Bat Survey and Assessment

Lower Road

Crosshaven

Co. Cork

Final Report prepared for Cork County Council

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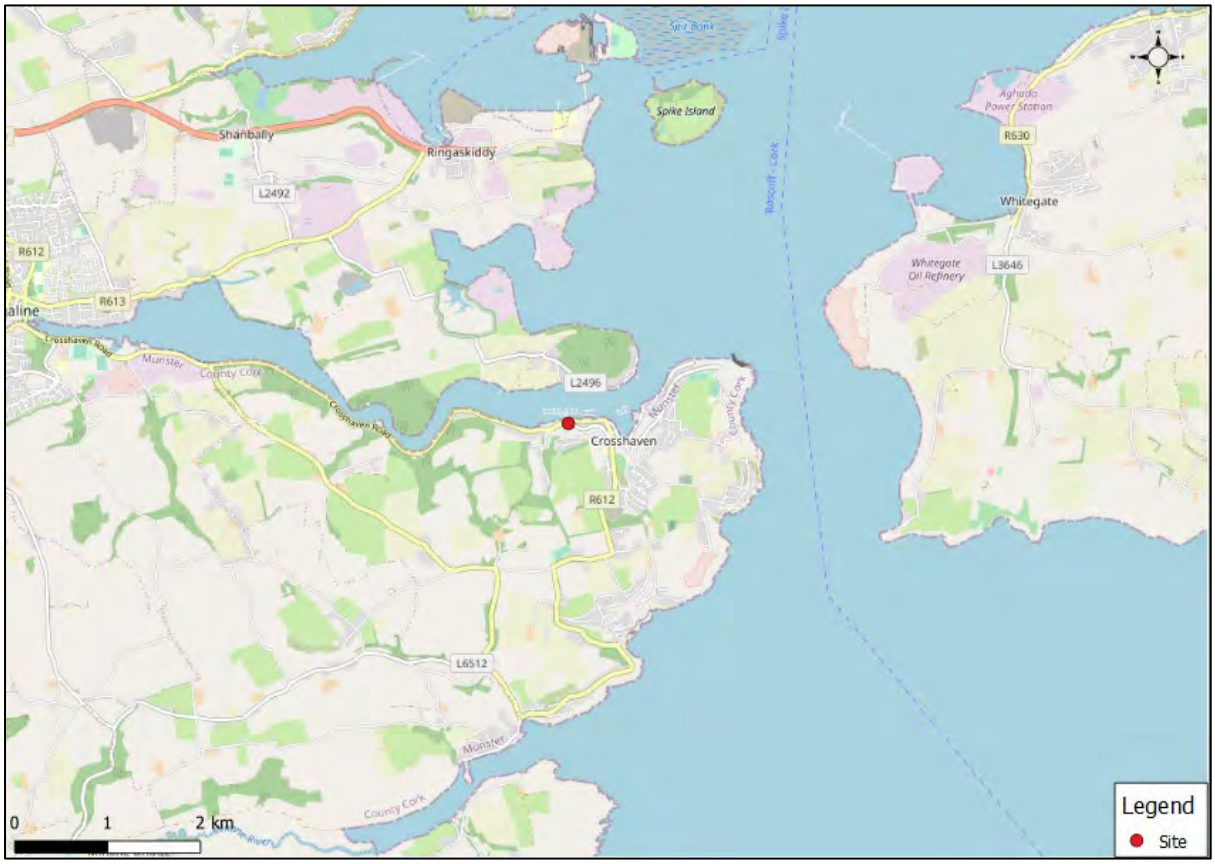
1 Introduction

This report has been prepared by Karen Banks, Greenleaf Ecology, at the request of Cork County Council. It is proposed to renovate 7 no. dwellings at Lower Road, Crosshaven, Co. Cork.

A protected species survey of the proposed site, comprising a bat survey, was undertaken to assess the presence or absence of bats prior to commencement of development.

The site is located in the townland of Knocknagore, as illustrated in Figure 1.1.

