

Housing Development, Newcastle Village, Co. Dublin

Bat Survey



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FINAL REPORT



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Newcastle, Co. Dublin

Bat Survey

1. INTRODUCTION

1.1 Background

This report has been prepared by Faith Wilson (an independent ecological consultant and licensed bat specialist) who was appointed by Deane & Deane Ltd. to prepare a bat survey of lands proposed for development at Newcastle Village, Co. Dublin located within the red line boundary shown on **Figure 1.1** below. The proposed site layout is shown on **Figure 1.2** below.

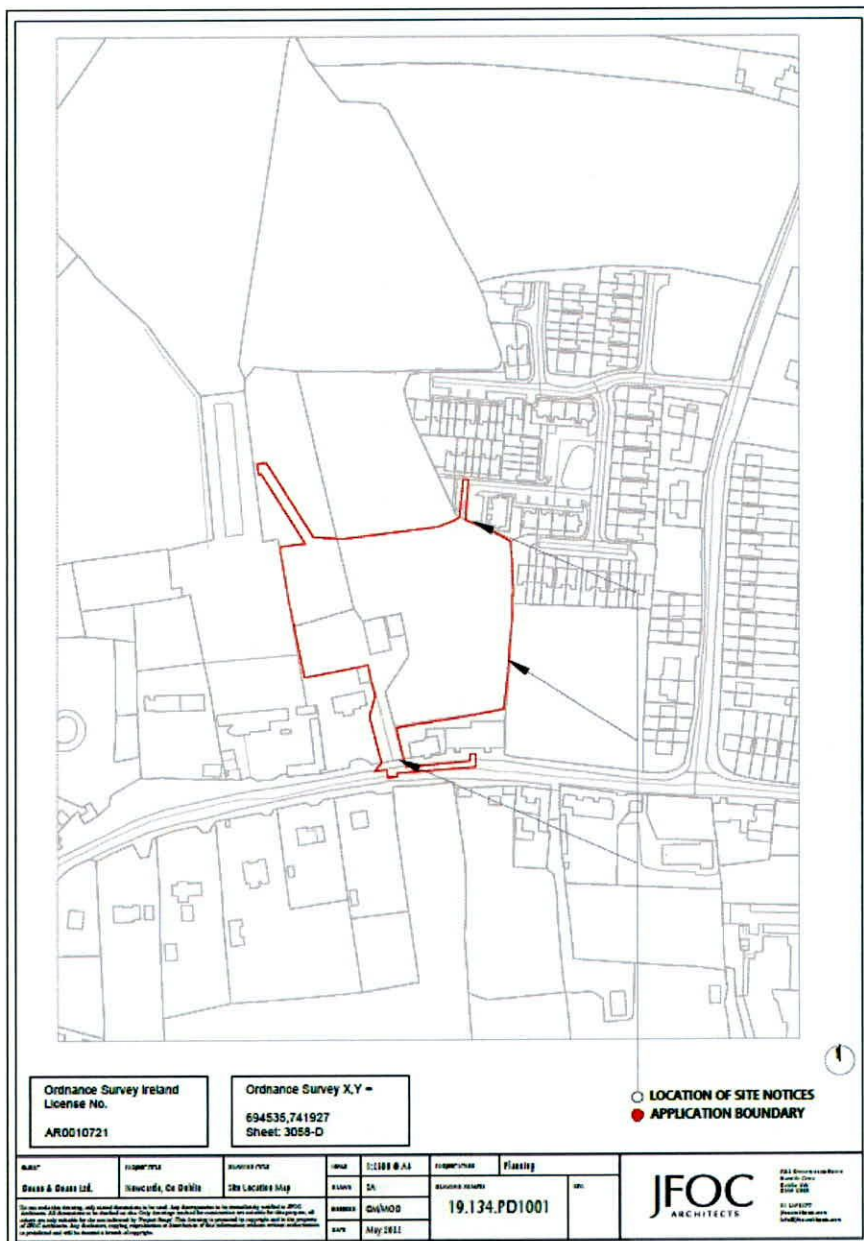


Figure 1.1 Lands proposed for development in Newcastle Village as indicated by the red line boundary.

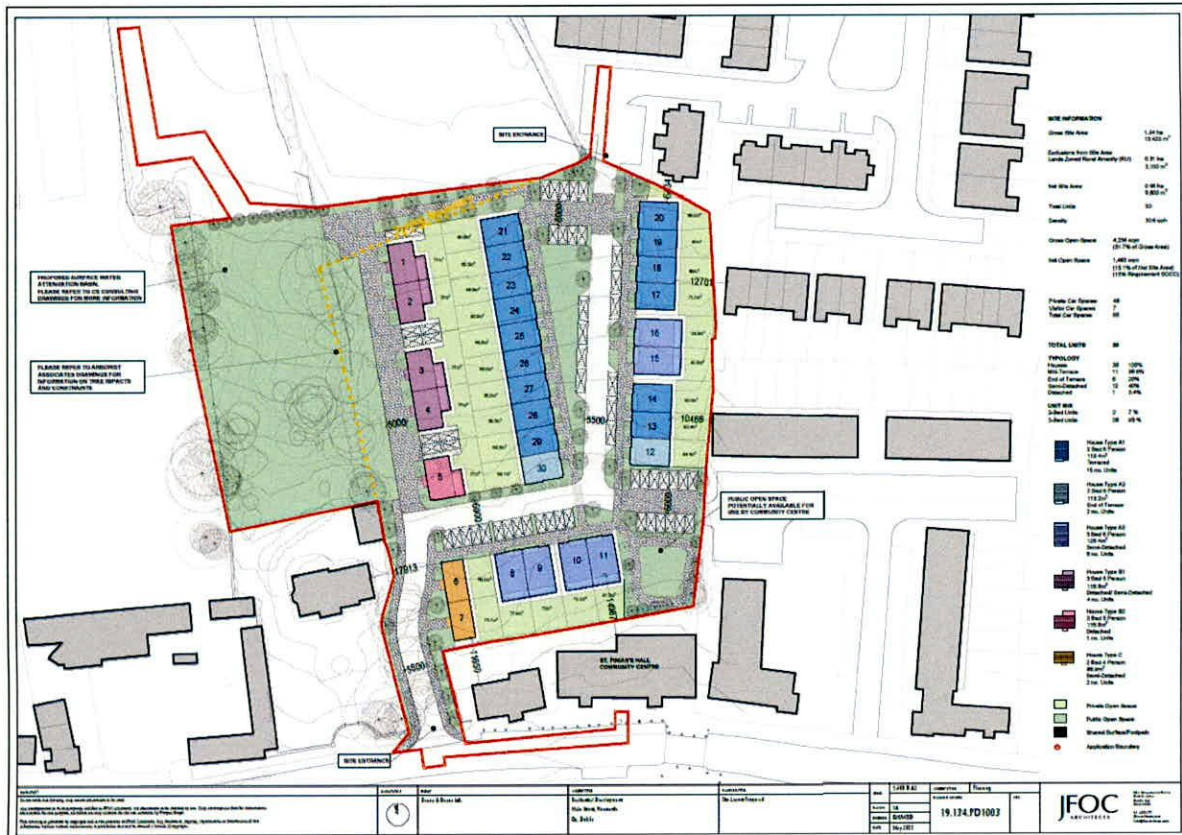


Figure 1.2 Proposed Site Layout.

