Bat Report

Limerick 2030 – Flax Mill Factory Building - Stage 1 Repair & Stabilisation Works

DOCUMENT DETAILS

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Rev	Status	Date	Authors	Checked by	Approved By
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MAIN FINDINGS

Background

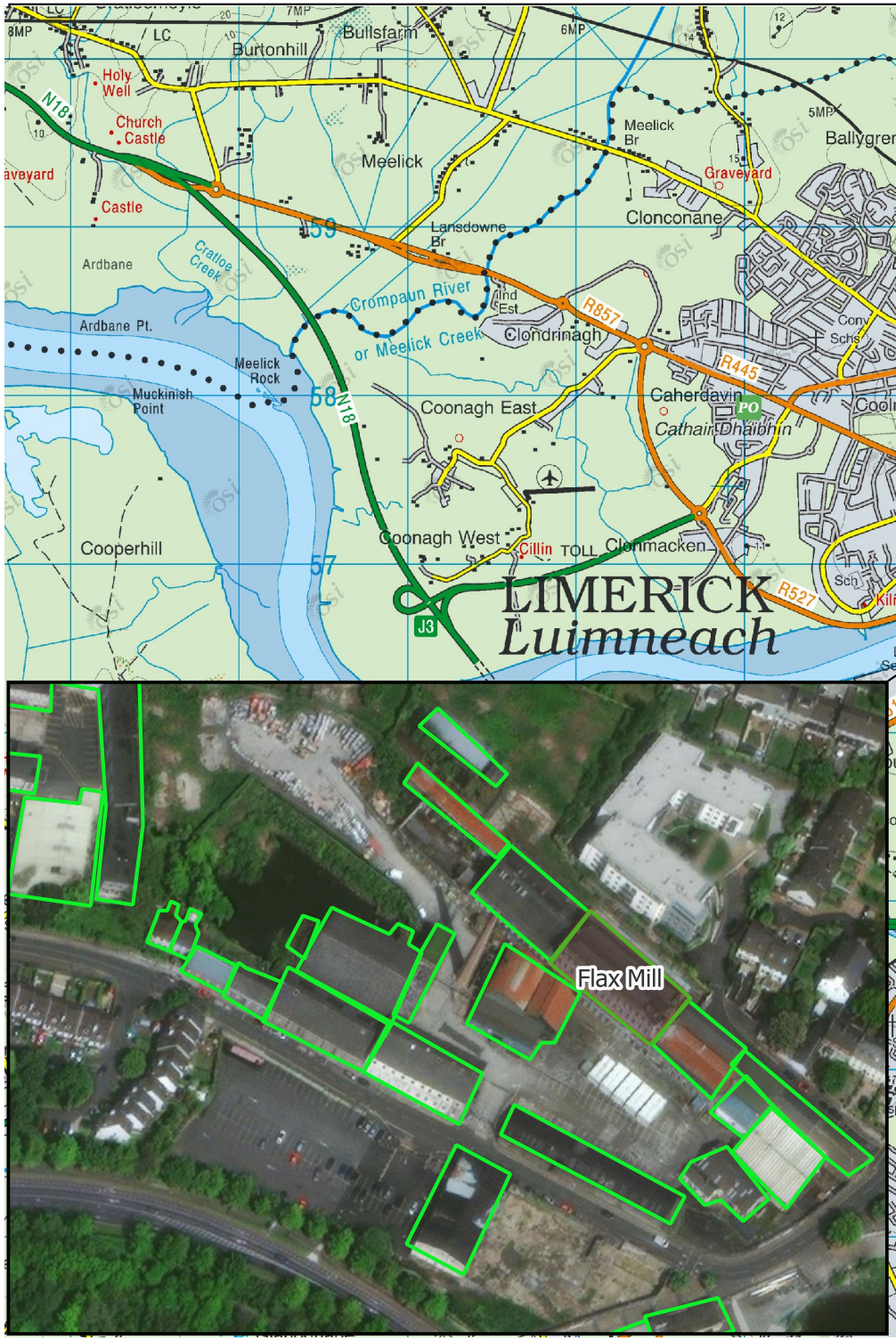
MKO was commissioned by Limerick Twenty Thirty (LTT) to prepare a bat derogation licence for upcoming works on a protected structure at Cleeves Riverside Quarter, Co. Limerick (Grid Ref: R 57051 57119). For reading ease, this section presents all relevant information, with detailed methods and results presented at the bottom of the document. The site location and site plan are presented in Figure 1.

The site comprises a total of 17 buildings however, this report focuses only on the Flax Mill building and former Cleeves Condensed Milk Factory (number 9), situated in the middle of the site, for which urgent repair and stabilisation works are proposed. These works comprise Phase 1 of the proposed renovation of the building, which has fallen into a state of advanced disrepair, and are concerned with the rectification of defects and reinstatement of the building to a shell state.

The report presents all results of the bat surveys related to of the c.1855 former Cleeves Condensed Milk Factory and Flax Mill building, which is listed a protected structure (Protected Structure No. 21512053).

Bat surveys were carried out in winter 2021-22, summer 2022 and winter, spring, summer and autumn 2023, within the site. Another visit was carried out in October 2024 to continue monitoring potential changes in the baseline. The surveys included a roost suitability assessment of buildings and seasonal manual activity surveys and ground-level static detectors surveys. The main objective of the surveys was to gather information on potential roosting bats and observing commuting behaviour into the site, with a particular focus on lesser horseshoe bats (*Rhinolophus hipposideros*).

Recommendations to safeguard bats during the works are also presented. The mitigations have been considered in the context of the wider LTT Cleeves Riverside Quarter development project, which 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.



Map Legend

Site Boundary

N

Drawing Title

Site Location

Project Title	
Flax Mill Stage 1 Works	
Drawn By: SF	Checked By: AJ
Project No.: 211052	Drawing No.: Fig 1
Scale: 1:40,000	Date: 01.12.2022

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Proposed Works

The proposed phase 1 works are specifically concerned with the stabilisation, consolidation, remediation, repair and reinstatement of the upper most storey and roof of the main mill building. More details are presented in the Phase One Repair, Investigations and Trials – Stage One summary report and appendices prepared by Feilden Clegg Bradley Studios (included in application). These are provided as part of the licence application.