Figure 1-1: Site Location Map



1.1 Site Summary and Context

The proposed development is located in the townland of Knocknagore, Crosshaven, Co. Cork. The site comprises a 7 no. disused dwellings, associated outbuildings and vegetated area to the south of the dwellings.

1.2 Description of the Proposed Project

It is proposed to sensitively refurbish 7 no. cottages to include:

- New internal walls
- New internal Doors
- New mechanical and electrical installations
- New sanitary ware and kitchen
- New external windows and doors
- New porch to selected cottages

Outbuildings associated with the dwellings and vegetation in lands to the south of the dwellings will be cleared.

1.3 Legislative Context

All Irish bats are protected under the Wildlife Act (revised). Also, the EC Directive on The Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats, and requires that appropriate monitoring of populations be undertaken. Across Europe they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

All bats are listed in Annex IV of the EU Habitats Directive (92/43/EC) and the Lesser Horseshoe bat is further listed under Annex II of the same Directive.

Local Planning Authorities are required to give consideration to nature conservation interests under the guidance of the SEA Directive 2001/42/EC. This Directive states that the protected status afforded to bats means that planning authorities must consider their presence in order to reduce the impact of developments through mitigation measures.

Destruction, alteration or evacuation of a known bat roost is a notifiable action under current legislation and a derogation licence has to be obtained from the National Parks and Wildlife Service (NPWS) before works can commence.

In addition, it should be noted that any works interfering with bats and especially their roosts, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by the NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

1.4 Objectives

The objectives of the bat survey were to assess:

- The potential suitability of the proposed site for roosting bats;
- Whether or not bats are roosting within the buildings and vegetation present within the site and how many bats these roosts support (i.e. size and importance);
- Make an assessment of the potential impacts of the proposed renovation of the buildings and site clearance on bats; and
- To provide appropriate mitigation measures to remove or reduce impacts.

2 Methodology

2.1 Desk Study

A pre-survey data search was conducted in order to collate existing information from the footprint of the site and its surrounding area on bat activity, roosts and landscape features that may be used by bats. The data search comprised the following information sources:

- Collation of known bat records from the National Bat Database held by the National Biodiversity Data Centre (www.biodiversityireland.ie); and
- Review of Ordnance Survey mapping and aerial photography of the site and its environs.

2.2 Field Survey

This bat survey and assessment was undertaken in accordance with the following guidelines:-

- BTHK. (2018). Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Pelagic Publishing, Exeter UK.
- Bat Conservation Ireland, (2010). Guidance notes for Planners, Engineers, Architects, and Developers;
- Collins, J. (ed.) (2016). Bat Surveys for Professional ecologists: Good Practice Guidelines (3rd ed.). The Bat Conservation Trust, London;
- Kelleher, C. & Marnell, F. (2006). Bat Mitigation Guidelines for Ireland; and
- NRA (2006). Guidelines for the Treatment of Bats During the Construction of National Road Schemes.

2.3 Surveyor Information

The survey was undertaken by Karen Banks, MCIEEM.

Karen is an ecologist with 15 years' experience in the field of ecological assessment. Karen is an experienced and skilled bat surveyor, first gaining a scientific licence to disturb bats from Natural England, UK in 2008. Karen is trained in bat handling and capture methods and currently holds a bat disturbance licence granted by the NPWS. Karen has undertaken bat survey and assessment for numerous projects, including bridge repair and replacement works, domestic dwelling repair and demolition works, wind farm developments and large scale infrastructure projects such as flood relief schemes, road developments and pipeline schemes.

2.4 Bat Roost Inspection Survey

Trees

A detailed inspection of the exterior of trees present at the site was undertaken on 25th August 2021 to look for features that bats could use for roosting (Potential Roost Features, or PRFs) from ground level. The aim of the survey was to determine the actual or potential presence of bats and the need for further survey and/or mitigation.

