June
2019

Ecology Report - Bat, Badger & Invasive Alien Species

McDonaghs Lane, Glenaraneen, Brittas, Co. Dublin

CIEEM
REGISTERED PRACTICE 2019-2020

ASH
Ecology & Environmental

Business
All-Ireland Pollinator Plan 2015-2020
supporter

ASH Ecology & Environmental

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1. INTRODUCTION

1.1 Purpose of the Report

Ash Ecology and Environmental Ltd (AEE) were commissioned to carry out an ecology survey of a site and to evaluate its importance for Badgers, Bats, and Invasive Alien Species (IAS), and to outline the findings in a report. The report was done on behalf of Annette Richie (nee McDonagh), Alan and Dylan Richie. The site is located at McDonaghs Lane, Glenaraneen, Brittas, Co. Dublin.

A previous planning application submitted to South Dublin County Council (SDCC) under Planning No. SD19A/0010 received a response from the Parks & Landscape Services / Public Realm (dated 29/01/2019) which recommended this report:

"The applicant shall submit an ecological survey that includes bats, badgers and invasive species. The ecological assessment report shall clearly outlining if there is ecological value on the proposed site. This shall be conducted by an independent, suitably qualified ecologist."

The site area is located on the western side of McDonaghs Lane with an access point out on to this lane. The site is located in the Glenaraneen, Co. Dublin (Grid Ref: 53°14'19.3"N 6°27'41.5"W) and approx. 0.46ha in size, shown in Figure 1. The site is surrounded by adjoining residential properties to its north, south and open farm lands to the west. It is bordered by the lane on its eastern side and on the other side of the laneway by a residential property. The site currently has an entrance off the lane at its northern end of the road side boundary and there is an existing wooden cabin and a pump house (for well) on the site.

1.2 Project Description

This project sets out to seek permission for "*Proposed erection of 3 bed bungalow, Christmas Tree Farming, contain of 1 stable, area for horse, food Store and forge installation of wastewater treatment plant and percolation area stormwater disposal, new vehicular access and walling, well, landscaping and ancillary sitework. Also the Temporary Retention of an existing 2 bed log cabin, temporary septic tank, well, pumphouse and temporary vehicle driveway.*"

An existing site layout is shown as Figure 2 while a proposed site layout which is also a landscape plan is shown as Figure 3.

1.3 Competency of Assessor

This report has been prepared by Ash Ecology & Environmental Ltd (AEE) whose managing director and leading ecologist is Aisling Walsh who is a full member of the Chartered Institute of Ecological & Environmental Management (CIEEM) and whose qualifications include M.Sc. (Dist) in Biodiversity and Conservation (TCD) and B.Sc. (Hons) Zoology (NUIG). Aisling has over 10 years of experience providing environmental consultancy and environmental assessment services. Aisling has written numerous Ecological Impact Assessments (EcIA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statement, Environmental Impact Assessments/Statements, Badger Surveys, Bat Surveys, Habitat Surveys. She has also provided input and reviewed Ecological and Environmental assessments for

several EIS and EIA Reports and conducted numerous noise surveys for EPA licensed facilities. AEE is listed as a Registered Practice by the CIEEM.

1.4 Legislation

1.4.1 Badgers

Badgers and their resting places are protected under the Wildlife Acts (1976-2018) and in Northern Ireland under the Wildlife (N.I.) Order of 1985. Badgers are also protected under Appendix III of the Berne Convention.

It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. It is standard best practice to ensure that mitigation measures are taken to limit impacts on protected mammals. Such measures might include the exclusion of animals from affected setts. Where significant dwellings have to be removed, alternative artificial dwellings may need to be created. The removal of protected mammals from affected areas and subsequent destruction must be conducted under licence by experienced ecologists or other suitably qualified personnel. The National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government grant licences to the experts undertaking such operations and not to the developer or contractor. It is normal practice to impose seasonal constraints e.g. that badger breeding setts are not interfered with or disturbed during the badger breeding season (December to June inclusive). No protected mammal dwelling should be interfered with or disturbed during the breeding season as they may contain young.

1.4.2 Bats

In view of their sensitive status across Europe, all species of bat have been listed on Annex IV of the EC 'Habitats and Species Directive' and some, such as the lesser horseshoe bat, are given further protection and listed on Annex II of this Directive. This Directive was transposed into Irish law as the European Communities (Natural Habitats) Regulations, 1997, and combined with the Wildlife Acts (1976 to 2018), ensures that individual bats and their breeding sites and resting places are fully protected. This has important implications for those who own or manage sites where bats occur.