1. Address agents of instability
    - High level work - upper storey and parapet masonry stabilisation / remediation of structural movement, failure of coverings, rainwater drainage systems and fabric generally
    - Roof remediation arising from walls moving out and rot from water penetration / possible alteration in roof design and detailing to accommodate outward movement of the upper storey
    - Cornice parapet – determine stability and condition of core fabric / investigate form of construction to inform proposals for consolidation
2. Inherent Defects
    - Address jacking from corroding iron
    - Appraise scope of removal / renewal of embedded ironwork
    - Anticipate rebuilding of large areas of masonry at the northwest and northeast corners
3. Repair and Enhance
    - Iron Gutter – retain iron / overhaul in workshop / develop details to manage thermal movement and improved water management
    - Rainwater Goods – wholly renew and identify required improvements
    - Roof Coverings – complete renewal (Blue Bangor Quarry)
    - Water tank at the head of the south stair – seek to retain in-situ / possible reuse for grey water recycling
4. Alteration
    - Removal of early C20th lift overrun / reinstate roof
    - Removal of ceilings to allow for overall repairs / consider designs that leave the roof space on show i.e. no reinstatement of the lath and plaster ceiling
    - Removal of later partitions to the upper floor
    - Appraise location for new roof level access / consider designs solutions to include for access

Summary of results

Detailed results relating to the surveys undertaken within the Flax Mill are presented in the detailed report below (Page 10). The following points set out the main conclusions following the completion of the surveys carried out on the Flax Mill building:

- The Flax Mill building was assigned *Moderate* suitability for roosting bats. The building presents ample opportunity for access and regular roosting places, however none to support large colonies. No evidence of maternity roosts or hibernating behaviour was observed.
- The Flax Mill building and surrounding Cleeves site are used for public consultations, storage, events (i.e. scare factory), as well as fire brigade and army trainings.
- Evidence found within the building include small accumulation of droppings under likely perches and feeding remains. This is detailed in Table 8. All evidence found within the building points at regular use of the structure by a small number of lesser horseshoe bats. While no evidence of use by other species was found, this cannot be excluded due to the accessibility and complexity of the building.
- At least 7 species of bat were confirmed utilising the wider Cleeves site during static surveys. These included the soprano pipistrelle, common pipistrelle, Leisler's bat, brown long-eared bat, Nathusius' pipistrelle and lesser horseshoe bat. Additionally, passes of the genus *Myotis* sp. were also documented, possibly indicating the presence of *Myotis mystacinus*, *Myotis nattereri* and/or *Myotis daubentonii*.
- Surveys were undertaken throughout the Cleeves site, and a commuting corridor utilized by lesser horseshoe bats was identified traversing the site, connecting at least two known roosting locations (i.e. the Flax Mill and a derelict classroom located to the north of the Educate Together School west of the site). This suggests that the site serves as a vital foraging ground and regular roosting site by a small number of individuals of this species. Figure 3 shows the location of all relevant evidence found.
- No evidence of a commuting route into or out of the site was recorded for lesser horseshoe bat, however it is suspected that the bats may move to more suitable foraging grounds along the Shannon River (i.e. Westfields wetlands) from this location.

Potential Impacts

The potential for the repair and stabilisation works to affect bats, and particularly lesser horseshoe bats (LHB), was identified in the form of the following unmitigated effects:

Effect	Type	Duration	Significance prior to mitigation	Notes
Disturbance	Likely Indirect Effect	Temporary, medium-term	Not Significant	The proposed works will create noise, dust and increased footfall within the building. While already in use on occasion, this will likely increase disturbance on bats using the structure. There are various roosting locations present within the structure and across the wider future development site. The type of LHB roosts identified within the building were not hibernacula or maternity roosts, which are particularly sensitive to disturbance. With these considerations, while an effect on bats is expected as a result of the works, this is not considered to be significant as it does not restrict usage of the site, or affect the conservation status of the species.
Roost Removal	Likely Direct Effect	Temporary, medium-term	Not Significant	The proposed works will see the effective removal and reinstatement of the upper floor, including the walls and roof. The works will be invasive and will likely see a complete disuse of the space for day roosting bats, throughout their duration. One roosting location was found on the third floor, as well as evidence of feeding, potentially by other bat species. These will be rendered unusable for the duration of the works. As above, due to the availability of similar roosting spaces across the wider site, this is not considered significant. No roost was identified using the roof space.
Roost Access Removal	Likely Direct Effect	Temporary, medium-term	Not Significant	Scaffolding will be in place to facilitate the works. Access by lesser horseshoe bats, which require large gaps to fly in into their roosts, was somewhat limited

				in comparison with access for crevice dwelling species. An opening was found to be used on the ground floor, and other large gaps were present in adjacent buildings. In absence of mitigation, the blockage of these access point can impede use of the building, however, as above, this is likely no considered significant as an effect on its own.
Bat Displacement	Likely Direct Effect	Temporary, short term	Not Significant	Due to the proposed works, bats may not use existing roosting locations, however the works are not considered likely to affect foraging and commuting at night.
Bat Harm	Unlikely Direct Effect	Permanent	Significant	The proposed works have the potential to harm roosting bats. Killing bats within the proposed development site is assessed as significant, as the small population recorded is considered of national importance.

Recommended Mitigations

Consideration will be given to the following measures to mitigate for potential impacts during works:

- A bat derogation licence from NPWS will be required to go ahead with the works, in consideration of the potential effects outlined in Table 9. MKO will engage in regular communication with NPWS for the duration of the works.
- A pre-commencement survey is recommended to assess the buildings where roosting was identified prior to any works. The function of this survey will be to assess any changes in baseline environment since the time of last undertaking surveys in 2024, and to prevent direct harm on bats.
- Prior to commencement, a toolbox talk will be carried out by the project ecologist to inform working crews of the potential effects of the works on resident bats, and known roosting locations will be clearly pointed out. Roosting locations will be avoided where possible.
- While it is recommended to avoid works during the bat activity season (April – September), it is understood that this cannot be avoided due to the structural integrity of the building being at risk. The work programme currently is anticipated to commence in Q2 2025 and run for a period of 12 months.
- Based on the work programme, regular site visits will be undertaken by a licenced bat ecologist at different stages of the works to assess progress and use of known roosts by bats, as well as checking access to known locations is maintained. Inspections will make use of scaffolding equipment where possible to expand bat searches to previously unreachable areas.