A detailed inspection of each potential tree roost within the site was undertaken. The inspection was carried out in daylight hours from ground level, and information was compiled on the tree, PRFs and evidence of bats. All trees surveyed were numbered and marked on a map and a description of each PRF observed was recorded. PRFs that may be used by bats include:

- Rot holes;
- Hazard beams;
- Other horizontal or vertical cracks or splits (e.g. frost cracks) in stems or branches;
- Lifting bark;

- Knotholes arising from naturally shed branches or branches previously pruned back to the branch collar;
- Man-made holes (e.g. flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers in which cavities have developed;
- Other hollows or cavities;
- Double leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and
- Bat or bird boxes.

Signs of a bat roost (excluding the actual presence of bats), include:

- Bat droppings in, around or below a PRF;
- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather; and
- Staining below the PRF.

It should be noted that bats or bat droppings are the only conclusive evidence of a roost and many roosts have no external signs. Therefore, this survey and evaluation was relatively basic as only those PRFs at ground level could be inspected closely to ascertain their true potential to support roosting bats. Trees were categorised according to the highest suitability PRF present.

Structures

On 25th August 2021 the existing buildings at the site were surveyed for potential roost sites and signs of bats. The survey utilised a high powered torch, close focussing binoculars and an endoscope (Explorer Premium 8803 with 9mm camera) where required. The external inspection involved looking for bat droppings on the ground, stuck to walls, windowsills or in crevices in the stone work and recording suitable entry and exit points.

The internal inspection involved looking for features that may be suitable for roosting bats, such as joints and crevices in wood, holes or crevices between stonework in the walls and searching for bat droppings, urine stains and feeding signs on the floor.

The following criteria were used to determine the potential suitability of the site for bats (Table 2-1)[1].

Table 2-1: Criteria for Assessing the Potential Suitability of the Site for Bats

Suitability	Description Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).	Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.

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

	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.5 Emergence Roost Survey

Dusk surveys of the buildings were undertaken on 25th and 26th August 2021 in order to watch and listen for bats exiting bat roosts to determine the presence or absence of bats at the time of survey. The surveys were undertaken by two people (Ms. Karen Banks and Mr Cathal MacPartholán). The dusk emergence surveys commenced approximately 15 minutes before sunset and ended approximately 90 minutes after sunset. The surveys were undertaken in suitable weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (12°C)).

Two Anabat Walkabout detectors were utilised for the survey, which record bat echolocation calls directly on to an internal SD memory card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded. Data was then downloaded and all recordings were analysed by the Anabat Insight software analysis programme version 1.9.2.

3 Results

3.1 Existing Bat Data

The review of existing records of bat species in the area of the site indicates that five of the ten known Irish species of bat have been recorded within a 4km radius of the proposed site. These bats include pipistrelle species (*Pipistrellus pipistrellus sensu lato*), soprano pipistrelle (*P. pygmaeus*), Leisler's (*Nyctalus leisleri*), brown long-eared (*Plecotus auritus*) and Daubenton's bat (*Myotis daubentonii*) as shown in Table 3-1 below. Of these species, soprano pipistrelle has been recorded roosting in a building c.1.8km to the north-east of the site, brown long-eared bat has been recorded roosting in a building within 1km OS grid square W7961 and Leisler's bat has been recorded roosting in a building located c.0.8km to the east of the site.

Table 3-1: NBDC and NPWS bat records within a 4km radius of the proposed site

Common Name	Scientific Name	Present	Date of Last Record	Location of Known Roost (to 1km OS Grid Square Resolution)
Pipistrelle spp.	*Pipistrellus pipistrellus sensu lato*	√	28/06/2008	None
Soprano Pipistrelle	*Pipistrellus pygmaeus*	√	24/07/2014	W7961
Nathusius's Pipistrelle	*Pipistrellus nathusii*			
Leisler's Bat	*Nyctalus leisleri*	√	16/08/2011	W7961
Brown Long-eared Bat	*Plecotus auritus*	√	28/08/2014	W7961
Daubenton's Bat	*Myotis daubentonii*	√	28/06/2008	None
Whiskered Bat	*Myotis mystacinus*			
Natterer's Bat	*Myotis nattereri*			
Lesser Horseshoe Bat	*Rhinolophus hipposideros*			
Brandt's Bat	*Myotis brandtii*			

The bat landscape association model (Lundy *et al,* 2011) suggests that the site is part of a landscape that is of moderate to high suitability for bats including common pipistrelle, soprano pipistrelle, brown long-eared, Leisler's, Daubenton's, natterer's and whiskered bat. The proposed site and its environs are of low suitability for Nathusius' pipistrelle and is outside of the distribution range for lesser horseshoe bat (Roche *et al*, 2014).

