

Bat Surveys at the Former Presentation Convent, Convent Hill, Mitchelstown, Co. Cork May 2024

Report prepared by:

Dr. Isobel Abbott, Abbott Ecology



Report prepared for:

Appletree Developments Limited

Unit 1 Building 4
Delta Retail Park
Ballysimon Road
Limerick

Abbott Ecology

Ballinahina
White's Cross
Co. Cork

Email: isobelabbott@gmail.com

Mob: (086) 1516391

14 May 2024

Table of Contents

Summary	3
1. Introduction.....	4
1.1 Background and Aims	4
1.2 Statement of Competency	4
1.3 Site Description and Proposed Works	4
1.4 Legal Protection of Bats	6
1.5 Bats In Ireland.....	6
2. Methods	8
2.1 Overview	8
2.2 Desktop Review	9
2.3 Visual Survey for Potential Roost Sites	9
2.4 Dusk Emergence Surveys	9
2.5 Automated/Passive Detector Monitoring	9
2.6 Note on Differences in Bat Species' Acoustic Detectability.....	10
2.7 Survey Constraints.....	10
3. Results	11
3.1 Desktop	11
3.2 Visual Surveys.....	11
3.3 Potential Roost Features (PRFs) in Trees	13
3.4 Dusk Emergence Surveys	14
3.5 Automated All-Night Acoustic Monitoring	15
3.6 Other Ecology of Note - Barn Owl Nesting	16
4. Assessment of Potential Impacts on Bats	17
5. Bat Derogation Licensing Requirements and Recommended Mitigation Measures	18
References.....	19
Appendices.....	20
Appendix A: Roost Types Used by Bats	20

Document History: Draft 1 13.5.2024, Draft 2 (Final) 14.5.2024

Summary

Abbott Ecology was commissioned by Appletree Developments Limited to conduct a pre-construction bat survey at the former Presentation Convent, Convent Hill, Mitchelstown, Co. Cork in response to Planning Condition No. 7 in the conditional grant of planning by Cork County Council on 24.1.2019 (Planning Ref. 18/05485). A residential development consisting of 32 dwellings is proposed, including converting the former convent to a number of dwellings. All Irish bats are protected under national and EU legislation. Both the animals themselves and their roosts are protected and it is an offence to disturb or interfere with them without a licence.

The principal aim of the survey was to conduct a bat roost survey of the protected structure on site, the former Presentation Convent, Mitchelstown. Surveys were carried out during the early part of the main bat active season in suitable weather conditions in May 2024. The methods used in the bat roost survey included visual searches of potential roost structures (e.g. stone walls, buildings), a search for Potential Roost Features in trees remaining on site, two dusk emergence surveys, and passive bat detector monitoring of the ruined convent building over five consecutive nights in May 2024. The convent building is in a very dangerous state of collapse, and could not be entered for a close-up visual survey.

Overall, five bat species were detected at the site; Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's Bat (*Nyctalus leisleri*), Brown Long-eared Bat (*Plecotus auritus*), and Daubenton's Bat (*Myotis daubentonii*). Surveys revealed a single Soprano Pipistrelle individual roosting in the ruined convent building. Dusk survey visual observations, and overnight passive acoustic monitoring, indicated that there were long spells of repetitive foraging by mostly one, sometimes two, Soprano Pipistrelle, and one or two Common Pipistrelle at the site, with a small number of instances of Leisler's Bat flying past the site. While Soprano Pipistrelle and Common Pipistrelle dominated the bat activity recorded at the site, the acoustic monitoring also detected brief instances of activity of Leisler's Bat (*Nyctalus leisleri*), Brown Long-eared Bat (*Plecotus auritus*), and Daubenton's Bat (*Myotis daubentonii*) passing through or over the site. There was no evidence to indicate roosting by the three latter bat species.

The surveys also revealed the presence of nesting Barn Owl (*Tyto alba*) in the ruined convent building, and it is likely that the former convent is a breeding site for this species. Barn Owl is Red-listed according to Birds of Conservation Concern in Ireland 2020-2026, and is classified as of high conservation concern. Other bird species also incidentally recorded nesting in the ruins were Blue Tit, Blackbird, Swallow, and Jackdaw. The nest sites of all birds are strictly protected, and it is illegal to cause damage or disturbance to such nests.

Potential impacts of the development on bats and mitigation measures relating to bat roosting and foraging at the site are outlined. In the hierarchy of bat roost significance, and proportionate mitigation, a minor roost of a single Soprano Pipistrelle is at the lower end of conservation significance. The developer will undertake an application for a bat roost disturbance derogation license from the National Parks and Wildlife Service in relation to the minor roost.

1. Introduction

1.1 Background and Aims

Abbott Ecology was commissioned by Appletree Developments Limited to conduct a pre-construction bat survey at the former Presentation Convent, Convent Hill, Mitchelstown, Co. Cork (Plate 1 and Figure 1), specifically in response to Planning Condition No. 7 in the grant of planning by Cork County Council on 24.1.2019 (Planning Ref. 18/05485).

Planning Condition No. 7: "A pre-construction bat survey shall be completed by a suitably qualified specialist to establish whether bats are using the building. The results of this survey must be submitted to Cork County Council before the commencement of demolition or any other works in the building. In the event that bats are identified, the applicants are required to contact the National Parks and Wildlife Service to determine whether a Section 23(5)(d) Wildlife Act derogation license is required to allow the works to proceed following the obtainment of such a license from NPWS and in accordance with any conditions imposed by the license."

1.2 Statement of Competency

Dr. Isobel Abbott (Principal Ecologist, Abbott Ecology): Isobel is an independent ecological consultant, specialising for >15 years in bat ecology, bat survey, assessment and mitigation. She graduated first in class in Zoology from University College Cork in 2007, and subsequently obtained her PhD on the effectiveness of bat mitigation measures employed on Irish national road schemes in 2012. She has published a number of research papers on bat ecology in scientific journals. She has extensive experience of conducting bat surveys and other multi-disciplinary ecology surveys for Ecological Impact Assessments, Preliminary Ecological Appraisal, and Ecological Constraints and Appropriate Assessment Screening Reports. She has worked on a variety of projects including national bat monitoring programmes, wind farms, solar farms, road construction, bridge repairs, quarries, and residential and industrial developments. Isobel has designed bat mitigation measures and successfully applied for >50 bat derogation licenses from the National Parks and Wildlife Service associated with planning permission applications or research. She currently holds nationwide NPWS licenses to capture and handle bat species, and to disturb bat roosts for the purpose of ecological impact assessment.

1.3 Site Description and Proposed Works

The proposed residential development consists of 32 new dwelling units in the grounds of Protected Structure 00109 The Former Presentation Convent and Gate Lodge and 01334 Entrance Gate to Church, Convent Hill, Mitchelstown including conversion of the Convent building to 6 dwellings as well as existing chapel use. The development comprises 9 new detached dwellings, 6 new semi-detached dwellings, 11 new terrace dwellings with 4 dwellings and 2 apartments in the existing convent buildings, 5 new garages, provision for internal roads, access from local road, landscaping, car parking, substation kiosk, alteration to site entrance, demolition of ancillary buildings, associated site works and additional alterations, repair, restoration and consolidation of the convent buildings including demolition of the former convent nursing home wing.

The study site comprises a large burned-out ruin of Protected Structure 00109 The Former Presentation Convent and Gate Lodge and its surrounding site (Plate 1, Figure 1, Lat. 52.265132, Long. -8.267094). The site is located within the urban fabric of Mitchelstown in North Cork. The site is surrounded by urban developments on all sides, with the main road through the town lying c. 0.18km to the west. Farmland with hedgerows, tree lines and the Gradoge River (more optimal bat habitats) lie c. 0.6km to the east, and the M8 motorway lies c. 1.2km to the east of the site. Construction of some of the new houses were well underway at the site, and demolition of the former convent nursing home wing at the SE corner of the building had already taken place.