- Bat access to the first floor will be maintained throughout the works by ensuring access points are kept free from obstruction. The roost locations on the first floor will not be used to store materials and will be kept free from human traffic.
- Interior lighting will be restricted to the areas where works are being undertaken and any exterior lighting will be turned off when not in use.

There are no favourable alternatives from the stabilisation and repair works as they are necessary for the structural soundness of the building. With the above mitigations in place, significant impacts on the local bat populations are not anticipated as a result of the proposed structural works on the Flax Mill building.

These works are the first phase of the larger Limerick Twenty Thirty Cleeves Riverside Quarter development project, which intends to revitalise the Cleeves Factory building and its curtilage, together with adjacent sites, for a mixed-use public realm development. While the residential and public realm project will be subject to an EIA process, including impact assessment reporting on bats, these initial works on the Flax Mill represent a valuable opportunity to consider mitigations and enhancements for bats across the site, with the restoration of the upper floor providing the first opportunity to work towards bespoke roosting and other wildlife-friendly features.

These measures are a work in progress and have to keep into consideration the final use of the site, together with landscape architecture and interim work programme. Limerick Twenty Thirty has engaged with MKO ecologists since early design phases of the wider project to ensure all ecological constraints are considered.

DETAILED REPORT

Statement of Authority

Initial site visits in 2021/2022 were scoped by Pat Roberts and Aoife Joyce, and were led by Aoife Joyce. Further survey effort was scoped by Pat Roberts, Aoife Joyce and Sara Fissolo, who has led the bat survey and reporting effort since 2023, in collaboration with Colin Murphy (B.Sc., M.Sc.), project ecologist for all other ecological surveys.

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

Table 1 MKO's bat specialists involved in the project

Staff	Role	Training
Pat Roberts (B.Sc., MCIEEM)	Principal Ecologist	B.Sc. Environmental Science, National University of Ireland, Galway. 18 years post graduate experience working as a professional ecologist. Over 10 years previous experience working as a nature conservation warden, tree surgeon/surveyor. Bat Detector Workshop (Bat Conservation Ireland). Bats & Arboriculture Training Course, (BCT & Arboricultural Association).
Aoife Joyce (B.Sc., M.Sc.)	Project Director	B.Sc. (Hons) Environmental Science, University of Galway, Ireland. M.Sc. (Hons) Agribioscience, University of Galway, Ireland. Advanced Bat Survey Techniques – Trapping, biometrics, handling (BCI), Bat Impacts and Mitigation (CIEEM), Bat Tree Roost Identification and Endoscope Training (BCI), Bats in Heritage Structures (BCI), Bats and Lighting (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics).
Sara Fissolo (B.Sc.)	Project Ecologist	B.Sc. (Hons) Ecology and Environmental Biology, University College Cork, Ireland. Advanced Bat Survey Techniques (BCI), Bat Impacts and Mitigation (CIEEM), Bats in Heritage Structures (BCI), Bat Care (BCT), Bats and Lighting (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics).
Ryan Connors (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. (Hons) Zoology, University College Galway, Ireland. M.Sc. (Hons) Conservation Behaviour, Atlantic Technological University, Galway, Ireland. Surveying Trees for Bats (BRTS), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Kaleidoscope Pro Analysis (Internal), Winter Tree Identification (Internal), Wintering Bird Surveying (Internal).

Kate Greaney (B.Sc., M.Sc.)	Ecologist	B.Sc. (Hons) Botany and Plant Science National university of Ireland, Galway, M.Sc. (Hons) Climate Change, Agriculture, and Food Security (MScCCAFS) National university of Ireland, Galway, Kaleidoscope Pro Analysis (Wildlife Acoustics). Endoscope Training (Internal), Emergence and Re-Entry Surveys (Internal) Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal)
Nathan Finn (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. (Hons) Science, National University of Ireland, Galway. M.Sc. (Hons) Environmental Science, University College Dublin. Bat Detector and Survey Training (BCI), Kaleidoscope Pro Analysis (Internal), Endoscope Training (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal).
David Culleton (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. Zoology, University College Cork, Ireland. M.Sc. Conservation Behaviour, Atlantic Technological University, Galway, Ireland. Bat Detector and Survey Training (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics), Endoscope Training (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal).
Nora Szijarto (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. Biology, University of Lausanne, Switzerland M.Sc. Behaviour, Evolution and Conservation, University of Lausanne, Switzerland 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	B.Sc. (Hons) Botany and Plant Science, National university of Ireland, Galway Bat Handling Training Course (BCI), Bats: Assessing the Impact of Development on Bats, Mitigation & Enhancement - (CIEEM), Kaleidoscope Pro Analysis (Wildlife Acoustics). Endoscope Training (Internal), Emergence and Re-Entry Surveys (Internal) Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal).
Laura Gránicz (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. Biology, University of Szeged, Hungary. M.Sc. Biology, University of Pécs, Hungary. 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).
Neil Campbell (B.Sc., M.Sc.)	Bat Ecologist	B.Sc. Botany and Plant Science, National University of Ireland, Galway.

		M.Sc. Botany and Plant Science, National University of Ireland, Galway. 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).
Keith Costello (B.Sc.)	Ecologist	BSc., Environmental Science, National University of Ireland, Galway Lantra Qualification in Conservation Dog Handling Diploma in Canine Behaviour 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)

Methods

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*

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.

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.

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.

Habitat and Landscape

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.

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).

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).

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.

Fieldwork

Inspections

The site was first visited in December 2021, then February and July 2022 and again February, May, July, and September 2023 (Table 2). All structures within the wider Cleeves site were assessed for their potential to support roosting bats. An initial site visit was undertaken on the 15th December 2021 as part of a multidisciplinary walkover. Signs of bat use were noted within the Flax Mill and subsequent dedicated bat inspections were arranged. The aim of the surveys was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

The latest site visit was undertaken in October 2024, accompanied by LCCC Ecologist Sean Doyle. On the day the site visit, the Cleeves site was in use for fire brigade trainings, and the Limerick Scare Factory event had just finished using the Flax Mill and adjacent buildings.