3.2 Habitat Description

The dwellings comprise 7 no. terraced cottages (Plate 3-1). In relation to potential bat habitats within the buildings, the characteristics of the dwellings are the same and so are described as one in the following section.

The subject of the survey comprises 7 no. 2-storey terraced houses with rendered walls. The windows and doors of the properties have been boarded up. The roof is constructed of timber beams and slate roof tiles. There is no membrane to the roof tiles. The guttering is fixed to concrete coping stones; there are no soffits. Internally, no evidence of bats was recorded and the loft spaces contained many cobwebs.

Outbuildings to the south of the dwellings are constructed of stone and are obscured by heavy growth of Traveller's Joy, Bramble and Himalayan Honeysuckle (Plate 3-2).

The land to the south of the dwellings is overgrown with Bramble, Himalayan Honeysuckle, Butterfly Bush and Willow scrub (Plate 3-3). Semi-mature Sycamore and Willow are present to the north and centre of the land to the rear of the dwellings. A linear band of semi-mature Beech, Sycamore and Hawthorn, and Birch saplings are present at the southern boundary of the site (Plate 3-4). One mature Hawthorn present on the southern site boundary supports lifting bark and Ivy growth and one Sycamore to the centre of the site supports Ivy growth.

The site is connected to suitable foraging habitat in the surrounding landscape by the scrub and trees present to the rear of the dwellings. Areas of broadleaved woodland are present to the southwest and west of the site.

Plate 3-1: Row of terraced cottages.

Plate 3-2: Outbuilding overgrown with vegetation to the south of the dwellings

Plate 3-3: Willow scrub in vegetated area to the south of the dwellings

Plate 3-4: Beech located on the southern site boundary

3.3 Bat Roost Survey

3.3.1 Potential Bat Access Points

The slate roof tiles are generally in relatively good upkeep, however, there are some gaps between the roof tiles, under the ridge tiles and also under chimney flashing.

Plate 3-5: Tiles in good condition over most of the roof

3.3.2 Bat Roosting Potential

3.3.2.1 Structures

The roof space of the dwellings supports potential roosting habitat for bats on wooden beams and within the ridge tiles. The buildings are considered to be of moderate suitability for roosting bats as they provide one or more potential roost sites that could be used by bats.

3.3.2.2 Trees

One mature Hawthorn present on the southern site boundary supports lifting bark and Ivy growth and one Sycamore to the centre of the site supports Ivy growth; these trees are considered to be of low suitability as roosting or resting places for bats. The location of trees with low roosting potential is illustrated in Figure 3-1.

The site is linked to other suitable foraging and commuting habitat in the surrounding landscape by the vegetation present to the south of the dwellings. Areas of broadleaved woodland present to the southwest and west of the site would provide good foraging habitat. Overall, the dwellings and surrounding habitat is considered to be of moderate suitability for bats.

3.3.3 Evidence of Bats

The buildings and the roof void were examined externally and internally with close focussing binoculars and a high powered torch (as appropriate). No evidence of bats (e.g. actual sightings, droppings, feeding remains, scratch marks, urine stains) was observed during the inspection of the buildings.

No evidence of bats was recorded during the inspection of the trees at the proposed site.

Figure 3-1: Lower Road, Crosshaven- trees supporting low roosting potential

3.4 Bat Activity Survey

One common pipistrelle bat was recorded emerging from the roof of dwelling no. 8 (entry/ exit point illustrated in Plate 3-6).

No emergent bats or bat roosts were identified in the outbuildings or trees during the emergence roost surveys.