This report details the findings of a bat detector survey of the site, an inspection of the buildings scheduled for removal and an assessment of the lands to assess their importance for bats. The report includes mitigation measures to ensure that bats in the area are not significantly impacted by the proposed development.

1.2 Relevant Legislation

1.2.1 Bats

Eleven species of bats occur in Ireland (of which nine are resident) and all are protected under both national and international law.

Wildlife Act 1976

In the Republic, under Schedule 5 of the Wildlife Act 1976, all bats and their roosts are protected by law. It is unlawful to disturb either without the appropriate licence. The Act was amended in 2000.

Bern and Bonn Convention

Ireland has also ratified two international conventions, which afford protection to bats amongst other fauna. These are known as the 'Bern' and 'Bonn' Conventions. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), exists to conserve all species and their habitats, including bats. 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, which covers certain species of bat.

EU Habitats Directive

All bat species are given strict protection under Annex IV of the EU Habitats Directive, whilst the lesser horseshoe bat (*Rhinolophus hipposideros*) and greater horseshoe bat (*Rhinolophus ferrumequinum*) are given further protection under Annex II of the EU Habitats Directive. Both are listed as a species of community interest that is in need of strict protection and for which E.U. nations must designate Special Areas of Conservation (SACs). The latter is only known from a single site and no breeding populations have been recorded to date. The former are a species of the western seaboard of Ireland and have not yet been recorded on the east coast.

The principal pressures on Irish bat species have been identified as follows:

- urbanized areas (e.g. light pollution);
- bridge/viaduct repairs;
- pesticides usage;
- removal of hedges, scrub, forestry;
- water pollution;
- other pollution and human impacts (e.g. renovation of dwellings with roosts);
- infillings of ditches, dykes, ponds, pools and marshes;
- management of aquatic and bank vegetation for drainage purposes;
- abandonment of pastoral systems;
- speleology and vandalism;
- communication routes: roads; and
- inappropriate forestry management.

2. METHODOLOGY

2.1 Desk Study & Field Surveys

The bat survey consisted of several elements – a desktop review and consultation with Bat Conservation Ireland, an inspection of trees within the site for their potential to support roosting bats, an inspection of the buildings due for demolition and a bat detector activity survey of the property.

The aims of the surveys were to:

- Identify roosting sites in buildings or trees surrounding the site.
- To determine the use of the mature trees and other habitats in the site as feeding and commuting areas;
- Identify species of bats utilising the site for foraging or commuting purposes.

Desktop Research

The Bat Conservation Ireland database was examined for records of bats from the Newcastle Village area.

Building Inspection

The bat surveys were carried out by Faith Wilson, a licensed bat specialist and consisted of an external and internal inspection of a farm barn and stable building.

Bat activity is usually detected by the following signs (though direct observations are also occasionally made):

- bat droppings (these will accumulate under an established roost or under access points);
- insect remains (under feeding perches);
- oil (from fur) and urine stains;
- scratch marks; and
- bat corpses.

The nature and type of habitats present are also indicative of the species likely to be present.

Tree Survey

Trees within the site were assessed for their potential use by bats by completing a preliminary ground level roost assessment using the following standard criteria, which were created by bat specialists from Bat Conservation Ireland for use in the assessments of tree roosts on large infrastructural projects and are summarised in NRA (2006):

- Presence or absence of bat droppings (these can be hard to find amongst leaf litter or may be washed away following periods of wet weather),
- Bat droppings may also be seen as a black streak beneath holes, cracks, branches, etc.,
- Presence or absence of smooth edges with dark marks at potential entrances to roosts,
- Presence or absence of urine stains at potential entrances to roosts,
- Presence of natural cracks and rot holes in the trunk or boughs of the tree,
- Hollow trees,

- Presence or absence of creepers such as ivy or honeysuckle on trees (ivy clad trees are often used by bat species such as pipistrelles as roosts),
- Presence or absence of loose bark such as that of sycamore, or flaky bark on coniferous species such as cedars, cypress and Scot's pine,
- Presence or absence of bracket fungi which may indicate a rotten or potentially hollow centre to the tree,
- Known bat roosts previously identified,
- Trees with storm or machinery damage or broken boughs,
- Clutter level - where the branches and trunk are easily accessible, this is considered a better tree for bat roosts,
- Adjoining habitat - if there are a variety of feeding opportunities for bats, this increases the potential of a tree as a bat roost,
- Adjoining potential roosts / known roosts. This raises the likelihood of a tree being of benefit as bats may move roosts if the roost becomes too hot or cold during roosting and a nearby alternative roost is highly desirable.

A review of the tree survey conducted by Felim Sheridan of Arborist Associates (2021) was also completed. The arboricultural features described in the Bat Tree Habitat Key (Andrews, 2018) also informed the survey. Suitable features which were accessible from the ground were inspected for signs and evidence of bats using an endoscope and other features higher on the tree were identified using binoculars.

Detector Survey

In accordance with best practice as described in the 'Guidelines for the Treatment of Bats During the Construction of National Road Schemes' (NRA 2006) and 'Bat Mitigation Guidelines for Ireland' (Kelleher 2006), a bat activity survey of the general environs of the site was conducted during the active bat season. This survey assisted in determining if any bat roosts are present in any of the buildings, what bat species occur within the site and how bats are using the site for foraging or commuting purposes.

A bat detector survey was carried out at dusk on 18th June 2021 and pre-dawn on the 19th June 2021 using several types of bat detectors - two Batbox Duet Heterodyne/Frequency Division detectors, a Pettersson D100 Heterodyne detector and an Echometer Touch Pro. A Song Meter 2 Mini monitor was also utilised overnight to determine the level of bat activity in and around the farm buildings on the site between the 18th and 19th June 2021. Signals recorded on the SM Mini were stored on SDHC cards and transferred to a laptop and desktop for analysis. Signals were identified with Kaleidoscope Pro and included a manual verification of all calls. This data is presented in **Section 8**.

The emergence of bats in the general area of the site at dusk was monitored and a walkover survey of the lands was conducted. Activity at dawn when bats return to roosts was also monitored.

Bat activity is predominantly bi-modal, with bats taking advantage of increased insect numbers on the wing during the periods after dusk and before dawn, (there is usually a lull in activity in the middle of the night). While this holds true for 'hawking' species (bats that capture prey in the open air), 'gleaning' species such as brown long-eared (*Plecotus auritus*), Natterer's (*Myotis nattereri*) and Whiskered/Brandt's bats (*Myotis mystacinus/brandtii*) remain active throughout the night, as prey is available on foliage for longer periods.

3. RESULTS

3.1 General Description of the Study Area

The lands are located on the main street in Newcastle Village, Co. Dublin. The site is bounded to the west by a historic townland boundary that is heavily planted with mature trees. This boundary separates the townlands of the Glebe to the west and Newcastle North to the east. It is bounded to the east by the existing residential developments of the Glebe and Market Square. Lands to the north are in agricultural use, and to the south the site is bounded by buildings along the Main Street and St. Finian's Community Hall. Currently on the site there are 2 no. agricultural sheds (a barn and stables), which are no longer in use and are to be demolished as part of this application.