All bat species are protected under the Wildlife Acts 1976-2018 which make it an offence to wilfully interfere with or destroy the breeding or resting place of these species; however, the Acts permit limited exemptions for certain kinds of development.

All species of bats in Ireland are listed on Schedule 5 of the 1976 Act, and are therefore subject to the provisions of Section 23, which make it an offence to:

1. *Intentionally kill, injure or take a bat,*
2. *Possess or control any live or dead specimen or anything derived from a bat,*
3. *Wilfully interfere with any structure or place used for breeding or resting by a bat,*
4. *Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.*

1.4.3 Other Protected Mammals

Otter, Stoat, hedgehog, and pygmy shrew, and their breeding or resting sites are subject to the same protection from injury and disturbance as badger. There was no potential for breeding or resting sites for otter found within the site due to lack of suitable habitat (streams and rivers).

1.4.4 Invasive Alien Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality.

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 77 of 2011) include legislative measures to deal with the dispersal and introduction of invasive alien species:

Regulation 49
'a person shall be guilty of an offence if they plant; disperse; allow or cause to disperse; spread or cause to grow the plant in the Republic of Ireland'. The list of species in the Third Schedule includes Japanese Knotweed, Giant Knotweed and their hybrid Bohemian Knotweed.'

Regulation 50
'an offence to or intend to import; buy; sell; breed; reproduce or propagate; offer or expose for sale; advertise; publish a price list; transport; and distribute any plant species or vector material listed in the Third Schedule.'

Non-native species subject to restrictions under Regulations 49 and 50 are included in the third schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). Species listed under the Third Schedule include:

- Japanese knotweed (Fallopia japonica),
- Giant knotweed (Fallopia sachalinensis),
- Giant hogweed (Heraculeum mantegazzianum),
- Gunnera species (G. tinctoria and G. manicata),
- Himalayan Balsam (Impatiens glandulifera),
- Himalayan Knotweed (Persicaria wallichii),
- Hottentot Fig (Carpobrotus edulis),
- Rhododendron (Rhododendron ponticum), and
- Three-cornered leek (Allium triquetrum).

Vector materials which aid in the spread of these species include soil or spoil taken from places infested with Japanese Knotweed, Giant Knotweed or their hybrid Bohemian Knotweed. Two vector materials are referred to in the regulations (Third Schedule Part 3), one is blue mussel seed and the second is:

'Soil or spoil taken from places infested with Japanese Knotweed, Giant Knotweed or their hybrid Bohemian Knotweed'.

Under Section 40 of the Wildlife Act 1976 (as Amendment 2000), it is an offence for a person to *cut, grub, burn or otherwise destroy, during the period beginning on the 15th day of April and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated or in course of cultivation for agriculture or forestry.'*

The management of invasive plant species should refer to Section 40 of the Wildlife Act particularly during the preparation of Invasive Species Management Plans.

1.4.5 Nesting Birds

All nesting birds are legally protected from disturbance and/or injury to nest, eggs, and young under the Wildlife Acts (1976-2018). The nests of some species are subject to additional national protection under Schedule 4 to the Wildlife Act which includes provisions such as restricting damage to property as a justification to destroy nests. Species listed on Annex 1 of the Birds Directive are subject to special European protection measures by EU member states (including designation of SPAs).

2. METHODOLOGY

This report has been prepared by AEE using the following guidance documents:

2.1 Information Sources

A desk-based review of information sources was completed. Information contained on the websites of the National Parks and Wildlife Service (NPWS)[1] and the National Biodiversity Data Centre (NBDC)[2] was reviewed.

A Screening for Appropriate Assessment was compiled for this planning application by 'Whitehill Environmental' (June 2018) which states *"It can be concluded objectively that should this development be granted planning permission, that there will be no impacts upon the integrity or the conservation objectives of any SAC, SPA or pNHA. The habitats and species associated with this site will not be adversely affected. This proposed development does not need to proceed to Stage II of the Appropriate Assessment process."*

In that regard Natura 2000 sites (SACs and SPAs) are not referred to in this report as impacts have already been screened out.