Table 2 Inspections Surveys at the Flax Mill

Survey Date	Surveyors	Notes
15/12/2021	Kevin McElduff	Multidisciplinary walkover
22/02/2022	Tim Murphy & Aoife Joyce	Systematic bat inspection, winter assessment
14/03/2022	Tim Murphy & Aoife Joyce	Site visit, camera trap deployment
07/07/2022	Aoife Joyce, Sara Fissolo, Laura McEntegart	Systematic bat inspection
09/02/2023	Sara Fissolo, Kate Greaney, Nathan Finn, Pat Roberts, Colin Murphy	Systematic bat inspection
15/05/2023	Sara Fissolo	Evidence revisit
24/07/2023	Sara Fissolo	Evidence revisit
25/07/2024	Sara Fissolo	LHB location revisit following dawn survey
26/09/2023	Sara Fissolo	Evidence revisit
06/10/2024	Sara Fissolo, Nora Szijarto, Colin Murphy	Evidence revisit

Thorough and systematic searches of the Flax Mill were first undertaken on the 22nd February 2022 as part of a winter suitability assessment. A systematic search of all accessible interiors, including all attic spaces and roof area, was undertaken with consideration of health and safety constraints.

The exterior of the building was assessed 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 and binoculars, and searched for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises, as well as potential access points into the structure. All four floors of the Flax Mill were inspected, with the exception of the western section of the ground floor, which was too unstable to be safely accessed.

After the initial searches in 2022, the Flax Mill was reinspected in February 2023, and subsequently reassessed during each site visit, primarily with a focus on areas where previous activity was recorded, to assess whether any new evidence denoting active roosts could be found. A thermal camera (Thermal Monocular Eye II E6+ V3.0 (InfiRay, UK)) was used to aid these assessments.

Manual surveys

Manual surveys consisting of dusk emergence or dawn re-entry surveys were carried out with a specific focus on the Flax Mill on the 7th-8th July 2022 and on the 15th May, 26th-27th September 2023. In Summer 2023, the dusk emergence survey effort was concentrated elsewhere on the project site. However, during the dusk and dawn surveys carried out on the 24-25th July 2023, one surveyor (David Culleton at dusk, Sara Fissolo at dawn) performed a night bat walkover (NBW) to the south of the factory building to observe any potential roosting activity in the area.

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 points and roosting features. The purpose was to identify any bat species, numbers, access points and roosting locations within the structure.

Table 3 summaries the manual surveys undertaken since 2022.

Table 3 2022-2023 Manual surveys

Date	Surveyor	Type	Sunrise/Sunset	Weather
07/07/2022	AJ, LM, SF, SC, NC, LG, KG, KM, POB	Dusk	21:58	17-18°C, Dry, Light-gentle breeze
08/07/2022	LM, SF, SC, NC, LG, KG, KM, POB	Dawn	05:21	14-15°C, Dry/light drizzle, Calm
15/05/2023	SF, KG, DC, NF, LM, NS, NC, LG	Dusk Emergence	21:24	11-13°C, Dry, Calm – Light breeze
24/07/2023	SF, KG, DC, RC, NS, LG, TP, NC, KB	Dusk Emergence & NBW	21:40	16-17°C, Dry, Calm
25/07/2023	SF, KG, DC, RC	Dawn Re-entry & NBW	05:42	13-15°C, Dry, Calm
26/09/2023	SF, TOC, TP, KG, CF, DC, NF, RC, SC	Dusk Emergence & NBW	19:24	13 - 15°C, Dry, Calm
27/09/2023	SF, KG, DC, NF	Dawn Re-entry	07:28	13 - 15°C, Dry – Moderate Breeze, Calm

Static surveys

Static detectors were employed across the Cleeves site throughout the survey effort. The location of the statics is presented in Table 4 and shown in Figure 2. While the majority of the detectors were not located in proximity to the Flax Mill building itself, they allowed to monitor bat activity within the site and understand its use, both in terms of regularity and seasonality.

Table 4 Static Detector Location

Detector ID	IG Reference	Habitat (Fossitt)	Season	Deployment	Collection
Surveys 2022					
SMU5124	R 57019 57185	BL3	Summer	07/07/2022	08/07/2022
SMU3248	R 56936 57147	BL3	Summer	07/07/2022	08/07/2022
D01	R 56988 57159	BL3	Summer	07/07/2022	22/07/2022
D02	R 56920 57159	GA2	Summer	07/07/2022	22/07/2022
Surveys 2023					
D01	R 56923 57150	BL3	Spring	15/05/2023	01/06/2023
D02	R 56901 57173	WL2	Spring	15/05/2023	01/06/2023
D03	R 57049 57209	GS1	Spring	15/05/2023	01/06/2023
D04	R 56996 57164	BL3 FL7	Summer	24/07/2023	10/08/2023
D05	R 56920 57245	ER2	Summer	24/07/20232	10/08/2023
D06	R 56858 57257	BL3	Summer	24/07/2023	10/06/2023
D07	R 56858 57257	BL3	Autumn	12/09/2023	27/09/2023
D08	R56905 57249	BL3/ED3	Autumn	12/09/2023	27/09/2023
D09	R 57033 57186	BL3	Autumn	12/09/2023	27/09/2023
D10	R 56997 57248	GA2/WL1	Autumn	12/09/2023	27/09/2023
D11	R 56901 57199	ED3	Autumn	12/09/2023	27/09/2023

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.

