings contained at least one access point.

During the interior inspection of all the buildings, buildings B3, B8, B9, B10, B11, B12 and B13 all contained signs of bat use, i.e. feeding remains and droppings. These PRF's within the buildings mentioned above were considered suitable for transitional, day, night or satellite roosts. No hibernacula were identified with the site boundary.

This report, along with the additional surveys agreed to take place during the bat activity season (April-October), will be used to determine the current status of the roosts and the likely effects on bats resulting from any proposed works. A combination of the results gathered will provide a full and comprehensive assessment of the potential for impact on bat populations within the site boundary. The surveys and assessment provided in this report are in accordance with the relevant industry guidance.

7.

BIBLIOGRAPHY

- Andrews, H. (2018) *Bat Roosts in Trees*. AEcol, Bridgewater.
- Aughney, T., Kelleher, C. & Mullen, D. (2008) *Bat Survey Guidelines: Traditional Farm Buildings Scheme*. The Heritage Council, Áras na hOidhreachta, Church Lane, Kilkenny.
- Aughney, T., Langton, S. & Roche, N. (2011) *Brown long-eared bat roost monitoring scheme for the Republic of Ireland: synthesis report 2007 - 2010*. *Irish Wildlife Manual s, No. 56*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Bontadina, F., Schofield, H. and Naef-Daenzer, B. (2002) *Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland*. *Journal of Zoology* 258: 281–290.
- ILP (2018) Guidance Note 08/18: Bats and Artificial Lighting in the UK. *Bats and the Built Environment Series*. Institute of Lighting Professionals, Warwickshire, UK.
- Boye, P., & Dietz, M. (2005). *Development of good practice guidelines for woodland management for bats*. English Nature.
- CIEEM (2013) *Competencies for Species Surveys: Bats*. Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM (2021) *Good Practice Guidance for Habitats and Species (Version 3)*. Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins, J. (ed) (2016) *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, England.
- Fossitt, J. A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council Dublin Ireland.
- Kelleher, C. & Marnell, F. (2006) *Bat Mitigation Guidelines for Ireland*. *Irish Wildlife Manuals, No. 25*. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Mitchell-Jones, A.J. & McLeish, A.P. (eds) (2004) *'Bat Workers' Manual' (3rd edn)*. JNCC, Peterborough.
- Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.
- National Roads Authority (2006) *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes*. National Roads Authority, Dublin Ireland.
- National Roads Authority (2006b) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes*. National Roads Authority, Dublin, Ireland.
- Russ, J.M. (2012) *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, Exeter.
- Stone, E. L., Jones, G., & Harris, S. (2009). *Street lighting disturbs commuting bats*. *Current biology*, 19(13), 1123-1127.
- Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*. The Bat Conservation Trust, England.
- Schofield, H.W. (2008) *The lesser horseshoe bat: conservation handbook*. Vincent Wildlife Trust.



APPENDIX 2

2023 WINTER REPORT

Briefing Note

Cleeves Riverside Quarters
– 2023 Winter Survey





DOCUMENT DETAILS

Client: **Limerick Twenty Thirty**

Project Title: **Cleeves Riverside Quarters – 2023 Winter Survey**

Project Number: **211052**

Document Title: **Briefing Note**

Document File Name: **BN F – 211052 – 2023.03.28**

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			<i>Kate Greaney</i>		

Background

MKO was commissioned to undertake additional winter bat surveys at Cleeves Riverside Quarter, Co. Limerick (Grid Ref: R 57051 57119) In February 2023. The project will include the redevelopment and revitalisation of the Cleeves site as a public realm accommodating a mix of uses including proposed residential and office spaces, educational and tourist facilities. The main objective of the surveys was to gather additional information on roosting bats, inspect the structures for winter roosts and to access four additional buildings which were previously not accessed.

For the purposes of the surveys the buildings have been divided into blocks, and sub-blocks and are numbered 1-17. They are presented in Figure 1.

Methods

The site visit undertaken for this assessment was carried out on 9th February 2022 by ecologists Pat Roberts, Sara Fissolo, Colin Murphy and Kate Greaney. February is within the optimal survey period for hibernacula surveys (Collins, 2016).