Plate 1. Photographs of the front (left) and rear (right) of the former Presentation Convent Mitchelstown.



Figure 1. Aerial photography showing location of the former Presentation Convent Mitchelstown (red arrow).

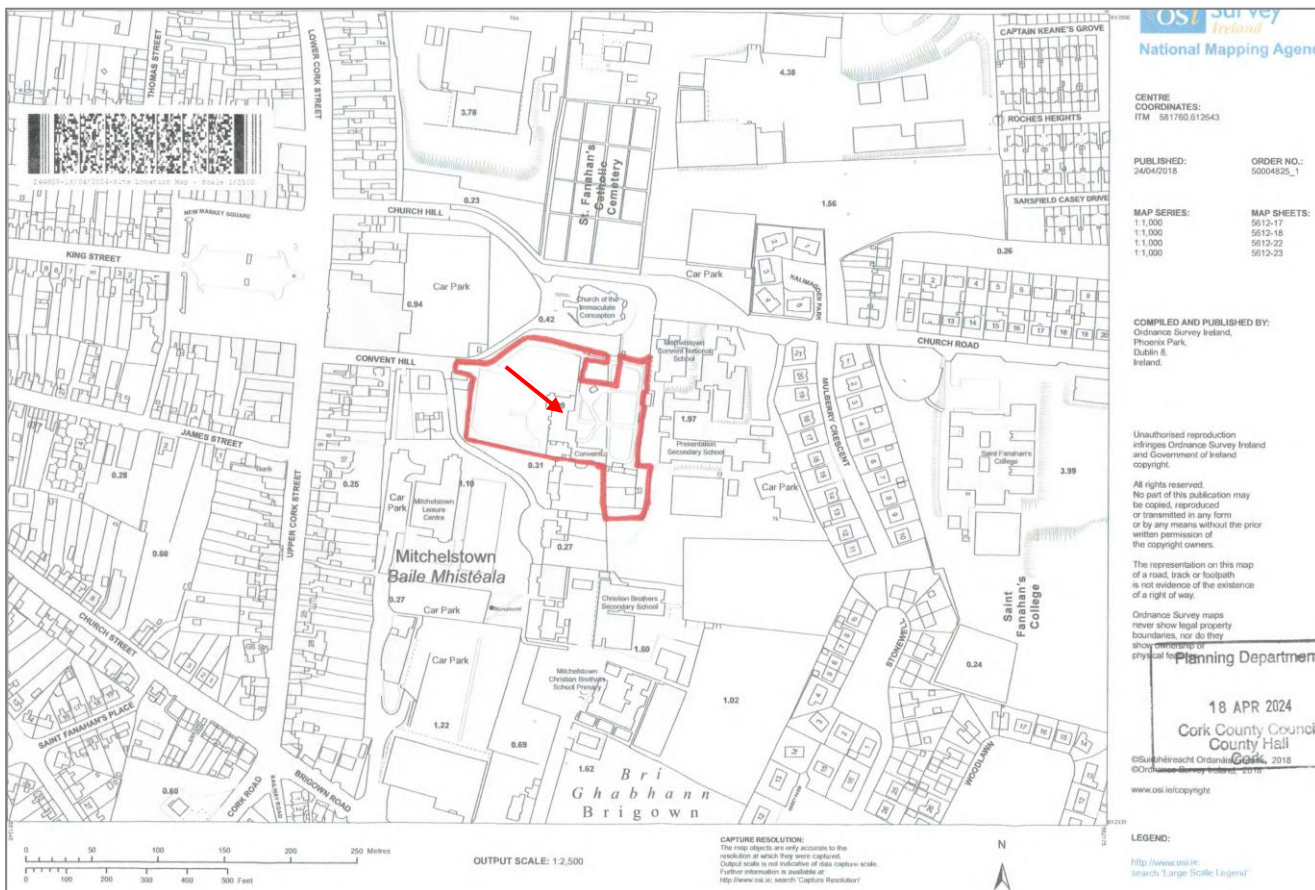


Figure 2. Development site outline (red) around the former Presentation Convent Mitchelstown (red arrow).

1.4 Legal Protection of Bats

Bats comprise one of the most highly diverse mammalian groups. There are over 1,200 species of bat worldwide, with nine confirmed as resident in Ireland to date. Due to sharp declines in many bat populations in recent decades, all bat species in Europe are legally protected under the European Habitats Directive, 1992 (92/43/EEC). The Habitats Directive seeks to “maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community Interest”. It contains lists (in ‘Annexes’) of habitats, plant species, and animal species, which are rare or declining on a European scale. It is built around two pillars;

- A **System of Strict Protection** for species of European importance, **including all bat species** (listed under Annex IV, Article 12 of the EU Habitats Directive). This provides protection to the bats themselves, and also prohibits deterioration/destruction of breeding sites and resting places.
- **The Natura 2000 Network of Protected Areas** (Special Areas of Conservation, SACs, and Special Protection Areas, SPAs) (Article 6 of the EU Habitats Directive). The Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is the only Irish bat species listed under Annex II, and for which the Irish government is required to designate SACs. This species occurs almost exclusively in the Atlantic seaboard counties of Cork, Kerry, Limerick, Clare, Galway and Mayo, with sparse records in counties Tipperary, Roscommon, and Sligo.

The domestic legislation, the European Communities (Birds and Natural Habitats) Regulations 2011, (S.I. No. 477 of 2011) (“the Habitats Regulations”), which implements this EU Directive, combined with the Wildlife Acts 1976 to 2021, ensures that individual bats and their breeding sites and resting places are fully protected in Ireland. A summary of the law in relation to bats in Ireland and the Europe is highlighted in *Text Box 1* below.

Text Box 1. Bats and the Law

As a result of the legislation outlined above, it is an offence to:

1. Deliberately capture, injure or kill a bat.
2. Deliberately disturb a bat, particularly during the period of breeding, hibernating or migrating.
3. Damage or destroy a breeding site or resting place of a bat.
4. Keep, transport, sell, exchange, offer for sale or offer for exchange any bat taken in the wild, other than those taken legally before the Habitats Directive was implemented.

Bat Roost Derogation Licenses

Both pillars, (i) the System of Strict Protection and (ii) the Natura 2000 network of SACs and SPAs, allow for exceptions or “derogations” from the protection regimes under Article 6 and Article 16 of the EU Habitats Directive. A person may apply to the Minister under Regulation 54 of the Habitats Regulations for a derogation license to carry out one or more of these prohibited activities. Firstly, a license can only be granted by the Minister via the NPWS only for the reasons which are specifically listed in Regulation 54¹. Secondly, the applicant must demonstrate that there is no satisfactory alternative, and thirdly, that the action will not adversely affect the favourable conservation status of bat species in their natural range. Each case is considered on its particular circumstances, and an application may be refused. Mitigation to reduce or compensate for any impact of development is generally a condition of the licence and should be proportionate to the impact. Mitigation measures may require particular timing of operations, protection of existing roosts or the creation of new roosts to replace ones being lost. Monitoring of the effect of the mitigation is usually required (Marnell *et al.*, 2022).