Two-week Static Detectors Surveys 2022

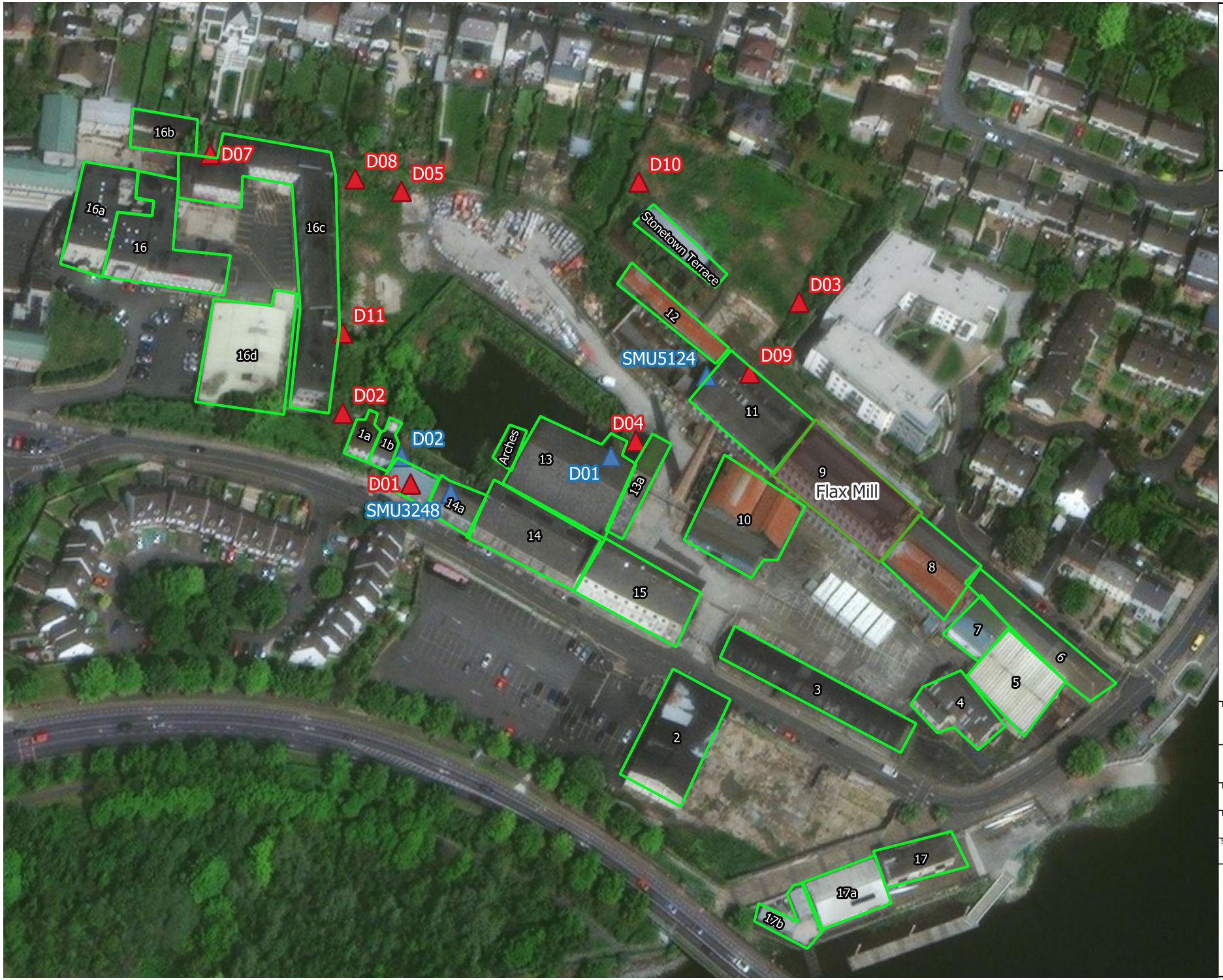
Full spectrum SM4 bat detectors (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity at two fixed locations over a 2-week period in July 2022. The two locations of static detectors were selected to represent the range of habitats present within the site,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

Seasonal static surveys 2023

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.



Map Legend

- Flax Mill
- Other Buildings Numbered
- Static detectors 2022
- Static detectors 2023

Drawing Title	Static detectors 2022-2023
Project Title	Flax Mill Stage 1 Works
Drawn By: NS	Checked By: SF
Project No.: 211052	Drawing No.: Figure 2
Scale: 1:1,600	Date: 01.10.2024

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Detailed Results

Desktop Study

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.*

National Biodiversity Data Centre

A review of the National Bat Database of Ireland on the 14th November 2024 yielded results of bats within a 10km hectad of the proposed works. The search yielded 5 bat species within 10km. Table 5 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 5 NBDC Bat Records

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

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 6 shows the designated sites within 15km.

Table 6 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

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 7 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 *Rhinolophus hipposideros*	Doonass House	Night	5-10km
2020	Lesser horseshoe bat *Rhinolophus hipposideros*	Mountshannon House	n/a	5-10km
2012	Lesser horseshoe bat *Rhinolophus hipposideros*	Ardnacrusha	n/a	5-10km
2020	Lesser horseshoe bat *Rhinolophus hipposideros*	Limerick Canal	n/a	1-2.5km

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.

Previous reports

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.

Inspection

The Flax Mill is located at the centre of the Cleeves site, it is a detached fifteen-bay four-storey stone factory building, built in 1853, to which various twentieth century alterations and interventions have been made. The asbestos mineral slate lined roof is hidden behind a parapet wall and comprises an attic space. The Mill is in a state of advanced deterioration with some areas of previous temporary stabilisation now also deteriorated.

This state of dereliction provides numerous access points for crawling bats throughout, particularly through open/broken windows and gaps in the stonework, which is mostly intact on the southern façade (Plate 1). The roof was also found to be mostly intact (Plate 2), though possible access points were noted particularly along roof edges (Plate 3) – the full roof and attic spaces were not walked due to health and safety concerns.

While the majority of the interior consists of large open spaces (Plate 4), it includes dark areas throughout, including behind plaster wall additions, under staircases and in windowless rooms. Access points suitable for lesser horseshoe bats, which require fly through access, were more limited, with a notable access point on the ground floor provided by a broken door arch (Plate 5 & Plate 6), which is connected to the rest of the building via an open staircase.

Bat droppings were discovered during inspections. Table 8 summarises the findings.