The site had previously been visited in December 2021, February 2022 and July 2022 where all accessible buildings were subject to an internal and external inspection to search for the presence of roosting bats. All buildings were revisited in February 2023, in particular areas where small dropping accumulations were previously identified.

Droppings were collected at two locations within the Cleeves main building (B9) (IG Ref: R 57058 57145) and Electrical Station (B10) (IG Ref: R 57030 57129) and sent for analysis to SureScreen Scientifics in the UK. Two intact droppings were collected at each location, and were stored and labelled in separate lab testing vials, with one acting as reserve for the lab analysis process.

In addition, interior inspections of the Educate Together school buildings (BL16, 16b, 16c, 16d), St. Joseph's Convent (BL16a), St. Micheal's Rowing Club (BL17, 17a, 17b) and a previously occupied semi-detached house (B1b) were inspected for hibernacula and potential signs of other roosting.

Results

No additional signs of bats were found within the buildings previously inspected and the surveys did not identify any evidence of hibernating bats within the proposed development site.

Results from SureScreen Scientifics were received on Monday 6th March. Lesser horseshoe bat (*Rhinolophus hipposideros*) was confirmed using the air vents on the ground floor of the main Cleeves building (B9). The results from the Electrical Station (B10) were inconclusive – indicating potential use by multiple bat species.

The following summarises findings within the newly inspected buildings:

Building	Code	Section	Bat Evidence	Winter Assessment	Other Roosts
St Joseph's Covent	BL16a	Basement – Boiler Room.	One dead bat found in advanced state of decomposition – ID not possible. Likely flew in and could not find way out. Open windows provide access into area, but warm conditions not suitable for hibernation. No other signs of bat use found.	Negligible	Low
		Ground Floor	Scattered droppings in Kitchen area – no access location found but windows potentially left open on occasion. Evidence of two small roosts found in the central courtyard, within rugs wrapped around exposed plumbing – to be revisited in May.	Negligible	Low
		First Floor & Mezzanine	No signs of bats – rooms very bright.	Negligible	Low
		Second Floor	No signs of bats – rooms very bright. Open windows in a bathroom could provide access during activity season.	Negligible	Low
		Roof	Water tank room has access potential but no signs of use. Not suitable hibernacula.	Negligible	Low
Educate Together school	BL16, BL16c, BL16d	Main Building	No evidence of bat use. School in use. Basement section provides access but in use as boiler room. No hibernacula suitability. Potential roosting spaces outdoors under flashing.	Negligible	Low
	BL16b	Outbuildings	Buildings completely open for access via doors and windows. Four hanging spots found with small dropping accumulations	Negligible	Low

			underneath, in cabinets, utility room and bathroom. LHB night roost suspected.		
St. Micheal's Rowing Club	BL17, BL17a	Main building	No evidence of bat use. Mice droppings found. No access to top floor – door was stuck - will revisit in May. Potential roosting spaces outdoors under flashing.	Negligible	Low
	BL17b	Outdoor storage sheds	No evidence of bat use. No access potential and bright during daytime.	Negligible	Negligible
Semi-detached House		Small building on two floors	No evidence of bat use. May site visit will inspect attics.	Negligible	Low

Incidental Findings

No incidental sightings of other protected species occurred during the survey.

Further Surveys

Further surveys are planned for Spring, Summer and Autumn 2023 to assess use of the site by bats, in particular Lesser horseshoe bat. Surveys will include daytime inspections of all buildings, in particular those not previously surveyed in Summer 2022, manual activity surveys carried out at dusk, and static detector surveys.

The 2023 winter roost survey found no hibernacula on site.

No other additional roosting locations were identified in the buildings inspected in 2022. Signs of additional small roosts were identified in St. Joseph's Convent (BL16a) and within the school's outbuildings (BL16b). These will be re-visited during the activity season to classify type of use. The Spring, Summer and Autumn surveys will focus on the identification of commuting routes in and out of the site as well as on the regularity of use of the roosting locations identified.



Map Legend

Building Outline

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Drawing Title

2023 Buildings Numbered

Project Title

Cleeves Riverside Quarter

Drawn By

SF

Project No.

211052

Scale

1:1500

Checked By

CM

Drawing No.

1

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