Tthe following publications and websites were also reviewed and consulted:

- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie;
- Online data available on European sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie;
- National Biodiversity Data Centre (NBDC) www.NBDC.ie
- NRA (2005) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes[3]
- NRA (2010) The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads[4]
- Environment Agency UK (2013) *Managing Japanese knotweed on Development Sites* (Version 3, amended 2013),
- Woodlands of Ireland Information Note No. 3, (2007). *The Control of Rhododendron in Native Woodlands,*
- NPWS (2011) Actions for Biodiversity 2011-2016, Ireland's 2nd National Biodiversity Plan. Department of Arts, Heritage and the Gaeltacht,
- Department of Environment (2013). An Invasive Alien Species Strategy for Northern Ireland. www.doeni.gov.uk,
- Inland Fisheries Ireland guidance regarding aquatic invasive species control (http://www.fisheriesireland.ie/Research/invasive-species), and
- Invasive Species Ireland guidance (http://invasivespeciesireland.com).

[1] The National Parks and Wildlife Services map viewer http://webgis.npws.ie/npwsviewer/
[2] The National Biodiversity Data Centre www.NBDC.ie
[3] https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Badgers-prior-to-the-Construction-of-a-National-Road-Scheme.pdf
[4] https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

- Bat Conservation Trust (2018) Bats and artificial lighting in the UK Bats and the Built Environment series[5]
- Bat Conservation Ireland (2012) Bats and Appropriate Assessment Guidelines, Version 1, December 2012. Bat Conservation Ireland, www.batconservationireland.org[6]
- Bat Conservation Trust (2015) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition
- Bat Conservation Ireland (2010) Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers[7]
- South Dublin County Heritage Plan 2010 - 2015
- South Dublin County Development Plan 2016 – 2022

2.2 Desk Study

A desktop review was carried out to identify the previous records of Badgers, Bats and Invasive species within the proposed development site and its environs. The site occurs in 10km² Grid Square O02. The website the NBDC (www.nbdc.ie) was accessed on 24/06/2019 to establish any previous relevant records and shown below in Table 1. A complete list of protected and threatened species for 10km² Grid Square O02 is shown as Appendix A.

Table 1 Relevant Historical Records in 10km Grid Ref O02 (NBDC website www.nbdc.ie accessed 24/06/2019)

Species Name - Common	Species Name - Latin	Last Documented Record
Bat Records		
Brown Long-eared Bat	(Plecotus auritus)	05/07/2012
Daubenton's Bat	(Myotis daubentonii)	21/08/2014
Lesser Noctule	(Nyctalus leisleri)	18/09/2012
Natterer's Bat	(Myotis nattereri)	14/09/2011
Common Pipistrelle	(Pipistrellus pipistrellus sensu lato)	15/10/2012
Soprano Pipistrelle	(Pipistrellus pygmaeus)	05/08/2012
Badger Records		
Eurasian Badger	(Meles meles)	13/09/2016
High Impact Non-Native Invasive Species Records (Terrestrial Plants)*		
Cherry Laurel	(Prunus laurocerasus)	13/01/2018
Giant Hogweed	(Heracleum mantegazzianum)	15/05/1987
Giant Knotweed	(Fallopia sachalinensis)	01/12/2017
Indian Balsam	(Impatiens glandulifera)	31/12/2017
Japanese Knotweed	(Fallopia japonica)	13/04/2019
Rhododendron	Rhododendron ponticum	13/04/2019

* Aquatic species are not listed as there are no aquatic habitats on the site.

[5] https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/
[6] https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIreland-AA-Guidelines_Version1.pdf
[7] https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf

2.2.1 Badgers

The Badger is the largest Irish member of the mustelid or weasel family and is one of our most distinctive mammals. Its stocky body, short, powerful limbs and striking black-and-white head markings make the badger unmistakeable. Adult badgers are typically 65-80 cm (25-32 inches) long and weigh between 8 and 12 kilos (17 and 27 pound).

Badger habitats are generally found in areas of deciduous or mixed woodlands which are near farmland or open ground. They have made good use of hedgerow systems in Ireland and have also adapted to life in parks and large gardens. They will establish their dens known as setts in any area where the soil is dry and allows for easy excavation. They generally do not range above 500 meters altitude and prefer sloping land areas close to pastures or clearings. The badger's powerful front claws are used to dig extensive systems of tunnels and chambers for their underground setts. Each territory will usually have one main sett with a number of smaller setts nearby. A sett will be comprised of a main nesting chamber ten meters from the main entrance and around three meters below ground level with connections to smaller bed-chambers and links to numerous entrances and emergency exists. A sett will be maintained and extended over time and can house several family groups which can remain in use for several generations of badger families. The main sett entrances are regularly marked with spoil heaps of excavated soil, old bedding materials or straw and dried vegetation. Pathways are regularly used along a badger's territory with a series of boundary latrines established to mark territorial ranges.