1.5 Bats In Ireland

The nine confirmed resident bat species in Ireland are; Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Nathusius' Pipistrelle (*Pipistrellus nathusii*), Leisler's Bat (*Nyctalus leisleri*), Brown Long-eared Bat (*Plecotus auritus*), Lesser Horseshoe Bat (*Rhinolophus hipposideros*) and three myotis species; Daubenton's Bat (*Myotis*

¹ (a) In the interests of protecting wild fauna and flora and conserving natural habitats

(b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property

(c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and the beneficial consequences of primary importance for the environment

(d) For the purpose of research and education, of repopulating and introducing these species and for the breeding operations necessary for these purposes, including artificial propagation of plants

(e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of bats

daubentonii), Natterer's Bat (*Myotis nattereri*), and Whiskered Bat (*Myotis mystacinus*). Ireland hosts the world population stronghold for Leisler's Bat, and one of the world's population strongholds for Lesser Horseshoe Bat.

There have been confirmed records of a further two species, currently considered vagrant species; Brandt's Bat (*Myotis brandtii*) in Co. Wicklow in 2003 confirmed by DNA analysis (Mullen 2007), and Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) has been confirmed by a single male in Co. Wexford in 2012/2013 (Roche *et al.* 2014), and more recently by acoustic recordings made during June and July 2020 in Glendalough, Co. Wicklow (email communication from Bat Conservation Ireland, 17.7.2020). There have been a few other Irish records of Brandt's Bat, unconfirmed by DNA analysis, and it is possible that Brandt's Bat may have been overlooked because of its close similarity to Whiskered Bat. However, a 2008-2009 re-survey of known Irish sites for Whiskered Bat did not confirm any additional Brandt's Bat through DNA analysis, so it cannot at present be considered a resident species (Boston *et al.* 2010).

Table 1 details the conservation status and legal protection of Irish bat species with respect to; Red List of Terrestrial Mammals (Marnell, Looney & Lawton 2019), the latest assessment of EU protected habitats and species in Ireland (NPWS 2019), the European Communities (Birds and Natural Habitats) Regulations 2011, and the Irish Wildlife Acts (1976 - 2021).

Table 1. Conservation Status, Population Size Estimate and Legal Protection of Irish Bat Species

Bat species	Estimated population size*	Red List Status**	EU Protected Species Assessment***	EU Habitats Directive	Irish Wildlife Acts
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	1.2 -2.8 million	Least Concern	Favourable	Annex IV	Yes
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	0.5-1.2 million	Least Concern	Favourable	Annex IV	Yes
Nathusius' Pipistrelle <i>Pipistrellus nathusii</i>	10,000 - 18,000	Least Concern	Unknown	Annex IV	Yes
Leisler's Bat <i>Nyctalus leisleri</i>	73,000 - 130,000	Least Concern	Favourable	Annex IV	Yes
Daubenton's Bat <i>Myotis daubentonii</i>	81,000 - 103,000	Least Concern	Favourable	Annex IV	Yes
Natterer's Bat <i>Myotis nattereri</i>	Unknown	Least Concern	Favourable	Annex IV	Yes
Whiskered Bat <i>Myotis mystacinus</i>	Unknown	Least Concern	Favourable	Annex IV	Yes
Brandt's Bat <i>Myotis brandtii</i>	Unknown	Data Deficient	Not included (vagrant)	Annex IV	Yes
Brown Long-eared Bat <i>Plecotus auritus</i>	64,000 - 115,000	Least Concern	Favourable	Annex IV	Yes
Lesser Horseshoe Bat <i>Rhinolophus hipposideros</i>	14,000	Least Concern	Inadequate	Annex II and Annex IV	Yes
Greater Horseshoe Bat <i>Rhinolophus ferrumequinum</i>	Unknown, low number	Not included	Not included (vagrant)	Annex II and Annex IV	Yes

* After Roche *et al.* 2014. ** After Marnell *et al.* 2019. *** After NPWS 2019

Bats use different types of roosts during different times of the year and phases of their life cycle (Plate 2) (see summary of roost types in Appendix A). For example, in early summer, pregnant females gather together to form maternity roosts where they give birth to pups and suckle them until they are weaned by late summer. The pups are flightless for a few weeks and are completely reliant on their mothers' milk. Bats spend the summer months mostly hunting for insect prey at night and sheltering by day. In winter when insect food becomes scarce due to low temperatures, bats seek out winter hibernation roosts where they enter into a torpor, reducing their metabolic requirements, thus surviving through the period of low food availability. They are vulnerable to disturbance in winter roosts, as waking up causes them to burn fat reserves that must last until spring, and they are vulnerable to injury when in a torpid state.

Bats also make use of roosts other than their daytime roost. During night-time foraging bouts, they may take temporary shelter from inclement weather or process and digest insect prey in what are called 'night roosts'. These often tend to be close to key foraging areas e.g. for Lesser Horseshoe (Knight & Jones 2009). Wherever a bat lives or rests is a bat roost. However bats need different roosting conditions at different times of the year, and they will often move around to find a roost that meets their needs. Summer maternity roosts, where females gather to give birth and rear pups, are of greater

conservation significance than a night roost or an occasional roost used by a single or small number of bats (Marnell, Kelleher & Mullen 2022).

Each bat species tends to have its own particular roost requirements and preferences. For example, Lesser Horseshoe Bats cannot use their limbs to crawl into crevices like other species, and they must instead fly directly into a roost through an opening of sufficient size and hang by their specially adapted feet from a suitable perch. For this reason, this species will not use bat roost boxes as other Irish bat species. Pipistrelle species on the other hand are crevice dwellers. They can land and crawl into very tight spaces through access holes as little as 1.2 x 2 cm. Their roosts can be concealed under ridge tiles, in wall cavities, or between slates and felt for example.

Bats, like other wildlife, tend to use habitat corridors with shelter of trees, hedgerows and woodland to move throughout the landscape. Such wildlife corridors provide connectivity between the various roosts, foraging, and mating sites that bats use during different seasons or phases of their life cycle (Plate 2, and see Appendix A for descriptions of roost types). Linear vegetated features such as tree lines, hedges, riverbanks, and woodland, are often important commuting and foraging habitats for bats. These landscape features provide concentrations of insect prey as well as shelter from wind, rain and predators. However, bats, like any other wildlife, will also move through less sheltered landscapes when exploring new roosting/foraging opportunities or migrating between areas e.g. moving between summer roosts and autumn mating sites or winter hibernation roosts. Loss of connective habitat patches/corridors can however impede bat movements and negatively impact bat populations (Voigt & Kingston 2016).

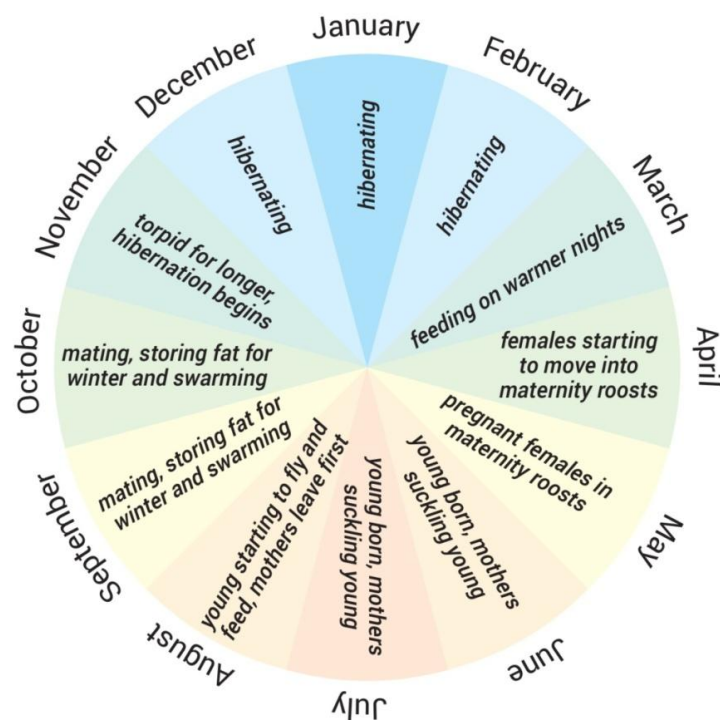


Plate 2. Generalised bat life cycle (from Collins Bat Survey Guidelines 2023)

2. Methods

2.1 Overview

Bat surveys were undertaken in accordance with current bat survey guidelines (Marnell *et al.* 2022; Collins 2023). The overall schedule of site surveys, and relevant weather conditions during surveys, are shown in Table 2.