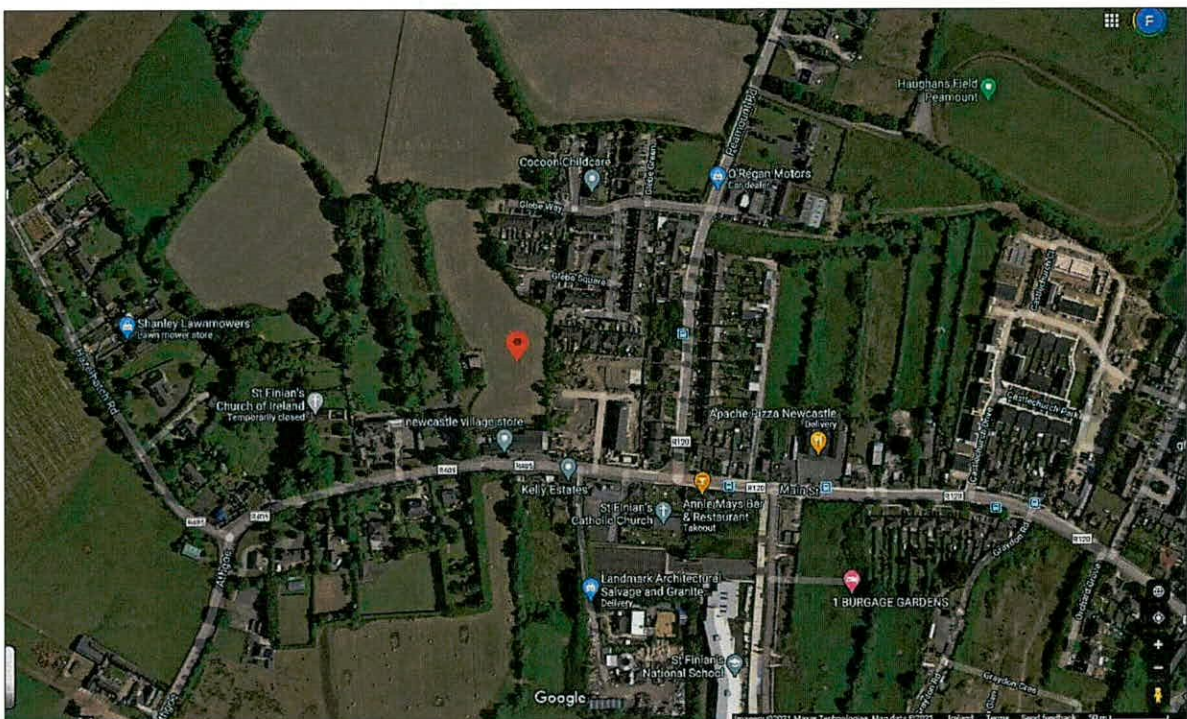


Figure 3.1. Site location within Newcastle Village (Google Maps).

The lands consist of two fields of what was formerly agricultural grassland (GA1 in Fossitt 2000) which is no longer grazed. The lands are bounded by treelines and remnant hedgerows. Further details on the habitats present are presented in the Ecological Impact Assessment Report which accompanies the planning application.

3.2 Records held by Bat Conservation Ireland and NPWS

Consultation with Bat Conservation Ireland has identified that several species of bats have been recorded within the 10km squares (N 92 and O 02) in which Newcastle Village is located. These include:

- Common pipistrelle (*Pipistrellus pipistrellus*),
- Soprano pipistrelle (*Pipistrellus pygmaeus*),
- Daubenton's bat (*Myotis daubentonii*),
- Leisler's bat (*Nyctalus leisleri*),

- Brown long-eared bat (*Plecotus auritus*),
- Several unidentified *Myotis* species, and
- an unidentified pipistrelle species (*Pipistrellus* sp.).

There are detector records of Leisler's bat and common pipistrelle from previous surveys conducted in the village for an EIS. Bat surveys conducted at Ballynakelly to the SE of the village have recorded Leisler's bat, soprano pipistrelle and an unidentified pipistrelle species.

There are several confirmed bat roosts from the wider area of Newcastle Village – these include several roosts of unidentified bats in Rathcoole Village and a roost of brown long-eared bat at the Church of the Nativity of the Blessed Mary in Saggart.

The National Biodiversity Data Centre (NBDC) has records of Leisler's bat, Common pipistrelle and Soprano pipistrelle bat as shown on Figures 3.2 to 3.4 below.

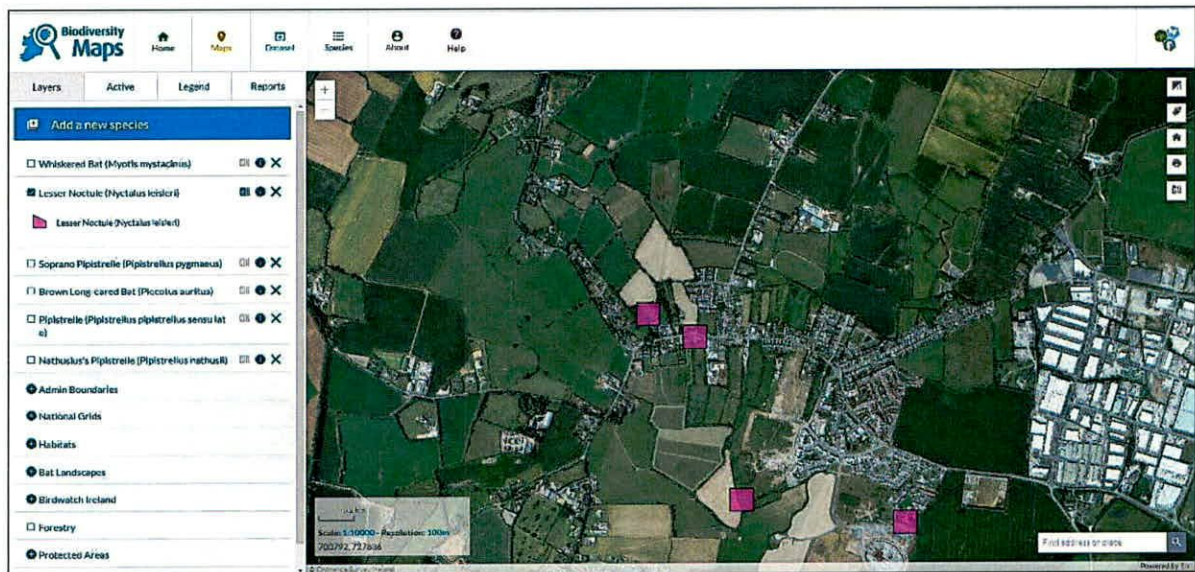


Figure 3.2. Leisler's bat recorded from Newcastle Village (Source: NBDC).