Plate 3-6: Lower Road, Crosshaven- emergence/ re-entry point for single common pipistrelle

Three species of bat were recorded during the dusk activity survey: soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*P. pipistrellus*) and Leisler's bat (*Nyctalus leisleri*). As noted above, one common pipistrelle emerged from dwelling no. 8 and foraged along the vegetation to the south of the dwellings. A single soprano pipistrelle was recorded foraging to the rear of the dwellings and Leisler's bat was recorded commuting overhead on three occasions.

3.5 Significance of the Structure for Bats

The dwellings provide roosting opportunities for at least one species of bat. The surrounding landscape provides potential foraging and commuting habitat along domestic gardens, treelines and broadleaved woodland. No evidence of bats was recorded within the buildings, however, one common pipistrelle bat was recorded emerging from the roof of dwelling no. 8 on 25th August 2021. Dwelling no. 8 is considered to be a day roost for common pipistrelle in the summer. The buildings would not provide the stable conditions required for roosts of high conservation significance. The roost is of low conservation significance (in accordance with the *Bat Mitigation Guidelines for Ireland*).

The bat species recorded roosting and foraging at the site are of Least Concern (Marnell et al., 2019) and are of Favourable conservation status (NPWS, 2019).

4 Potential Impacts

Cork County Council propose to renovate the existing buildings at the site and clear the lands located to the south of the dwellings. Should works to the roof of dwelling no. 8 be required, there is potential for disturbance to a minor common pipistrelle roost should the roof renovation works be undertaken during the active season for bats (April to September).

While no bat roosts were identified during the course of the surveys within the vegetation located to the south of the dwellings, two trees supporting low suitability as roosting or resting places for bats were recorded within these lands. The two trees of low suitability for bats may be used occasionally as roosting or resting places by individual/ small numbers of bats. Therefore, there is potential for adverse impacts to individual/ small numbers of bats as a result of the removal of trees during the construction phase.

There is also potential for clearance of vegetation to the south of the dwellings to result in a reduction in available insect prey species and, in turn, a reduction in foraging area for bats.

5 Mitigation Measures

Bats utilise the roof space of dwelling no. 8 for roosting, therefore, safeguards are recommended to ensure the safety of these animals during works.

Measure 1: timing of demolition works

In accordance with the *Bat Mitigation Guidelines for Ireland*, the optimum time for undertaking works to a building supporting a summer roost (not a proven maternity site) is between 1st September and 1st May.

Works to the roof of dwelling number 8 shall occur between 1st September and 1st May.

Application for a derogation licence

NB: Work on a known bat roost is a notifiable action under current legislation and a derogation licence has to be obtained from the National Parks and Wildlife Service before works on the roost can commence. Such a licence is required if works to the roof of dwelling number 8 are proposed, including change in roofing materials, alteration to bat access points and structural changes to the roost. No such works shall be undertaken to the roof of dwelling no. 8 before the licence is granted by the NPWS.

Measure 2: pre-construction survey

Confirmed Roost: The building will be subject to a daytime inspection or dusk/ dawn survey (depending on season and weather conditions) for evidence of bat usage prior to the commencement of works. In the event that no evidence of bat usage is found during the inspection, renovation works can commence. Should bats be found within the building, works will be delayed until they are no longer present (i.e. they have naturally flown from the roost). Prior to commencement of works the bat specialist will brief contractors on the possible presence of bats on the site, the subsequent need to take appropriate care and attention whilst carrying out the works and the steps to take should bats be discovered at the site at any time (i.e. stop works and inform the bat specialist). Active bats will usually keep out of the way of any operations, but torpid bats may need to be gently temporarily placed in a box until dusk and released on site.

Potential Roosts: Dwellings no. 4, 5, 7, 9, 10 and 11 have not been confirmed as bat roosts but are regarded to have moderate potential for bats. A bat detector assessment of these properties will be carried out if roofing works are proposed during the period May – August. These dwellings will be subject to a dusk/ dawn roost survey prior to commencement of roofing works to determine the presence or absence of bats. In the event that no evidence of bat usage is found during the assessment, development can commence. Should bats be found, development will be delayed and a derogation license will be required from NPWS wildlife licencing section.