Table 2. Overall bat survey schedule

Date	Field Survey	Times	Weather Conditions
1/5/2024	- Daytime visual search for roosts - Deploy 2 x passive bat detectors	N/A	Calm, dry, mild, excellent visibility
3/5/2024	- Visual survey - Dusk emergence survey 1	Dusk survey: 20:30-23:00 Sunset: 21:03	Temperature 10-9°C; Wind F1, Cloud 8/8 Otkas, Precipitation None
6/5/2024	- Visual survey - Dusk emergence survey 2 - Collect 2 x passive bat detectors	Dusk survey: 20:30-23:00 Sunset: 21:08	Temperature 11-10°C; Wind F1-F2, Cloud 8/8 Otkas, Precipitation None

2.2 Desktop Review

A desktop review of publicly available ecology/bat data for the development site and locality was undertaken (i.e. National Biodiversity Data Centre NBDC). The NBDC online ecology database holds bat records from Bat Conservation Ireland's national bat database. Other available bat surveys for the area were also reviewed.

2.3 Visual Survey for Potential Roost Sites

Ground-level visual surveys of structures were assisted with high powered directional torchlight, close-focusing binoculars, and an endoscope as needed. Searches of the interior (where possible due to dangerous state of building) and exterior of potential roost structures were undertaken during daylight on 1.5.2024, 3.5.2024 and 6.5.2024, searching for signs of bat roosting, including for example;

- Bats, dead or alive
- Bat droppings: these can accumulate under established roosting and access locations.
- Feeding remains: discarded insects parts such as moth wings under feeding perches.
- Fur oil/grease staining: natural oils in bats' fur rubs onto regularly used surfaces.
- Urine staining, or splashes on windows.
- Scratch marks: from bats movements in and out of perching/roosting locations.
- Characteristic smells of bats may sometimes be detectable.
- Audible daytime roost bat chatter.

2.4 Dusk Emergence Surveys

Two dusk emergence surveys were carried out by two observers (Isobel Abbott and Vincent Brennan) during suitable weather conditions as detailed in the survey schedule in Table 1. Dusk emergence surveys were conducted from c. 15 minutes before sunset until c. 2 hours after sunset. Bat detectors (Magenta Bat5, Wildlife Acoustics EM3+) were used to listen for bats in real time to aid observations during the surveys, and recordings were also made using two static detectors (Wildlife Acoustics Song Meter SM4BATFS with SMM U2 microphones) for later analyses. Recorded bat activity was manually analysed using Wildlife Acoustics Kaleidoscope Viewer Pro, specialist bat call analysis software. A Delmodes 8k 64MP 60 frames per second video camera with infrared (IR) night vision, with two additional IR illuminators (Tonton IR illuminator 8-LEDs c. 5Watts at 850nm, and a Lonlky IR illuminator 30 LEDs c. 15Watts at 850nm) was also used to aid night-time observations during the dusk surveys.

2.5 Automated/Passive Detector Monitoring

Automated bat detectors (Wildlife Acoustics Song Meter SM4BATFS with SMM U2 microphones) were used to record all-night bat activity during five full consecutive nights from 1 May 2024 to 6 May 2024, with an additional partial night of monitoring during the dusk emergence survey on 6 May 2024. Detectors were set to automatically record from half an hour before sunset until half an hour after sunrise. The passive monitoring survey schedule is shown in Table 3, and the positions of the two microphones at the front and rear of the former convent building are shown in Plate 3.

Passive monitoring involves leaving a suitable bat detector in position with no observer present, and bats which pass sufficiently close to the detector microphone are recorded and their calls are stored for later analysis. Recordings were made in full spectrum, retaining all amplitude and harmonic information from the original signal for subsequent analysis, and were stored in WAV format.

This passive monitoring allows a more long-term insight into bat activity at a roost, more than the 'snap-shot' of bat activity obtained during an emergence survey, and can also allow insights into bats' night-roosting that may not be apparent during an emergence survey. Passive detectors were also used to record bat activity for later analyses during the dusk emergence surveys.

Bat sonograms (e.g. Plate 13) are then manually analysed and identified to species level using specialist software, Wildlife Acoustics Kaleidoscope Viewer Pro, noting the time and date of bat registration files. Activity analysis of recorded bat echolocation was defined as registrations/contacts per species within a 15 s (maximum) file. Multiple passes/calls/pulses of the same species within a (maximum) 15 s file count as a single registration - two species within the same 15 s file count as two registrations. Feeding buzzes (indicating a prey capture attempt by a bat), and social calling of bats (used for communication rather than foraging or orientation) were also noted. A feeding buzz is a shortening of pulse durations and inter-pulse intervals as the bat homes in on prey.

Table 3. Automated Passive Detector Monitoring Schedule

Detector Reference	Location Notes	Dates Deployed	Nights Running	Nights Analysed
A	Attached to fire escape railing at the rear of the former convent building facing the roof	1.5.2024 - 6.5.2024	5	5
B	Attached just inside the front door of the former convent building facing inside, but would also detect bats from outside due to holes in ceilings and roof and open doors and windows	1.5.2024 - 6.5.2024	5	5

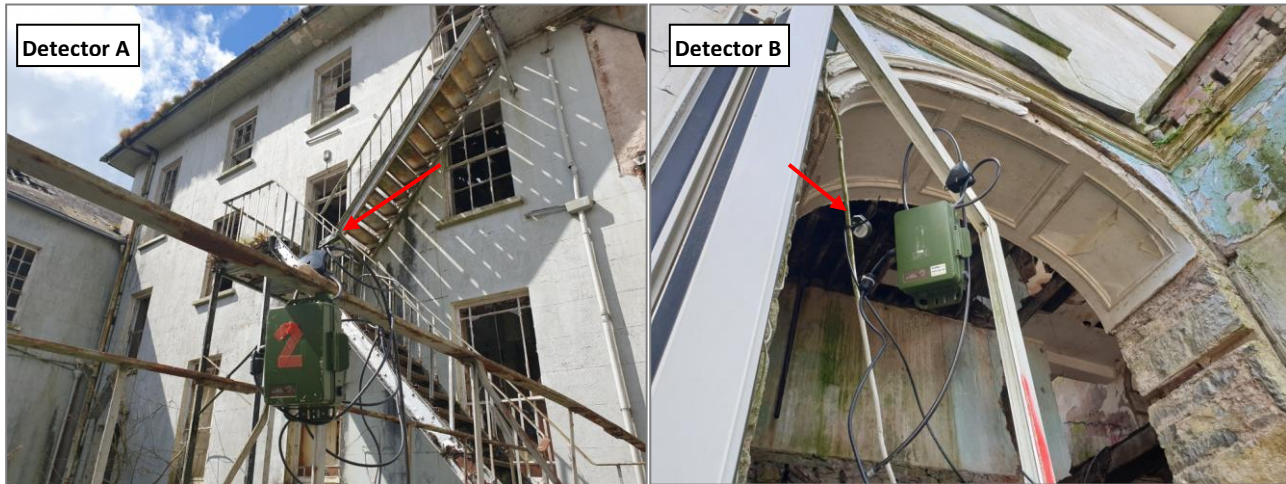


Plate 3. Bat detector microphone positions (red arrows) at the fire escape stairs at the rear of (left), and just inside the front door of the former Presentation Convent Mitchelstown (right).