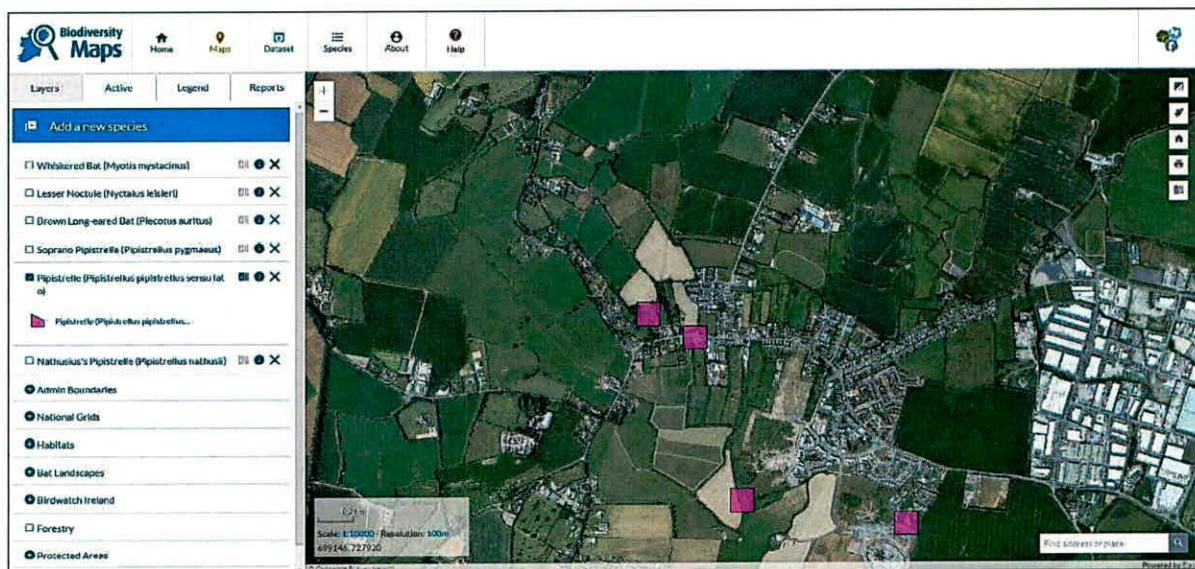


Figure 3.3. Common pipistrelle bat recorded from Newcastle Village (Source: NBDC).

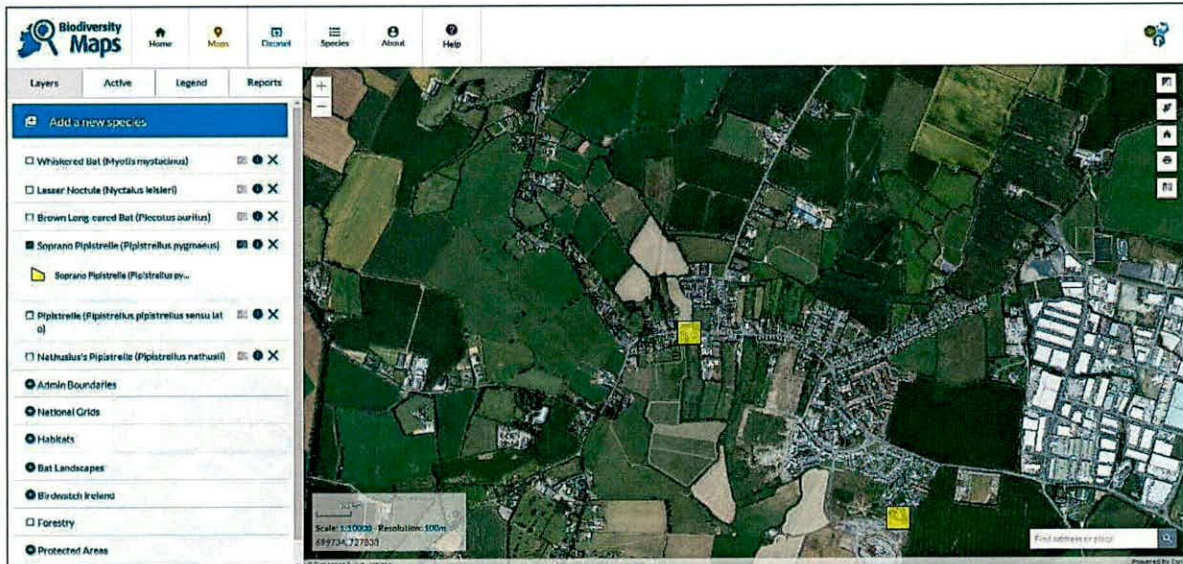


Figure 3.4. Soprano pipistrelle bat recorded from Newcastle Village (Source: NBDC).

Oakvale House

The adjoining property to the west (Oakvale House) was surveyed in 2010 as part of a planning application for a proposed mixed use development of a medical centre, housing and retail units (Planning Reference: SD10A/0017). The 2010 survey also included the stables and agricultural barn present within the applicant site.

Oakvale House contains a maternity roost of Soprano pipistrelle bats (c.219 bats as recorded in the Bat Conservation Ireland Database). The Scott Cawley (2010) study reported that bats from this property flew in a north/north westerly direction towards the agricultural fields and Glebe House. Droppings of a large bat (either Leisler's bat or Brown long eared bat) were also found in this attic.

Detector surveys conducted as part of the surveys completed here in 2010 recorded Common pipistrelle, Soprano pipistrelle, Leisler's bat and an unidentified *Myotis* sp. in the general environs of the Oakvale House property.

No bats were recorded in the Scott Cawley (2010) study from the eastern portion of the site or from the environs of the barn and stables (the current application site) including at dawn.

The Scott Cawley (2010) study found that the two hedgerows extending north from Oakvale House were used by four species of foraging bats (Common pipistrelle, Soprano pipistrelle, Leisler's bat and an unidentified *Myotis* sp.) as shown below on **Figure 3.5**.

The study using Anabat detectors indicated that the western hedgerow was used more extensively than the eastern one see **Figure 3.6**.