Table 8 Inspection results

Year	Location	Evidence of bats	Plate
2022	Ground floor	Droppings found at four locations. All locations show accumulations typical of LHB. Droppings collected at one of the locations (pictured) confirmed as LHB.	Plate 7
	First floor	Droppings found at one location, under the western staircase to the second floor. Typical of LHB.	Plate 8
	Second floor	Feeding remains found at two locations.	n/a
	Third floor	Droppings found at one location.	Plate 9
2023	Ground floor	droppings found in 2 locations, in small numbers, as well as feeding remains. Change of use of ground floor likely limited use of two locations previously identified.	n/a
	First floor	Droppings found at one additional location, no additional use of previously identified location.	Plate 10
	Second floor	Small amounts of droppings found.	n/a
	Third floor	Feeding remains throughout, some fresh droppings found at same location as 2022.	n/a
2024	Previous Locations	No additional findings, except potential fresh droppings on the First Floor.	n/a

On the 9th February 2023, bat droppings were collected at two locations within the Cleeves main building (B9) (IG Ref: R 57058 57145) and sent for DNA analysis to SureScreen Scientifics in the UK. 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 Flax Mill (Plate 7).

During a revisit in Spring 2023, it was noted that two areas of the main Cleeves Factory building (B9), including the air vent location, had been recently put to use as storage area and as a meeting room.

The building was initially assigned *High* roosting potential due to the evidence of bat use found and the potential for unreachable roosting locations to be located within the attic space of the building. No signs of significant roosting were identified during any of the inspections. With the results of the activity surveys, the building potential was lowered to *Moderate,* as it provides regular roosting availability but is unlikely to be used by a roost of significant size, likely also due to its urban location

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and the suboptimal conditions provided by its state of dereliction. The building is illuminated on all sides but particularly to the front (south) by security lighting (Plate 11).

Plate 1 Flax Mill: Southern aspect.

Plate 2 Central roof valley, intact slate work.

Plate 3 Roof damage seen from interior, likely access points

Plate 4 Second floor – example of unsuitable open floor space

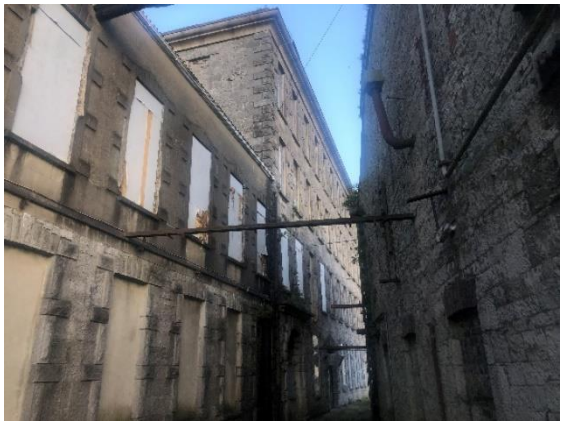

Plate 5 Door arch providing access into the Flax Mill

Plate 6 Door arch location in relation to the Flax Mill. South-western aspect.

Plate 7 Ground floor: evidence of LHB using vent to roost

Plate 8 Staircase space: old evidence of likely LHB use

Plate 9 Third floor, evidence of likely LHB use

Plate 10 First floor, additional location found in 2023

Plate 11 Security lights

Manual Surveys

Flax Mill

Since 2022, seven manual surveys took place on site, with the help of up to eight surveyors at once. The results related to the Flax Mill are shown in Table 9.

Dusk emergence and dawn re-entry surveys as well as transect surveys were carried out around the site and in proximity of the Flax Mill. No emergences were recorded from the building. While it is possible that single emergences might have been missed due to the size of the building and the difficulty in observing every potential access/entry point identified, particularly at higher floor levels, the results of the surveys confirmed that no large roost was using the structure.

Lesser horseshoe bat activity was noted during the transect survey in July 2023, and a single bat was observed accessing the ground floor door arch (Plate 5) at dawn. Its precise roosting location within the structure remains unconfirmed due to the building's extensive interior connectivity, and no bats observed at known roosting locations following the survey.

No other bat species was recorded using the structure.

Other buildings within the Cleeves Site

In total, bat use was confirmed in seven buildings within the Cleeves site. The majority of these comprised of dropping accumulations, with no bats observed roosting across the survey effort. Three other active roosts were successfully identified:

- A small (6no.) soprano pipistrelle roost was discovered within the rock face of the site's quarry.
- Two lesser horseshoe bats were seen emerging the derelict classroom building located at the rear of the disused Educate Together school.
- Droppings were discovered during initial inspections within an enclosed yard connected to the school and convent. Early dusk activity was recorded in this location in Summer 2023 confirming active use by a small pipistrelle roost.

Table 9 2022 and 2023 Manual surveys results (Flax Mill = Building 9)

Date	Survey type	Surveyor location IG Grid Ref.	Building focus	Results	Soprano pipistrelle	Common pipistrelle	Leisler's bat	Brown long-eared bat	*Myotis* spp.	Lesser horseshoe bat
07/07/22	Dusk emergence	R 57030 57198	9, 11, 12	No emergence. Activity concentrated above B12.	27	139	2	-	-	-
07/07/22	Dusk emergence	R 57090 57145	9,11	No emergence. Limited activity.	20	202	-	-	-	-
07/07/22	Dusk emergence	R 57038 57121	9,10	No emergence. Some foraging activity.	75	68	-	-	-	-
08/07/22	Dawn re-entry	R 57030 57198	9, 11, 12	No re-entry. Few bats recorded.	18	39	2	-	-	-
08/07/22	Dawn re-entry	R 57038 57121	9, 10	No re-entry. Foraging activity within B10. Building left before dawn.	3	39	-	-	-	-
08/07/22	Dawn re-entry	R 57090 57145	9,11	No re-entry. Limited activity.	1	38	1	-	-	-
15/05/23	Dusk emergence	R 57001 57136	10	No emergence.	2	25	2	-	-	-
25/07/23	Transect at dawn	R 57058 57142	9	Lesser horseshoe seen entering the Flax Mill at the open arch behind building 10 and seen flying inside	21	152	1	-	-	6
26/09/23	Dusk emergence	R 57013 57168	11	No bats were observed emerging from building 11, though activity commuting and foraging activity was high. One unidentified bat was observed entering Building 10.	10	179	-	-	-	-
27/09/23	Dawn re-entry	R 57013 57168	11	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.	3	9	-	-	-	-

Static results

One-night static detectors

Two SM-mini bat detectors were deployed within the site at Building 14 and within the Flax Mill, 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 the Flax Mill. Five individual passes were recorded by the detector SMU3248 deployed within Building 14. Table 11 shows a summary of the results obtained.