2.6 Note on Differences in Bat Species' Acoustic Detectability

Some Irish bat species have much higher intensity of echolocation than others, and can thus be detected from greater distances, e.g. Leisler's Bat (by far the loudest of all the Irish bat species), followed by relatively intense echolocation of Common Pipistrelle and Soprano Pipistrelle. Bat species with quieter echolocation, such as Brown Long-eared Bat and Natterer's Bat, must fly much closer to the microphone to be detected. Information taken from the UK Bat Conservation Trust's bat survey guidelines indicates that Brown Long-eared Bat and Natterer's Bat are among the most difficult to detect bat species (Plate 4, from Collins, 2023). These differences in acoustic detectability are important for interpreting the results of passive detector monitoring.

Table 3.8 Number of surveys required to achieve 95% certainty of detection on walked transect surveys in woodland (Scott and Altringham, 2014).

Species	Number of surveys to achieve 95% certainty of detection for walked transect survey
Pipistrelle	1
Brandt's bat	2
Whiskered bat	2
Barbastelle	2
Horseshoe bat	4
Natterer's bat	5
Brown long-eared bat	Up to 9 ^a
Bechstein's bat	4-6 ^b
Alcathoe	2-3 ^b

Plate 4. Table re bat species' acoustic detectability from Bat Conservation Trust Survey Guidelines (Collins, 2023)

2.7 Survey Constraints

The convent building on site has been badly fire damaged in previous years, and is in such a dilapidated and unsound state (Plate 5) that a full internal visual survey was not possible. A range of other survey methods were used to offset this constraint. The bat surveys were carried out at a suitable time of year during the main bat activity season, and weather conditions were favourable to bat activity during all surveys.

3. Results

3.1 Desktop

The site lies outside of the known range of the Annex II bat species, Lesser Horseshoe Bat (*Rhinolophus hipposideros*). NBDC Biodiversity Maps for the 2 km grid square in which the site lies (R81B) have bat records of Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared Bat, and Leisler's Bat, dating from 2020 (these online records happen to be from a previous roost survey conducted by the author in a site in Mitchelstown c. 500m west of the current site). Additionally, Daubenton's Bat is recorded for the 10km grid square in which the site lies, R81, with the latest record from 2021.

No bats were recorded during a previous bat survey that was conducted at the site in 2018 by Tom O'Byrne of Science Direct Ltd. in response to a Request for Further Information from Cork County Council in relation to Planning Ref. 18/05485. That survey involved a daytime visual survey in November 2018, with the report noting that November is not the ideal time of year to be surveying for bats, and that "*the bat survey of 8 November 2018 showed no signs of the presence of bats in the main building or outhouses of the Presentation Convent in Mitchelstown, Co. Cork. Furthermore, any potential roost sites showed no indications of previous occupation*".

3.2 Visual Surveys

The former convent building itself has been burned out during fires in the past few years. Floors and ceilings and roofs are rotting and collapsing throughout the building (Plate 5), and so it was not safe to conduct visual bat surveys inside this building. While there is a lot of ingress of daylight, and inclement weather into the building (not favouring bat roosting), there are still many places where bats could potentially find dark and sheltered roosting spots. No signs of bats, such as droppings stuck to walls, slates or fallen debris, were observed using a torch and binoculars. However, automated acoustic surveys and dusk emergence surveys revealed a roosting Soprano Pipistrelle in the former convent building (Sections 3.4 and 3.5), and nesting Barn Owl (Section 3.7).



Plate 5. Photographs showing fire damage, and collapsing floors, ceilings and roof of the former convent building

At the time of these bat surveys, demolition of the former nursing home wing at the SE corner of the convent building had already taken place, leaving the wall shown in Plate 6. Therefore, it is unknown whether bats may have been

roosting in that part of the building prior to demolition. The daytime visual bat survey in November 2018 by Science Direct Ltd. did not find any evidence of bat roosting anywhere at that time.



Plate 6. Remaining wall of the former nursing home wing that was at the SE corner of the convent building (inset).

There were no suitable bat roosting crevices in the tall stone walls that remain around the perimeter of the site (e.g. Plate 7).



Plate 7. No suitable bat roosting crevices were noted in the tall stone walls around the perimeter of the site.

There were no signs of bats roosting in the small gazebo structure (Plate 8), located near the mature Copper Beech at the NE corner of the former convent building. The structure has low bat roost potential because of holes in the timber ceiling and also the tile roof that allow access of daylight and inclement weather and dampness into the attic space (Plate 8).



Plate 8. Low bat roost potential and no signs of bat roosting in this gazebo structure

3.3 Potential Roost Features (PRFs) in Trees

There were three mature trees remaining at the site during these bat surveys, a Horse Chestnut at Lat. 52.265103, Long. -8.268058, a Copper Beech at Lat. 52.265403, Long. -8.266832, and a Sycamore at Lat. 52.265378, Long. -8.266655. There was low roosting potential (estimated from ground level) underneath some cracked bark on limbs of the Horse Chestnut (Plate 9). There was a knothole with medium roost potential for a single or small number of bats in the Copper Beech (see Plate 10), and no visible PRFs in the Sycamore.