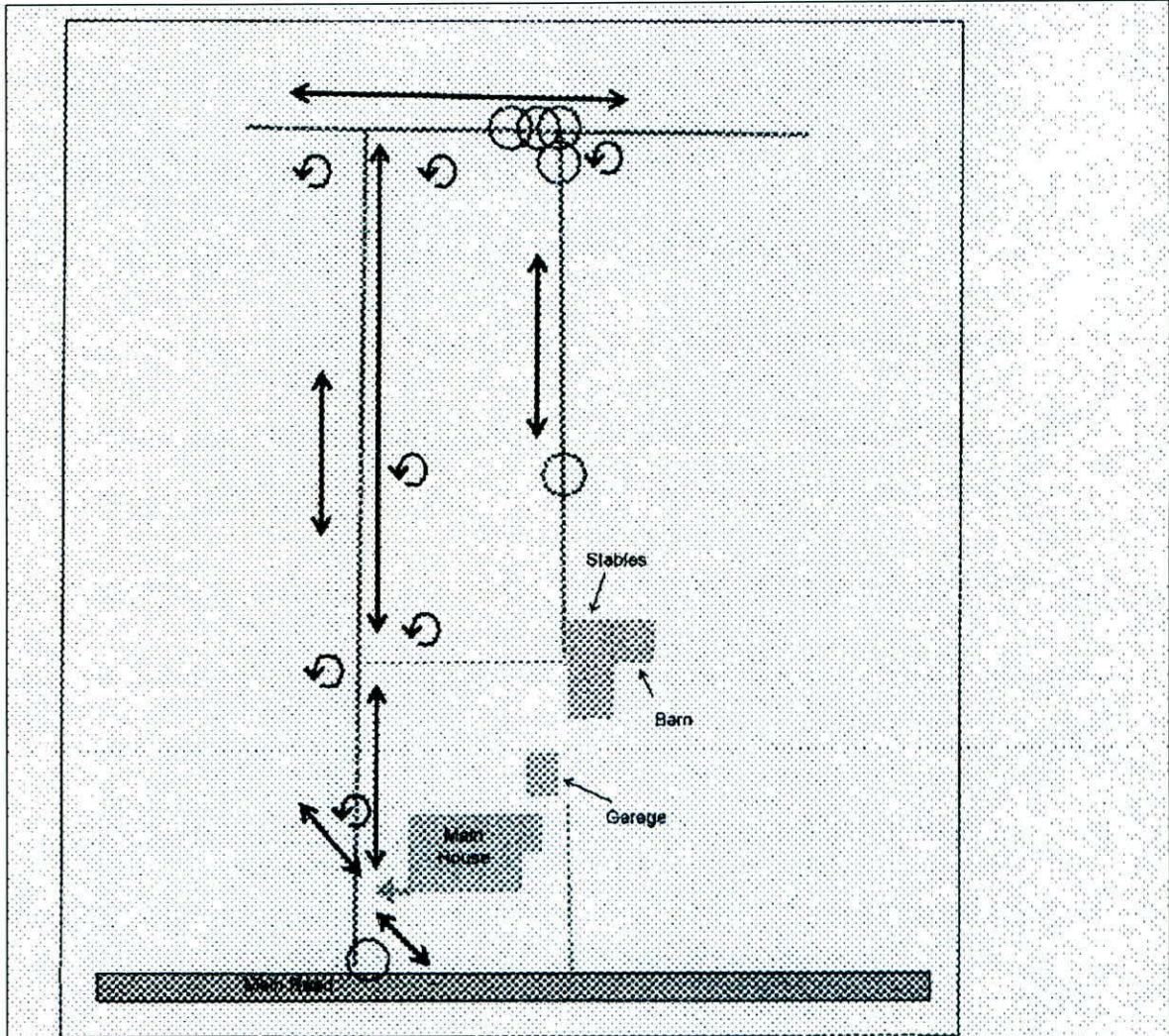


Figure 10 Sketch map showing foraging and commuting activity in the southern part of the site. The green arrow shows the exit point of the Soprano Pipistrelle roost. Green circles show mature trees that have potential to support bat roosts. Linear arrows show commuting routes through the site, and curved arrows show feeding locations.

Figure 3.5. Foraging activity recorded in 2010 (Scott Cawley, 2010).

Table 1. Results of Anabat surveys on the hedgerows to the north of the main house		
	Western Hedgerow	Eastern Hedgerow
31-May	24 SP*, 1 CP, 2 MY	7 SP, 2 LR
01-Jun	2 SP, 18 CP, 10 MY	12 SP, 4 LR, 3 CP
02-Jun	46 SP, 9 LR, 28 CP, 8 MY	8 SP, 2 LR, 3 CP
03-Jun	26 SP, 8 LR, 25 CP, 3 MY	13 SP, 1 LR, 10 CP
04-Jun	65 SP, 28 LR, 93 CP, 20 MY	8 SP, 1 LR, 1 CP
05-Jun	61 SP, 19 LR, 48 CP, 11 MY	5 SP, 5 CP, 1 MY

* SP – Soprano Pipistrelles, CP – Common Pipistrelles, MY – Myotis sp., LR – Leisler's bats.

Figure 3.6 Foraging and commuting activity recorded in 2010 (Scott Cawley, 2010).

Cairn Homes SHD

More recently a large area of land at the eastern end of the village has been comprehensively surveyed for bats as part of a Strategic Housing Development application (Tina Aughney, 2019). These surveys recorded the following species from these lands:

- Common pipistrelle *Pipistrellus pipistrellus* (roosts, foraging and commuting),
- Soprano pipistrelle *Pipistrellus pygmaeus* (foraging and commuting),
- Leisler's bat *Nyctalus leisleri* (foraging and commuting),
- Brown long-eared bat *Plecotus auritus* (foraging), and
- Daubenton's bat *Myotis daubentonii* (foraging).

3.3 Structural Survey

Two buildings are scheduled for removal on the property – these are a series of dilapidated stables and an agricultural barn. Both of these structures are constructed of breeze blocks and are roofed with corrugated iron. Buildings such as these offer limited potential for roosting bats.

Both of these buildings had been previously surveyed by Scott Cawley in 2010 as part of the previous planning application on the lands (Planning Reference: SD10A/0017) and no evidence of bats roosting were recorded in same and no bats were recorded returning to same during dawn surveys.



Plate 1. Agricultural barn.

There were no signs of bats roosting in either structure during the current survey and roosting potential is very low within these structures.

Soprano pipistrelle bats were recorded foraging within the barn during the night.

3.4 Tree Survey

A number of trees, which have been identified and tagged as per the arboricultural assessment, along both the internal western boundary (hedge no. 2 in the arborists report) and the western boundary of the site (adjoining the Glebe House lands) have the potential to support roosting bats. These include, but are not limited to Tree No. 1138, Tree No. 1158, Tree No. 1159, Tree No. 1160, Tree No. 1161, Tree No. 1162, Tree No. 1175, and Tree No. 1176.

3.5 Detector Survey

The detector survey recorded five species of bat using the property. These were:

- Leisler's bat *Nyctalus leisleri* (foraging and commuting),
- Common pipistrelle *Pipistrellus pipistrellus* (foraging and commuting),
- Soprano pipistrelle *Pipistrellus pygmaeus* (foraging and commuting),
- Nathusius's pipistrelle *Pipistrellus nathusii* (foraging), and
- An unidentified *Myotis* sp. (either Daubenton's bat *Myotis daubentonii* or Whiskered bat *Myotis mystacinus* (foraging)).

The most frequent of these were the common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*), which were recorded throughout the night and foraged across the site.

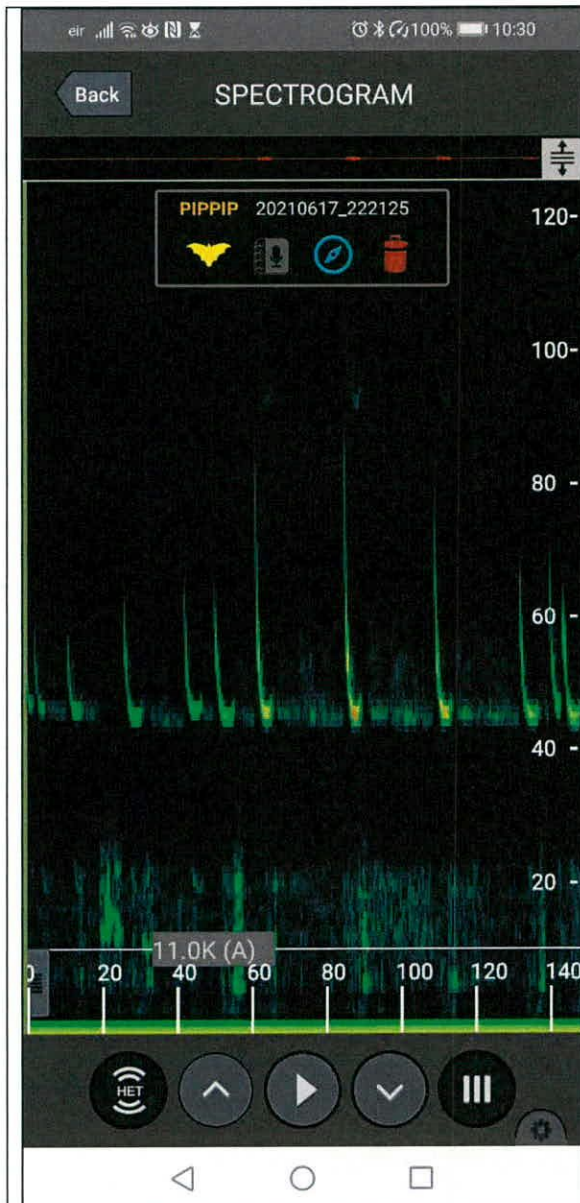
The treelines extending from Oakvale House are used as commuting routes by bats and were the subject of detailed surveys previously conducted by Scott Cawley in 2010 (see **Figure 3.5** and **3.6** above).