Table 10 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

Two-weeks static detectors

Analysis of the two 2022 detectors' 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 12 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.

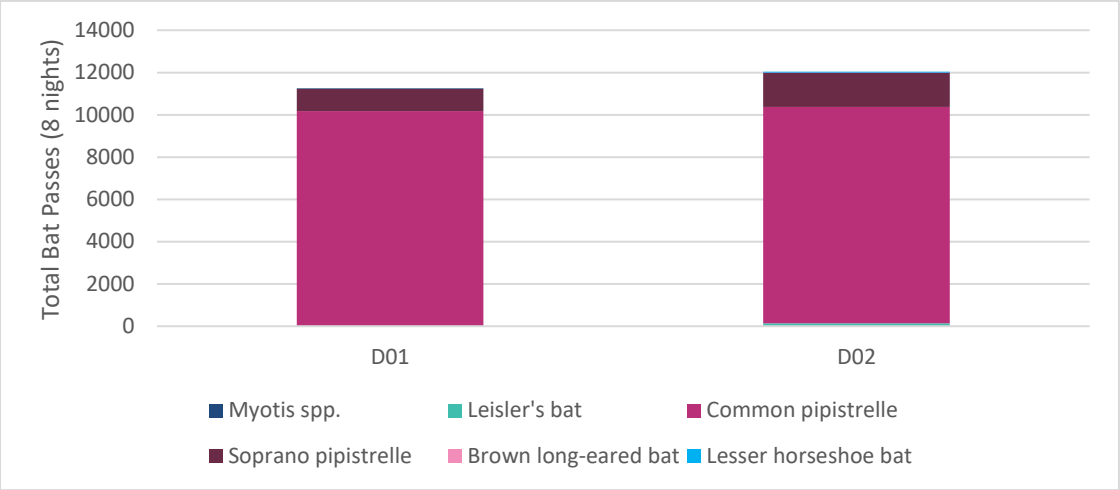

Plate 12 Total bat passes per detector across 8 nights, July 2022.

Seasonal static detectors 2023

SM4 static detectors were deployed on the site again in Spring, Summer and Autumn 2023. 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. As in 2022, 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=1,783). Followed by Lesser horseshoe bat *(Rhinolophus hipposideros)* (n=780). There was fewer instance of Myotis spp. (n=232), Brown long eared bat (Plecotus auritus) (n=117) and Nathusius' pipistrelles (Pipistrellus nathusii) (n=114) recorded on the site across all seasons. Plate 13 shows total bat species composition recorded at the site.

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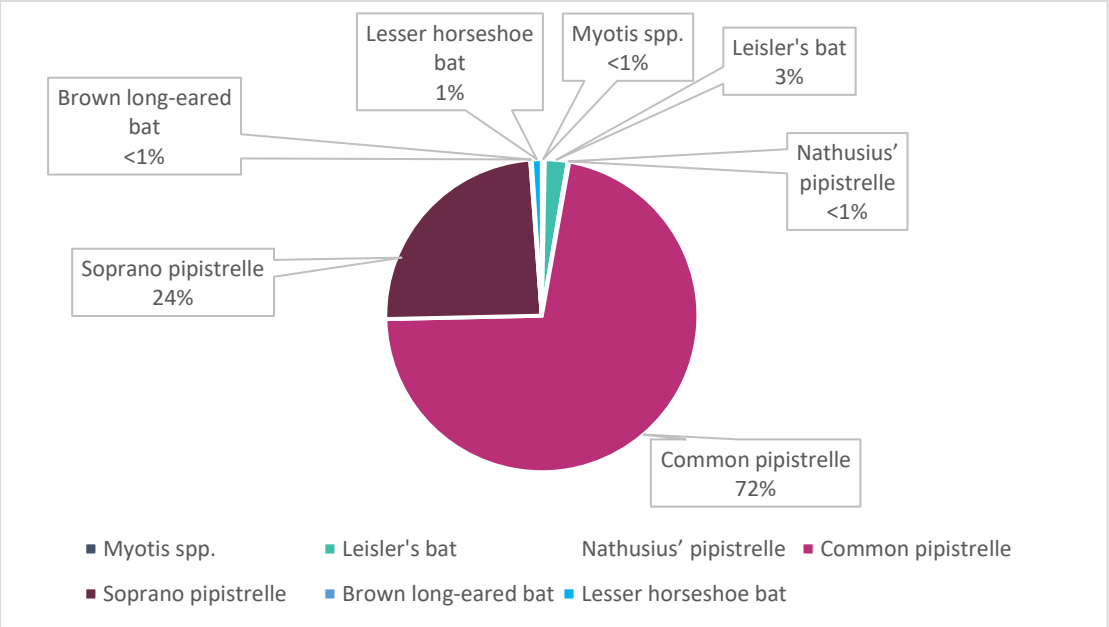

Plate 13 Total bat species composition.

Plate 14 shows total bat passes per detector, which are summarised in Table 6.

Table 11 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
Spring							
D01	10,237	3,348	83	-	3	13	82
D02	2,292	2,029	152	-	4	10	21
D03	2,833	3,217	285	2	11	13	15
Summer							
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
Autumn							
D06	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.