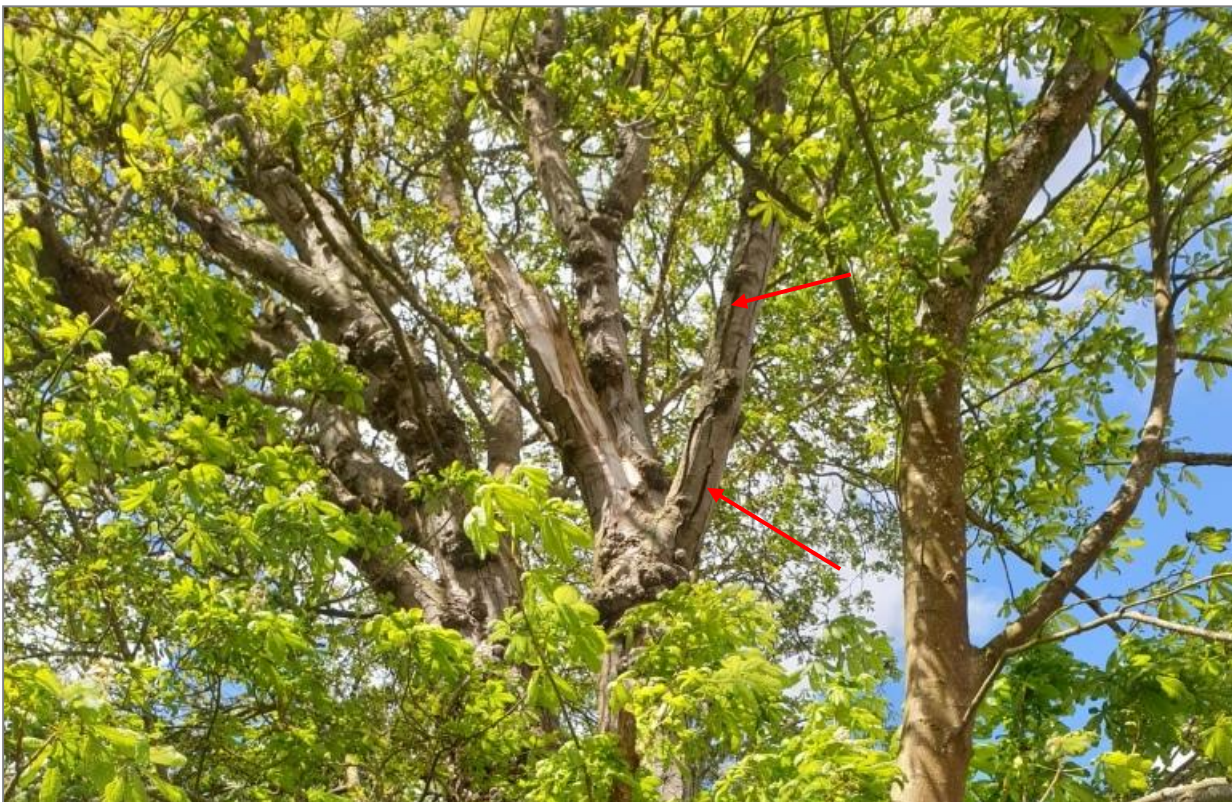


Plate 9. Cracked bark Potential Roost Feature in limbs of Horse Chestnut



Plate 10. Knothole Potential Roost Feature in Copper Beech

3.4 Dusk Emergence Surveys

During the first dusk emergence survey on 3 May 2024, one Soprano Pipistrelle emerged in daylight, 33 minutes before sunset. It emerged from the soffit box beneath the roof at the back of the convent building, where there are downpipes at the position marked with red arrows in Plate 11 and closer-up in Plate 12 below. This individual foraged repetitively around the back facade of the building, above the roofs of the building, and around the mature Copper Beech and Sycamore trees that remain on site beside the NE corner of the building. It occasionally flew away to the east of the site and what appeared to be the same individual came back to the site and foraged repetitively. No further individuals of Soprano Pipistrelle emerged from the former convent building. Common Pipistrelle also appeared at the convent shortly after sunset (19 minutes after sunset), but it came from a NE direction to the site. Mostly one, and sometimes two, Common Pipistrelle could be seen to forage repetitively around the roof and walls of the convent, and along mature trees adjacent to, but outside of, the site to the south, and sometimes around the mature Copper Beech and Sycamore beside the convent, and sometimes at a mature Horse Chestnut that was in flower in the SW corner of the site at Lat. 52.265103, Long. -8.268058.

During the second dusk emergence survey on 6 May 2024, a single Soprano Pipistrelle again emerged from the same part of the roof at sunset 21:08, again while it was still bright. It foraged around the walls and roof of the convent building and the Copper Beech and Sycamore again. A single Common Pipistrelle appeared at the back of the convent at just 11 minutes past sunset. It was not observed emerging from the building, but the early time after sunset would indicate that there is a roost of this species somewhere nearby to the site. No other bats emerged from the building, and repetitive foraging of one to two individuals of Soprano Pipistrelle and Common Pipistrelle continued for much of the dusk survey. Observations during the dusk surveys are put in context with the automated acoustic recording in the next section.

There was no artificial light in the study site, but there was some light spill from lights outside the church to the north of the site.

Observations of Barn Owl were also made during both dusk emergence surveys, indicating a likely breeding site for Barn Owl (Section 3.6).



Plate 11. Red arrow indicates emergence point of one Soprano Pipistrelle from the former Presentation Convent



Plate 12. Red arrow indicates emergence point of one Soprano Pipistrelle from the former Presentation Convent

3.5 Automated All-Night Acoustic Monitoring

The automated bat detectors detected five bat species overall in five nights, with the number of bat registrations and percentages of each species shown for each detector in Table 4. There was more bat activity detected at the rear of the convent building (2384 registrations) compared to the front (900 registrations). Soprano Pipistrelle was the most frequently recorded species at the rear (56.5% of registrations), while Common Pipistrelle was more frequently detected at the front (70.7%). This was consistent with dusk observations of mostly single individuals of Common Pipistrelle and Soprano Pipistrelle foraging close to the building. The detector microphones detected bats from outside the front and rear and above the roof of the convent building, because of the missing ceilings and holes in the roof. The timestamps of the registrations indicated activity of Common Pipistrelle and Soprano Pipistrelle throughout all hours of the nights. The relatively large amount of acoustic data generated likely comes from the repetitive flight and foraging behaviour of a small number of individuals, as was observed during both dusk emergence surveys. Even though the site would not seem

to provide an insect-rich habitat for bats, there was intense foraging activity by individuals, as evidenced by a high proportion of bat passes recorded with feeding buzzes, and observations of constant foraging activity by mostly single pipistrelles during the dusk surveys. Bat activity was quite variable between nights, as shown by the total number of bat registrations per night recorded by each detector in Table 5.

As shown in Table 4, there were very low activity levels of other bat species; Leisler's Bat was detected flying over the site rarely, despite its intense echolocation. Daubenton's Bat was detected only once at the rear of the building. Brown Long-eared Bat were detected just three times at the rear of the building, once on each of 3rd, 4th and 6th May 2024. There was no evidence to suggest roosting of these latter species.

Table 4. Total bat registrations per bat species/group during 5 full nights 1.5.2024 - 6.5.2024 recorded by the automated bat detectors at the rear (detector A) and front (detector B) of the former convent building.

Bat species/group	Detector A (fire escape at rear)		Detector B (inside front door)	
	Total registrations	Percentage	Total registrations	Percentage
Soprano Pipistrelle	1230	56.5%	254	28.2%
Common Pipistrelle	908	41.7%	636	70.7%
'50kHz Pipistrelle' (either SP or CP)	19	0.9%	0	0.0%
Leisler's Bat	15	0.7%	10	1.1%
Brown Long-eared Bat	3	0.1%	0	0.0%
Daubenton's Bat	1	0.1%	0	0.0%
Totals	2384	100.0%	900	100.0%

Table 5. Total bat registrations (all species combined) each night for during 5 full nights 1.5.2024 - 6.5.2024 recorded by the automated bat detectors at the rear (detector A) and front (detector B) of the former convent building.

Night	Dates	Detector A (fire escape at rear)	Detector B (inside front door)
		Total bat registrations	Total bat registrations
1	1-2 May 2024	348	286
2	2-3 May 2024	48	1
3	3-4 May 2024	621	58
4	4-5 May 2024	445	426
5	5-6 May 2024	714	129
	Totals	2384	900

Detector A at the rear of the convent (where the Soprano Pipistrelle emerged from during the dusk surveys) provides corroborating evidence that the Soprano Pipistrelle was likely roosting there every day during the period. Early detection of acoustic activity of Soprano Pipistrelle after sunset, and close to sunrise when it would have been getting very bright, are presented in Table 6 below. It is a minor summer day roost of a single individual.