Leisler's bat (*Nyctalus leisleri*) was recorded less frequently than the pipistrelle bats and was mostly recorded hunting high overhead.

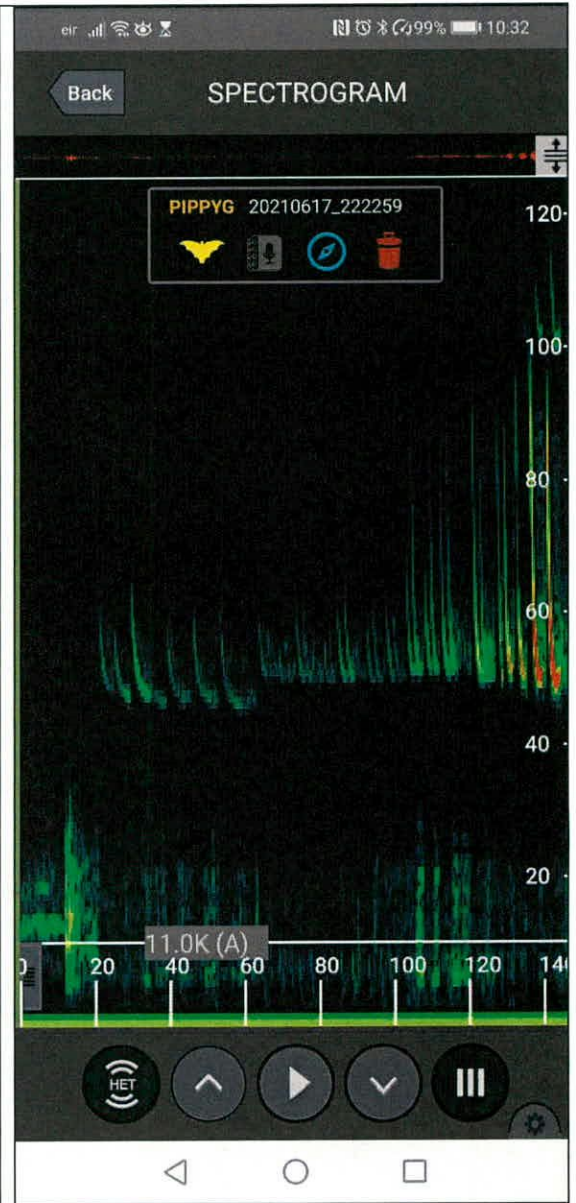
Most unusually Nathusius's pipistrelle (*Pipistrellus nathusii*) was detected on the lands (mostly early in the night) and may be availing of the large waterbody in the adjacent Glebe House property for foraging purposes.

There was a single detection of a *Myotis* bat species (either *Myotis daubentonii* (Daubenton's bat) or *Myotis mystacinus* (Whiskered bat)) during the survey.

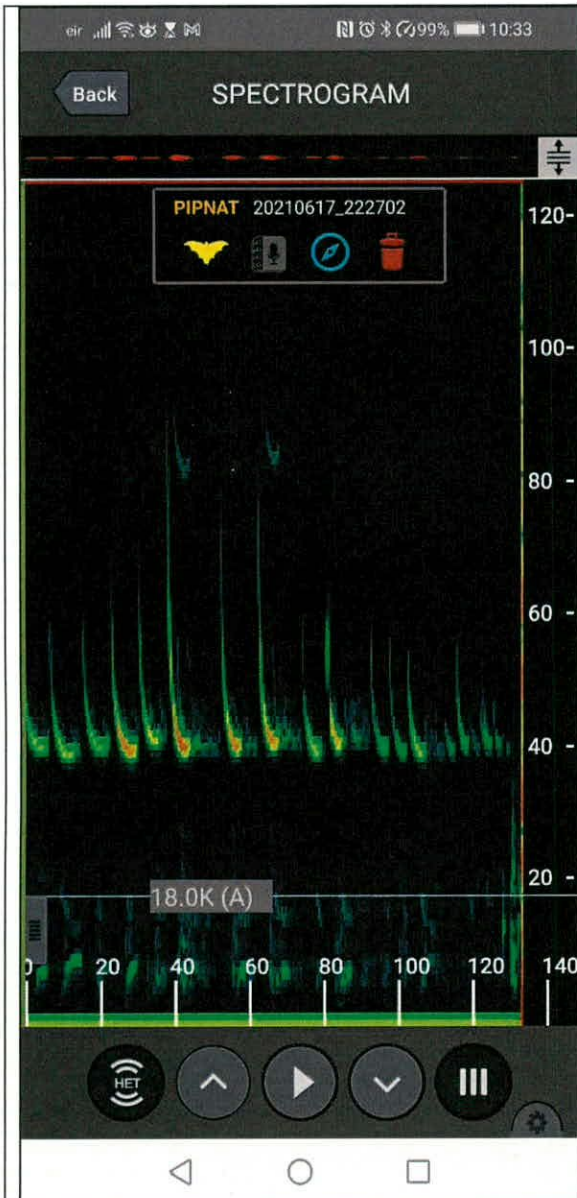
No roosts were recorded roosting within any of the buildings on site.



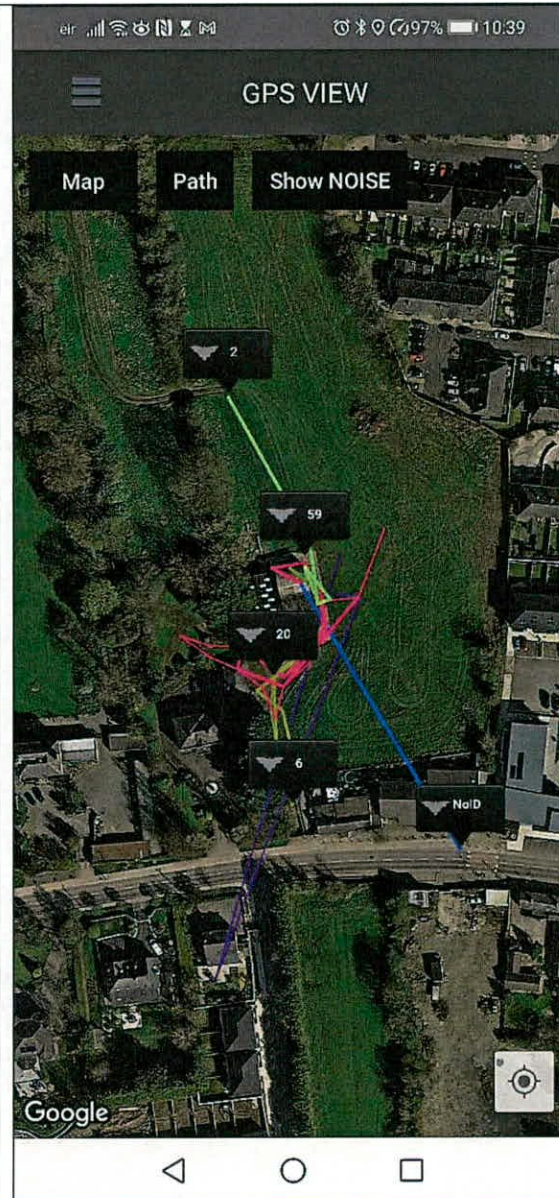
Spectrogram of Common pipistrelle recording made on the 17th June 2021



Spectrogram of Soprano pipistrelle recording made on the 17th June 2021



Spectrogram of *Nathusius pipistrelle* recording made on the 17th June 2021



Bat detections made on the 17th June 2021

3.6 Survey Constraints

There were no constraints to the survey which was conducted within the active bat season. Weather conditions were suitable throughout the survey with initial temperatures at dusk of 12°C.