Measure 3: timber treatment

Any necessary timber treatment operations e.g. within the roof space, shall be carried out during the winter months - November to March. Bat safe poisons shall be used throughout and any bats discovered during spraying operations shall not be sprayed directly. Should bats be discovered during spraying operations, then the work shall cease immediately. An experienced bat specialist shall then be consulted. The owner and building contractor shall ensure that only bat safe, pre-treated timbers are used where necessary during renovations to the roof space. For further information on timber treatment please refer to Appendix A.

5.1 Further Recommendations

Retention of roost access

Where feasible, access to the roost space shall be retained. Access for crevice dwelling bats such as common pipistrelle can be as small as 15-20mm high x 20-50 mm wide and simple, for example the use of an adapted tile.[2]

Landscaping

Landscaping of the lands to the rear of the dwellings should retain boundary trees and shrubs where feasible. Enhancement planting of native trees and shrubs is recommended where there are gaps in the existing site boundary. This would enhance the biodiversity of the site and provide foraging and commuting habitat for bats and maintain connectivity to the wider landscape.

Enhancement

The following recommendations for enhancement are adapted from *Landscape and Urban Design for Bats and Biodiversity* (Gunnell, 2012). To attract nocturnal flying insects, plant:

- Mixtures of flowering plants, trees (including fruit trees) and shrubs to encourage a diversity of insects to sustain bats and other wildlife throughout the year. It is recommended that new planting should include pollinator friendly tree species including locally appropriate species listed in the Pollinator Friendly Planting Code[3]. Hedgerows should include a range of different species to provide food throughout the year, for example willows and blackthorn for early season nectar; hawthorn, bramble and rose for summer flowers and autumn berries; ivy for autumn nectar and later winter berries;
- Flowers that vary in colour, fragrance, shape, amount of nectar and time of flowering;
- Pale flowers that are more easily seen in poor light, so attracting insects at dusk;
- Single flowers, which tend to produce more nectar than double varieties; and
- Flowers with insect-friendly landing platforms and short florets, like those in the daisy or carrot families.

Other enhancement options include:

- Integrated bat boxes built into the structure of buildings (with the majority located on southern orientations)
- SUDs features, such as rain gardens

[2] Example bat access tile available at: Bat Access Tile Set | NHBS Naturschutz

[3] National Biodiversity Data Centre (2021) Pollinator Friendly Planting Code. All-Ireland Pollinator Plan 2021-2025. www.biodiversityireland.ie/pollinator-plan.

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Appendix A: Timber Treatment

Treatment of timber in areas where bats are roosting or can potentially access can be a hazard for bats if the wrong chemicals are used or applied at the wrong time of the year. In the past the use of products such as lindane resulted in mass deaths of bats in attic spaces. However, many of these old style chemicals have been banned and safer chemicals are now used. However, it is essential to check out the ingredient list of the chemical product proposed to be used to ensure that it is safe to use in a bat roost. Sometimes, there is a label that indicates mammal friendly products. Relatively safe chemicals considered safe to use in bat roosts at the correct levels and at the right time of the year are permethrin, cypermethrin and synthetic pyrethroids.

Where spraying or painting of chemicals is required on-site, this should be kept to a minimum and undertaken while bats are not present and allowed to dry in-situ for at least 8 weeks before bats return to the roost (Bat Conservation Ireland, 2014).

Appendix B: Description of Irish Bat Species

Ireland has ten known bat species from two distinct families. Each is briefly described below. For a more comprehensive overview see Roche *et al* (2014). The conservation status of each species is derived from NPWS (2019).

Vespertilionidae:

Common pipistrelle (*Pipistrellus pipistrellus*)

This species was only recently separated from its sibling, the soprano or brown pipistrelle *P. pygmaeus*, which is detailed below (Barratt et al, 1997). The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland. The conservation status of this species is Favourable.

Soprano pipistrelle (*Pipistrellus pygmaeus*)

The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle on detector. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings but tree holes and heavy ivy are also used. Roost numbers can exceed 1,500 animals in mid-summer. The conservation status of this species is Favourable.