Table 6. Timing of nightly onset/cessation of recorded Soprano Pipistrelle activity recorded by Detector A at fire escape to the rear of the former convent building

Night	Date 1 (sunset)	Date 2 (sunrise)	Minutes after sunset	Minutes before sunrise
1	01 May 2024	02 May 2024	6	NA, last recorded at 02:18
2	02 May 2024	03 May 2024	3	37
3	03 May 2024	04 May 2024	-33 (emerged in daylight before sunset)	27
4	04 May 2024	05 May 2024	19	15
5	05 May 2024	06 May 2024	26	17
6	06 May 2024	NA, detector collected after dusk survey	0 (emerged at sunset)	NA, detector collected after dusk survey

3.6 Other Ecology of Note - Barn Owl Nesting

Barn Owl was heard vocalising and seen in flight during both of the dusk emergence surveys, and was nesting somewhere inside the ruins of the former convent building. The exact nesting location within the building is unknown, but all of the activity was at the rear of the building, near the roof. The automated bat detector attached to the fire escape at the rear of the building (detector A, Plate 3) also recorded barn owl vocalisations at various times throughout the nights during all five full nights of recording from 1-6 May 2024 (see example of a sonogram with recordings of Barn Owl, as well as Common Pipistrelle and Soprano Pipistrelle in Plate 13). Detector A detected some of the louder alarm or contact calling, but not the quieter repetitive wheezing/snoring calls that were coming from a stationary position inside the convent. Detector B didn't record any Barn Owl vocalisations. The former convent building is a probable breeding site

for Barn Owl. Barn Owl is Red-listed according to Birds of Conservation Concern in Ireland 2020-2026, and is classified as of high conservation concern. Other bird species also incidentally recorded nesting in the ruins were Blue Tit, Blackbird, Swallow, and Jackdaw. The nest sites of all birds are strictly protected, and it is illegal to cause damage or disturbance to such nests. Two Swifts also flew over the site near sunset, but were not observed returning to nests in the building. Grey wagtail also flew through the site.

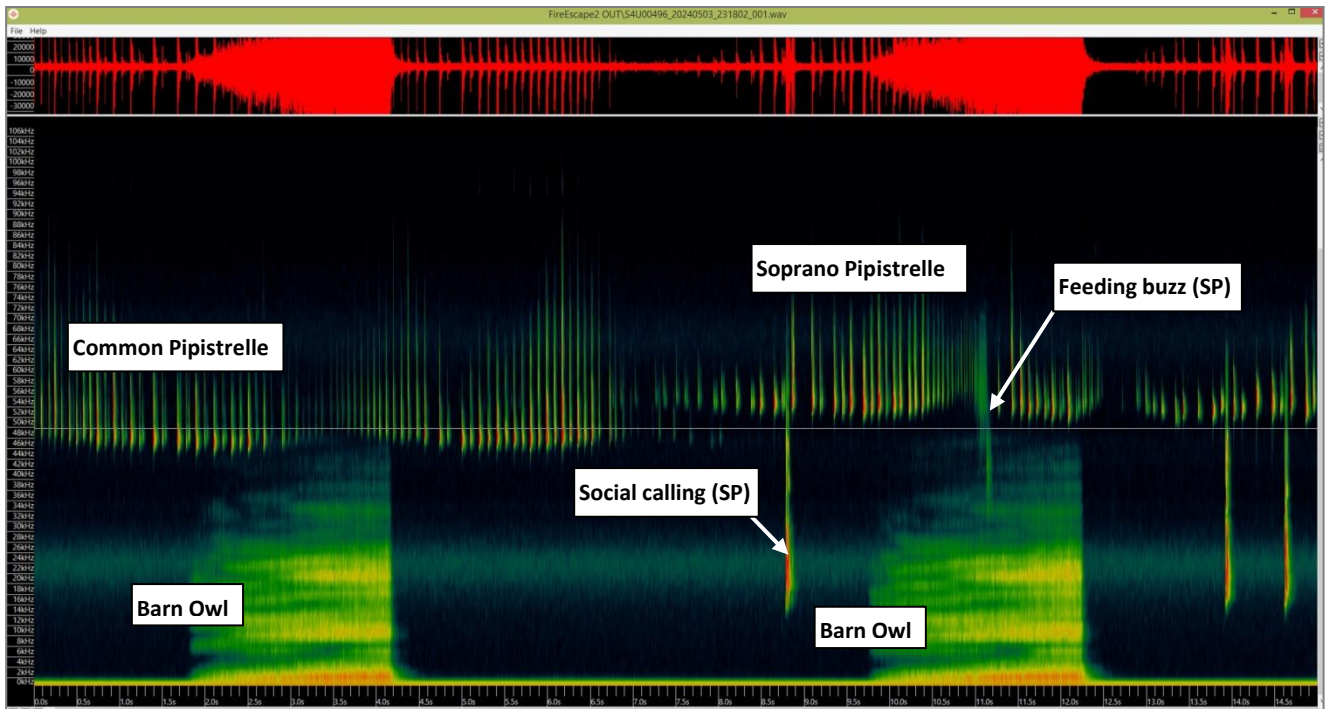


Plate 13. Example of sonogram showing flight pulses of Common Pipistrelle and Soprano Pipistrelle, social calling and feeding buzzes of Soprano Pipistrelle, as well as vocalisations of Barn Owl recorded by the detector at fire escape.

4. Assessment of Potential Impacts on Bats

During these bat surveys, five of the nine resident bat species known to Ireland were recorded. The site was mainly used by a small number of individuals of the more common bat species, Common Pipistrelle and Soprano Pipistrelle. Less common bat species, Leisler's Bat, Daubenton's Bat, and Brown Long-eared Bat were seldom detected using the site. All species recorded are Annex IV species under the EU Habitats Directive and all have favourable conservation status (Table 1).

Restoration and conversion of the former convent building into a number of residential dwellings would result in physical disturbance and destruction of the soffit box/roof space where a single Soprano Pipistrelle was roosting, and could potentially result in injury/death of a bat (see mitigation measures below to prevent this).

There is potential for a loss of foraging opportunities for bats due to temporary loss of cover of vegetation, and associated insects, during the construction phase. The importance of the three remaining mature trees on the site to provide foraging opportunities for bats was evident during dusk emergence survey observations of foraging pipistrelles. These three trees are being protected and remaining on site post-construction. The planting of native tree species during the landscaping plan will ensure that shelter and foraging opportunities for bats are restored/created in the long-term.

Increased levels of artificial lighting at the site post-construction may negatively impact on all bat species in terms of roosting, foraging, and commuting through the site. The two species using the site most (in small numbers only), Soprano Pipistrelle and Common Pipistrelle can tolerate low levels of lighting, while Daubenton's Bat and Brown Long-eared Bat are more sensitive to artificial lighting. The lighting design is the standard lux levels required for health and safety in residential developments. Lighting is designed to be downward-directed, and to minimise unnecessary light spill.

The impact on bats of the demolition of the nursing home wing that has already taken place is unknown. Potential/possible impacts to bats that may have occurred include injury/death to roosting bats, and the permanent loss of a bat roost (although the 2018 daytime bat survey did not find any visual signs of bat roosting). Given the urban setting, any such roosts were more likely to be those of the more common bat species that are relatively more tolerant of urban environments, Soprano Pipistrelle or Common Pipistrelle, although other bat species do sometimes roost in

semi-urban settings. The site is outside of the known range of the Annex II species, Lesser Horseshoe Bat. Proposals for appropriate remediation of a potential loss of a roost site are included in Section 5.

5. Bat Derogation Licensing Requirements and Recommended Bat Mitigation Measures

The developer has undertaken to submit an **application for a bat roost disturbance/destruction license to the National Parks and Wildlife Service** in relation to the roost of a single Soprano Pipistrelle in the roof of the former convent building. The bat mitigation measures outlined here will form a basis for the bat license application. No works to the bat roost area will take place unless such a license is granted by the NPWS. It is considered that other ongoing site work around the protected structure can proceed without disturbance to this minor roost.

In the hierarchy of bat roost conservation significance, and proportionate mitigation, presented in the latest Bat Mitigation Guidelines for Ireland (Marnell *et al.* 2022), a minor roost of a single Soprano Pipistrelle is at the lower end of conservation significance, as shown in Plate 14 below from those guidelines.