Plate 2. Dusk on the lands to the west.



Plate 3. Setting sun over the site.



Plate 4. Bats were recorded foraging along this laneway.



Plate 5. The adjoining Oakvale House contains a Soprano pipistrelle maternity roost.

4. DESCRIPTION OF LIKELY SIGNIFICANT IMPACTS

4.1 Potential Impacts of the Proposed Scheme on Bats

As no roosts are present in any building due for removal/demolition within the site a bat derogation licence from National Parks and Wildlife Service is not required for the demolition of these buildings.

The site is currently used by a minimum of five species of bats for foraging purposes and the long grass and boundary treelines on the western side of the site provide shelter for insects on which bats forage. The removal of grassland vegetation and invertebrates associated with same within the site will reduce foraging habitat for bats in the area. The shelter provided by the trees and treelines along the internal western treeline and the western boundary of the site also provides an important linear habitat for foraging and commuting bats as has been previously documented.

Increased lighting within the site, associated with housing will result in a reduction of dark areas within the landscape where bats currently forage and commute.

The main potential impacts on bats arise from the following:

- Potential for loss of roosting opportunity in trees scheduled for removal
- Potential for loss of roosting opportunity in retained trees within the site should they be damaged during construction
- Potential for loss of foraging habitat arising from the loss of vegetation within the site
- Potential for loss of previously identified and reconfirmed commuting routes for bats arising from the loss of vegetation within the site boundaries
- Potential for damage to retained habitats of importance to bats during the construction phase of the development
- Requirements for lighting to be used on the site which could act as a barrier to the movement of bats through the area

A series of mitigation measures to reduce/ameliorate same are set out below in **Section 5**.

5. MITIGATION MEASURES

Mitigation measures to offset potential disturbance and loss of commuting and foraging areas to bats are detailed below.

5.1 Felling of Trees Identified as potential Bat Roosts

All trees identified as potential bat roosts will be subject to appropriate felling measures as detailed in NRA Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority 2006). The felling/clearance of trees will be scheduled for the autumn months of September/October when bats are less likely to be using trees. This also avoids the bird breeding season.

The felling of those trees, which have been identified as potential bat roosts, must be supervised by a bat specialist holding a bat handling licence issued by the National Parks and Wildlife Service, (Department of Housing, Local Government and Heritage). If bats are encountered they should be removed by the licence holder to a bat box, to be sited on a nearby tree and the NPWS notified. A bat derogation licence may be required.

Identified trees must be felled carefully. Specific advice in relation to individual trees will be given on site by a bat specialist. Gradual dismantling of some mature trees may be necessary to ensure the safety of any bats which may be roosting within significant sized boughs or in the trunk. The tree should be inspected by a bat specialist, and depending on the structure of the tree they may need to be left intact on the ground for 24 hours to allow any bats within them to escape prior to processing.

5.2 Protection of Commuting Routes and Foraging Areas

It is recommended that as much native vegetation, immature and mature trees are retained adjoining and surrounding the site as possible. These areas support large numbers of invertebrates on which both bats and birds rely for feeding and foraging and also provide cover and shelter for a variety of species. The boundary vegetation along the southern, western and northern sides of the site will be mostly retained as shown on the tree protection drawings.

5.3 Protective Measures for Retained Vegetation

The retained boundary hedgerows which provide shelter and screening to the site must be afforded protective measures during the building works. Protective fencing will be erected outside the drip-line of the canopy of any retained trees in order to prevent damage by machinery, compaction of soil, etc. in accordance with BS 5837: 2013 in advance of works commencing to prevent accidental damage to the trees/shrubs as shown on the Tree protection drawing (Arborist Associates (2021)). All workers on the site will be informed of the need to protect these areas and how to prevent damage through stock piling of materials, careless works with machinery, etc.

5.4 Provision of Bat Boxes in Retained Trees

New roosting opportunities will be provided for bats on retained trees within the new development. These will include the erection of 10 no. artificial roost boxes (5 no. 1FF

Schwegler bat boxes, 3 no. 2FN Schwegler bat boxes and 2 no. 1FD Schwegler bat boxes, which will be accommodated on trees within the site. These will be specified by a licensed bat specialist and erected under their supervision.

5.5 Planting of Native Species

Planting proposals within the development have been prepared by the project landscape architects Ronan Mc Diarmada and Associates in collaboration with the project ecologist Faith Wilson and include many native trees, shrubs and wildflowers. These will be certified as being of native Irish provenance to ensure genetic provenance.

The recommendations of the Pollinator Friendly Planting Code All-Ireland Pollinator Plan 2015-2020 available on www.pollinators.ie have been included and considered in the landscaping proposals. These measures will ensure that some foraging habitat remains on site for local bat populations.

5.6 Lighting

Many species of bats and other mammals are sensitive to lighting and will avoid areas which are illuminated.

The design recommendations from the BCT (2018) for wildlife-friendly lighting will be incorporated into the lighting design for the scheme by the project lighting designers and in general any lighting used in the development will not overspill onto the retained boundary treelines/hedgerows/drainage ditches/watercourses thereby ensuring that a dark corridor for foraging and commuting bats and movement for other wildlife is maintained – see **Figure 5.1** below. A detailed lighting plan for the project will be developed with the lighting specialist and bat consultant.

Excellent guidance is available from the Bat Conservation Trust/Institution of Lighting Professionals Guidance Note 08/18 - Bats and artificial lighting in the UK. Bats and the Built Environment series.

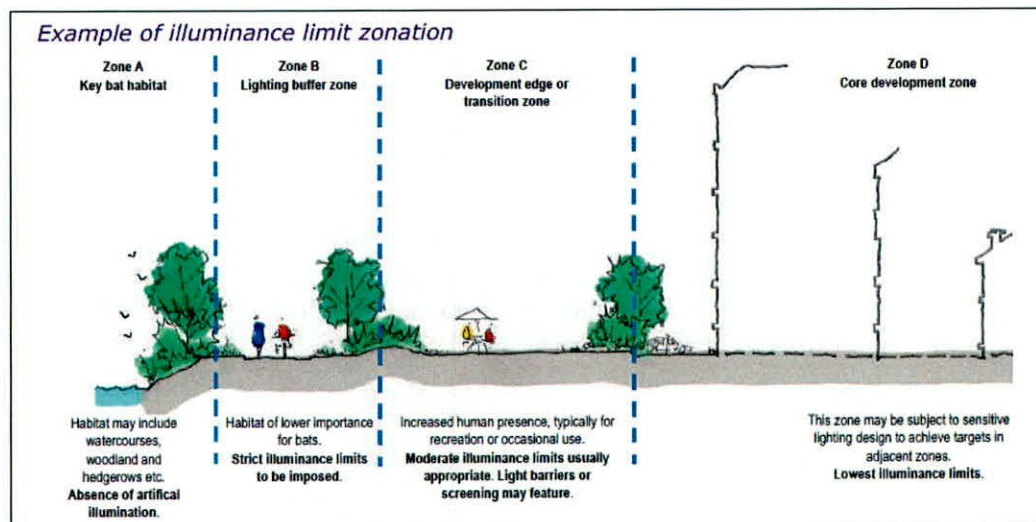


Figure 5.1 Limiting illumination of bat habitats.