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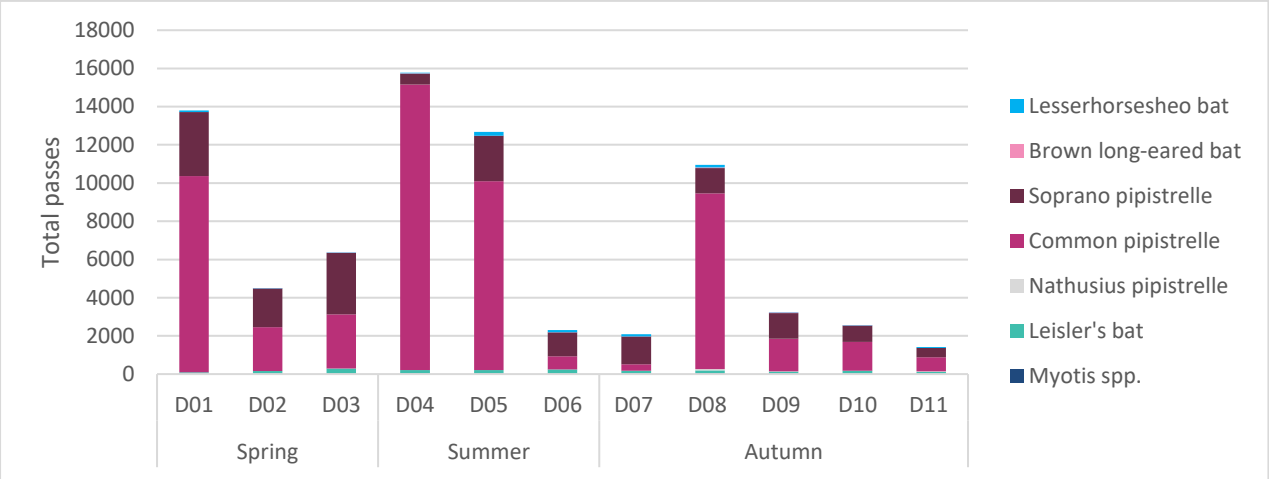

Plate 14 Total bat passes per detector

Plate 15 shows the Lesser horseshoe bat activity across all detectors. Lesser horseshoe bats were recorded in similar number for the spring and summer deployments, higher counts for these species were seen on D05 and D08, however the species was recorded throughout the site. The detectors were placed with the hope of confirming a commuting corridor for this species. Bats were picked up at slightly different times, minutes apart, as if a bat were to commute along the route.

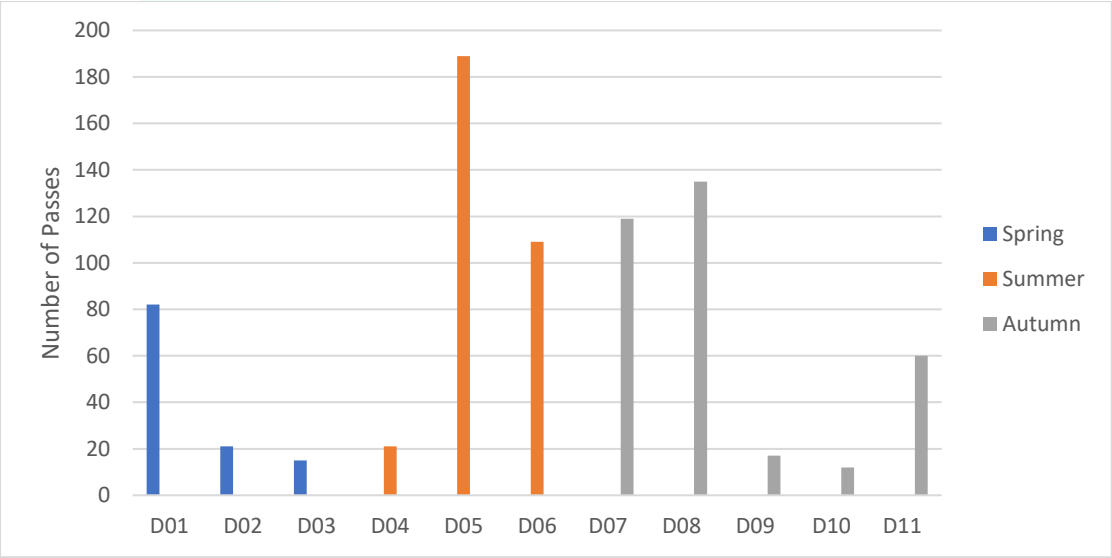

Plate 15 Lesser horseshoe bat count per detector

Data Evaluation

At least seven species of bat were confirmed utilising the site during the comprehensive suite of surveys conducted for LTT. These included soprano pipistrelle, common pipistrelle, Leisler's bat, brown long-eared bat, Nathusius' pipistrelle, and lesser horseshoe bat. Additionally, passes of the genus *Myotis* sp. were also documented, possibly indicating the presence of *Myotis mystacinus*, *Myotis nattereri* and/or *Myotis daubentonii,* whose known ranges include the Limerick area.

Despite the extensive survey effort, no large roosts or evidence of such were identified within the Flax Mill or any of the other buildings within the surrounding Cleeves site. However, the majority of

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buildings have the potential to support small-scale regular roosting, and droppings and feeding remains were observed within the Flax Mill.

A commuting corridor utilized by lesser horseshoe bats was identified traversing the site, connecting at least the two known roosting locations (Educate Together School and Flax Mill). Foraging activity was also recorded in proximity of the reservoir. The data 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. Figure 3 shows the roost resource within the site identified during the inspections and dusk surveys, as well as important bat habitats within the site.

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, 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 horseshoes.

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 (i.e. site greater than 100 individuals) was recorded within the site. No hibernacula or maternity roosts were identified within the site during the surveys undertaken in winter and summer 2023.

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Map Legend

- Flax Mill
- Other Buildings
- Foraging areas

Confirmed Roosts

- LHB
- Soprano pipistrelles
- Unidentified

Flight Corridors

- Main corridor
- Secondary corridor
- Likely flight paths to foraging area
- Likely flight paths to foraging area

N

Drawing Title: Bat evidence & LHB flight corridors

Project Title: Cleeves Riverside Quarter

Drawn By	Checked By
NS	SF
Project No.	Drawing No.
211052-a	Figure 3
Scale	Date
1:1,600	25/11/2024

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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.
- Some access limitations were encountered due to health and safety constraints, however, these were compensated by carrying out dusk surveys and are not considered a significant limitation to the survey effort.
- 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.

Conclusion

The surveys undertaken provide a good understanding of the use of the building and its surrounding habitats by bats. The planned works are necessary to the structural integrity of the protected structure. Temporary displacement towards other areas of the wider Cleeves site, which will remain available to all bat species, is expected as a result of disturbance. However, access to the ground, first and second floors of the building will be maintained for the duration of the works. With the proposed mitigations in place to ensure that no harm is caused to roosting bats, the urgent repair works are not expected to result in significant effects on the local bat population.

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