Low	Roost status	Mitigation/compensation requirement (depending on impact)
	Feeding perches of common/rarer species	
	Individual bats of common species	Flexibility over provision of bat-boxes, access to new buildings etc. No conditions about timing or monitoring
	Small numbers of common species. Not a maternity site	
	Feeding perches of Annex II species	Provision of new roost facilities where possible. Need not be exactly like-for-like, but should be suitable, based on species' requirements. Minimal timing constraints or monitoring requirements
	Small numbers of rarer species. Not a maternity site	
	Hibernation sites for small numbers of common/rarer species	Timing constraints. More or less like-for-like replacement. Bats not to be left without a roost and must be given time to find the replacement. Monitoring for 2 years preferred.
	Maternity sites of common species	
Conservation significance		
	Maternity sites of rarer species	Timing constraints. Like-for-like replacement as a minimum. No destruction of former roost until replacement completed and usage demonstrated. Monitoring for at least 2 years.
	Significant hibernation sites for rarer/rarest species or all species assemblages	
	Sites meeting SAC guidelines	Oppose interference with existing roosts or seek improved roost provision. Timing constraints. No destruction of former roost until replacement completed and significant usage demonstrated. Monitoring for as long as possible.
	Maternity sites of rarest species	
High		

Plate 14. Guidelines for proportionate mitigation. The definition of common, rare and rarest species requires regional interpretation (Marnell *et al.* 2022). Red boxes indicate where the Soprano Pipistrelle roost fits in this scheme.

Bat Mitigation Measures

The developer has undertaken to the following bat mitigation measures;

1. Hand removal of materials in the area near the bat roost location, such as slates, felt, roof timbers and soffit box materials, (Plate 11 and Plate 12) under supervision of a bat specialist licensed to handle bats. There are no conditions about the timing of these works (in line with guidance in Plate 14).
2. Bat boxes on former convent building:
Erect 1 x "Schwegler Summer Bat Roost 1FQ" and 1 x "Schwegler Bat Winter Roost 1WQ" to remediate for the potential loss of bat roosting opportunities in summer and winter due to the development.
 - Discretion to change the bat box model is recommended, in case there are any delays or shortages in obtaining the boxes from suppliers. Any alternative model to the 1FQ should provide summer bat roosting conditions, and alternatives to the 1WQ should provide conditions suitable to hibernation. Alternative boxes, if necessary, should be selected under the advice of a suitably qualified bat ecologist.
 - Bat boxes to be installed just beneath the eaves of the **south-facing** elevation of the three-storey part of the former convent building, above the roof of the two-storey part of the building, as indicated in Plate 15. This location will be in darkness because it is not near roads or footpaths, and will provide a relatively undisturbed and discreet location for bat boxes. It is also close to the current roost location.
3. Bat boxes on trees:
Erect 2 x "ANS-5 Bat Boxes" on the mature trees remaining on site. They should be securely attached facing any direction apart from north, and at c4-5m from the ground. The entrances should not be obscured by branches so that there is some uncluttered flight space around them. Bat boxes should not be hung where there is little or no artificial light spill onto them.

These bat box models are currently available to buy on e.g. <https://www.veldshop.nl/en/nest-boxes/bat-boxes/>

4. Native tree planting:
Native tree planting has already been included in the landscape plan. As much native tree planting as possible on the site will improve the foraging and shelter resources for bats.



Plate 15. Proposed location (red arrow) of bat boxes under eaves of south wall of the three storey part of the former convent building, above the roof of the two storey part.

References

- Boston, E., Buckley, D., Bekaert, M., Gager, Y., Lundy, M., Scott, D.D., Prodohl, P.A., Montgomery, W.I., Marnell, F. & Teeling, E.C. (2010) The status of the cryptic bat species, *Myotis mystacinus* and *Myotis brandtii*, in Ireland. *Acta Chiropterologica*, **12**, 457–461.
- Collins, J. ((editor). (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 4th edition. Bat Conservation Trust UK.
- Hundt, L. (2012) *Bat Surveys: Good Practice Guidelines, 2nd Edition*. Bat Conservation Trust.
- Knight, T. & Jones, G. (2009) Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat *Rhinolophus hipposideros*. *Endangered Species Research*, **8**, 79–86.

- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat Mitigation Guidelines for Ireland v2. Irish Wildlife Manuals No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.
- Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12, Terrestrial Mammals. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- Mullen, E. (2007) Brandt's bat *Myotis brandtii* in County Wicklow. *The Irish Naturalists' Journal*, **28**, 343.
- NPWS. (2019) *The Status of EU Protected Habitats and Species in Ireland. Volume 1.*
- Roche, N., Aughney, T., Marnell, F. & Lundy, M. (2014) *Irish Bats in the 21st Century*, 1st ed. Bat Conservation Ireland.
- Voigt, C.C. & Kingston, T. (2016) *Bats in the Anthropocene: Conservation of Bats in a Changing World*, 1st ed (eds CC Voigt and T Kingston). Springer.

Appendices

Appendix A: Roost Types Used by Bats

Text adapted from (Hundt 2012)

- **Transitional Roost (generally April-September/October)**
On waking from hibernation or in the period prior to hibernation, bats search for roosts in which they stay for only a few days or on some occasions several weeks. These transitional roosts can be occupied by a few individuals or occasionally small groups. The transitional roosts used prior to hibernation are generally cool and thus may allow bats to reduce their energy requirements before going into hibernation.
- **Maternity Roost (generally May-August)**
Breeding females gather together around the beginning of May to form nursery colonies. During this period gestation begins with births typically occurring between June and July. The females and their young remain within the maternity roost until the young are weaned and independent (late July-August). These roosts tend to break up between August and September. Adult males are rarely found within these colonies. However, the adult males of long-eared bats, Daubenton's, Natterer's and lesser horseshoe bats can be found roosting within maternity colonies with their numbers increasing throughout the active season.
- **Satellite Roost (generally May-August)**
Breeding females may have alternative roost sites in close proximity to the main nursery colony. These are referred to as 'satellite roosts'. The number of bats using these roosts can vary greatly, from a few individuals, to small groups.
- **Mating Roost (generally September-November)**
All Irish bats are polygynous i.e. males mate with several females. Mating generally takes place from late summer and can continue through the winter. A number of different mating strategies are used by bats, though males of some species establish mating roosts, whereby they defend territory and display/call to females to mate.
- **Hibernation Roost (generally October-March)**
Depending on the weather and food availability, bats tend to move to hibernation sites from October. Hibernation roosts can vary greatly in terms of the number of individuals and the diversity of species that occupy them. However, they tend to have a constant cool temperature and high humidity, which allows the bats to use less energy regulating their temperature. Bats will wake occasionally during hibernation to drink and feed.
- **Night Roost (generally March-November)**
Bats may use roosts other than traditional day roosting sites to rest in during the night. These roosts vary in their conservation significance. Night roosts may be used by a single individual on occasion or they could be used regularly by the whole colony. Studies have shown that night roosts may be of particular importance to some species such as the lesser horseshoe bat, providing key resting places within core foraging areas.
- **Day Roost (generally March-November)**
These roosts are used during the day to rest in. Males of most Irish species spend the summer roosting alone or in small groups with other males in such roosts. Bats may regularly use a number of day roosts, switching between them on a daily basis, though conversely they may occupy the same roosting site for several weeks.
- **Feeding Roost (generally May-November)**
These roosts can be occupied by a single animal or a few individuals throughout the active season. They vary in their significance as they may be used by the whole colony or just a few individuals to feed, to shelter from the weather or to rest temporarily. Feeding roosts are often used by *Plecotus* and *Rhinolophus* species.
- **Swarming Sites**
Swarming takes place between August and November, whereby large numbers of bats from several species gather, generally around caves and mines. They are often dominated by the *Myotis* species and appear to be important mating sites with some bats travelling tens of kilometres to reach these areas. A proportion of the bats that travel to these sites will remain to hibernate.