Nathusius' pipistrelle (*Pipistrellus nathusii*)

Nathusius' pipistrelle is a recent addition to the Irish fauna and has mainly been recorded from the north-east of the island in Counties Antrim and Down (Richardson, 2000) and also in Fermanagh, Longford and Cavan. It has also been recorded in Counties Cork and Kerry (Kelleher, 2005). However, the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. The conservation status of this species is Favourable.

Leisler's bat (*Nyctalus leisleri*)

This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddis-flies and beetles. The echolocation calls are sometimes audible to the human ear being around 15 kHz at their lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. The conservation status of this species is Favourable.

Brown long-eared bat (*Plecotus auritus*)

This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey. Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversize ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector. Furthermore, keeping within the foliage, as it does, it is easily overlooked. It prefers to roost in old buildings. The conservation status of this species is Favourable.

Natterer's bat (*Myotis nattereri*)

This species has a slow to medium flight, usually over trees but sometimes over water. It usually follows hedges and treelines to its feeding sites, consuming flies, moths, caddis-flies and spiders. Known roosts are usually in old stone buildings but they have been found in trees and bat boxes. The Natterer's bat is one of our least studied species and further work is required to establish its status in Ireland. The conservation status of this species is Favourable.

Daubenton's bat (*Myotis daubentonii*)

This bat species prefers feeding close to the surface of smooth water, either over rivers, canals, ponds, lakes or reservoirs but it can also be found foraging in woodlands. Flying at 15 kilometres per hour, it gaffs insects with its over-sized feet as they emerge from the surface of the water - feeding on caddis flies, moths, mosquitoes, midges etc. It is often found roosting beneath bridges or in tunnels and also makes use of hollows in trees. The conservation status of this species is Favourable.

Whiskered bat (*Myotis mystacinus*)

This species, although widely distributed, has been rarely recorded in Ireland. It is often found in woodland, frequently near water. Flying high, near the canopy, it maintains a steady beat and sometimes glides as it hunts. It also gleans spiders from the foliage of trees. Whiskered bats prefer to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and sometimes bat boxes. The conservation status of this species is Favourable.

Brandt's bat (*Myotis brandtii*)

According to NPWS (2013), whiskered and Brandt's bats are cryptic species and can only be told apart using DNA techniques. Brand't bat has been confirmed only once from Ireland; a single specimen found in 2003 in Wicklow (Mullen, 2006). Following this discovery, an intensive re-survey, involving DNA testing, was undertaken of all known whiskered bat roosts in Ireland, by the Centre for Irish Bat Research. Woodland mist-netting was also conducted for the species. Despite the extensive survey-work, no further Brandt's bats were identified. The most recent Red Data List for Irish Mammals (Marnell *et al*. 2009) lists Brandt's bat as data deficient. There is no evidence of any roosts for this species in the country and at present the single record for the species is considered an anomaly. Boston et al (2010) concluded that "M. brandtii …. cannot currently be considered a resident species. This species is now considered a vagrant to the country and consequently, a detailed assessment has not been carried out.

<u>Rhinolophidae:</u>

Lesser horseshoe bat (*Rhinolophus hipposideros*)

This species is the only representative of the Rhinolophidae or horseshoe bat family in Ireland. It differs from our other species in both habits and looks, having a unique nose leaf with which it projects its echolocation calls. It is also quite small and, at rest, wraps its wings around its body. Lesser horseshoe bats feed close to the ground, gleaning their prey from branches and stones. It often carries its prey to a perch to consume, leaving the remains beneath as an indication of its presence. The echolocation call of this species is of constant frequency and, on a heterodyne bat detector, sounds like a melodious warble. The species is confined to six counties along the Atlantic seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork. The current Irish national population is estimated at 12,500 animals. This species is listed on Annex II of the EC Habitats Directive and 41 Special Areas of

Conservation have been designated in Ireland for its protection. Where it occurs, it is often found roosting within farm buildings. The conservation status of this species is Inadequate.