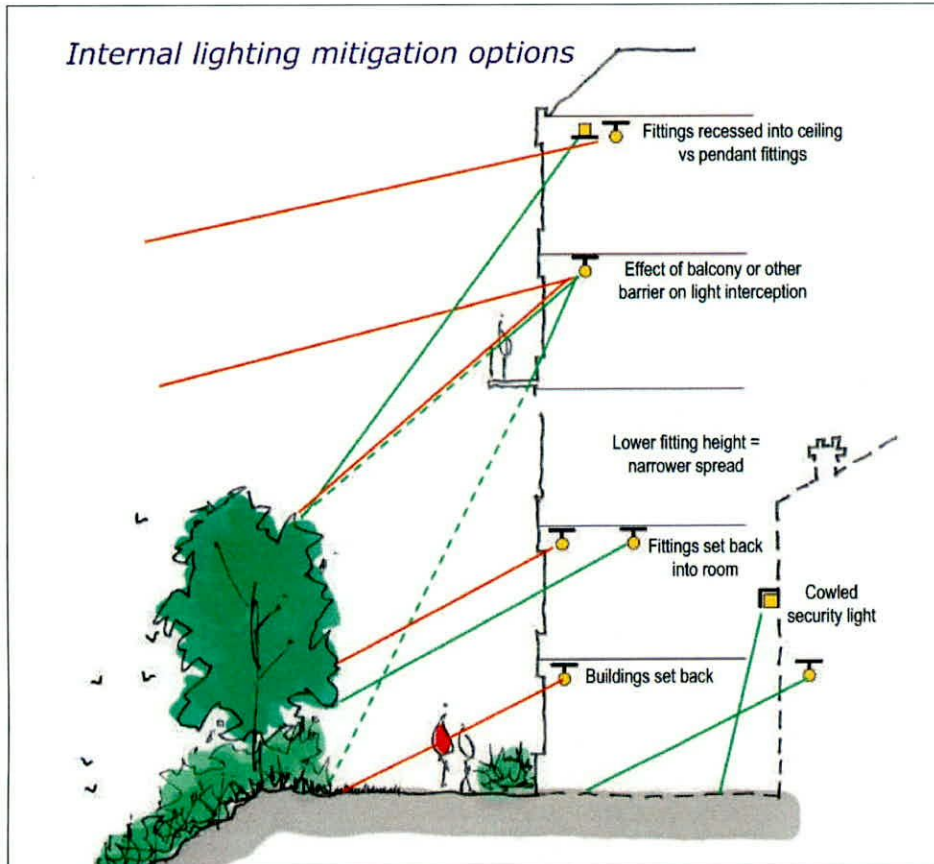


Figure 5.2. Internal building lighting mitigation options.

General design recommendations from the BCT (2018) include the following in relation to luminaires:

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill. (See **Figure 5.2** above.)
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use should only be as directed by the lighting professional.
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires should always be mounted on the horizontal, ie no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.

- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

As mentioned above the light spill from buildings also needs to be considered – see best practice guidance above in **Figure 5.2** for internal lighting mitigation options to be considered at the detailed lighting design stage.

6. CONCLUSIONS

No bat roosts have been confirmed from any of the buildings proposed for demolition within the site during any of the surveys conducted to date and therefore a bat derogation licence is not currently required for the demolition of these buildings.

A significant maternity roost of soprano pipistrelle bats adjoins the site in Oakvale House and previous studies have identified the treelines extending north from here as being used by commuting routes by bats.

Within the site itself there is potential for bats to roost in some of the trees along the particularly along the western boundary of the site.

The main interest from a bat perspective of the lands proposed for development at Newcastle is for foraging and commuting bats. Five species of bats have been recorded foraging and commuting here to date.

The undisturbed nature of these lands with long unmown grassland, large mature trees and dense vegetation along the western and northern boundaries provides rich foraging for bats, forming an important wildlife corridor and an important piece of green infrastructure within the environs of Newcastle Village.

A series of detailed mitigation measures have been set out in **Section 5**, which if implemented in full will reduce impacts on bats in the local environs of the site.

The development of these lands which were previously used for agricultural to that of housing will however reduce their overall value for local biodiversity including species of bats.

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8. RECORDINGS

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9. APPENDICES

Bat ecology - general

The bat is the only mammal that is capable of true flight. There are over 1,100 species worldwide, representing almost a quarter of all mammal species. There are 47 species in Europe - in Ireland, ten species of bat are currently known to exist, which are classified into two families, the *Rhinolophidae* (Horseshoe bats) and the *Vespertilionidae* (Common bats).

Prey

All the European bat species feed exclusively on insects. A Pipistrelle, weighing only 4 to 8 grammes, will eat up to 3000 insects every night, ensuring a build up of fat in the bat's body to allow it to survive the winter deep in hibernation.

Breeding and longevity

Irish bats can produce one young per year but, more usually, only one young is born every two years. This slow rate of reproduction inhibits repopulation in areas of rapid decline. Although bats have been known to live for twenty or more years, this is rare as most die in their first and the average lifespan, in the wild, is four years.

Threats

All bat species are in decline as they face many threats to their highly developed and specialised lifestyles. Many bats succumb to poisons used as woodworm treatments within their roosting sites. Agricultural intensification, with the loss of hedgerows, treelines, woodlands and species-rich grasslands have impacted bat species also. Habitual roosting or hibernation sites in caves, mines, trees and disused buildings are also often lost to development. Summer roosts are prone to disturbance from vandals. Agricultural pesticides accumulate in their prey, reaching lethal doses. Chemical treatments in cattle production sterilise dung thus ensuring that no insects can breed within it to be fed upon by bats. Likewise, river pollution, from agricultural runoff, reduces the abundance of aquatic insects. Road building, with the resultant loss of foraging and roosting sites is a significant cause in the reduction of bat populations across Europe.

Extinction

As recently as 1992, the greater mouse-eared bat *Myotis myotis* became the first mammal to become extinct in Britain since the wolf in the 18th century.

10. LIST OF IRISH BAT SPECIES (INCLUDING POTENTIAL SPECIES*) AND ADJUDGED STATUS ON SITE

Bats		Status on site
<i>Chiroptera</i>		
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	Present
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Present
Nathusius' Pipistrelle	<i>Pipistrellus nathusii</i>	Present
Brown Long-eared	<i>Plecotus auritus</i>	Absent
Leisler's	<i>Nyctalus leisleri</i>	Present
Lesser Horseshoe	<i>Rhinolophus hipposideros</i>	Absent
Greater Horseshoe	<i>Rhinolophus ferrumequinum</i>	Absent
Whiskered	<i>Myotis mystacinus</i>	Potential
Natterer's	<i>Myotis nattereri</i>	Absent
Daubenton's	<i>Myotis daubentonii</i>	Potential
Brandt's	<i>Myotis brandtii</i>	Absent