2.2.2 Bats

Ireland had ten known bat species until February 2013, when a single live greater horseshoe bat (*Rhinolophus ferrumequinum)* was found roosting in Co. Wexford[8]. The ten species (excluding the greater horseshoe) are briefly described overleaf. For a more comprehensive overview see McAney, 2006.[9]

The dependence of Irish bat species on insect prey has left them vulnerable to habitat destruction, land drainage, agricultural intensification and increase use of pesticides. Also, their reliance on buildings as roosting sites has made them particularly vulnerable to renovation works and the use of timber chemical treatment. Buildings are highly important as roosting sites for bats and all Irish bat species use buildings for all roost types. Most significant in terms of roosts in houses are maternity roosts, but cellars and even attics may serve as hibernation sites for bats. Roosts within buildings can far exceed the numbers encountered in trees, bridges, caves or cliffs and roosts of over 1,000 bats have been recorded in buildings.[10]

The National Biodiversity Data Centre (NBDC) maps landscape suitability bats based on Lundy *et al.* (2011). The maps are a visualisation of the results of the

[8] National Biodiversity Data Centre http://www.biodiversityireland.ie/new-bat-species-found-in-ireland/

[9] McAney, K. (2006) *A Conservation Plan for Irish Vesper Bats.* Irish Wildlife Manual No.20. National Parks and Wildlife Service, Department of the Environment, Heritage and Loca lGovernment.

[10] NRA (2005) Guidelines for the Treatment of Bats Prior to the Construction of National Road Schemes. National Roads Authority, Dublin

analyses based on a 'habitat suitability' index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The overall assessment of bat habitats for the current study area is given as 24.56. This low rating could be attributed to the general lack of hedgerow / treeline habitats, native tree species which are used as commuting / foraging corridors for bats. The low feeding potential for bats owing to the lack of insect production area coupled with the windswept aspect of the countryside is regarded as a limiting factor for bat numbers in the study area. Table 2 gives the suitability of the study area for the bat species found in the study area (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2009).

Table 2 Suitability of the study area for the bat species found in the Brittas area (based on the NBDC data). Irish Red list status also indicated (based on Marnell *et al*, 2009).

Common name	Scientific name	Suitability index	Irish red list status
All bats	-	24.56	
Common pipistrelle	*Pipistrellus pipistrellus*	43	Least Concern
Soprano pipistrelle	*Pipistrellus pygmaeus*	33	Least Concern
Nathusius' pipistrelle	*Pipistrellus nathusii*	0	Least Concern
Daubenton's bat	*Myotis daubentonii*	16	Least Concern
Brown long-eared bat	*Plecotus auritus*	37	Least Concern
Leisler's bat	*Nyctalus leisleri*	33	Near Threatened
Natterer's bat	*Myotis nattererii*	31	Least Concern
Whiskered bat	*Myotis mystacinus*	28	Least Concern
Lesser-horseshoe bat	*Rhinolophus hipposideros*	0	Least Concern

2.2.2.1 Family Vespertilionidae:

Common pipistrelle *Pipistrellus pipistrellus*

This species was only recently separated from its sibling, the soprano or brown pipistrelle P. pygmaeus[11], which is detailed below. 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.

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.

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[12] and also in Fermanagh, Longford and Cavan. It has also recently been recorded in

[11] Barratt, E. M., Deauville, R., Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A., & Wayne, R. K. (1997) *DNA Answers the Call of Pipistrelle Bat Species. Nature* 387: 138 - 139.

[12] Richardson, P. (2000) *Distribution Atlas of Bats in Britain and Ireland 1980 - 1999.* The Bat Conservation Trust, London, England.

Counties Cork and Kerry.[13] However, the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. The status of the species has not yet been determined.

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. This species is uncommon in Europe and as Ireland holds the largest national population the species is considered as Near Threatened here.

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.

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.

Daubenton's bat *Myotis daubentonii*

This bat species feeds close to the surface of 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.

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 whiskered bat is one of our least studied species and further work is required to establish its status in Ireland.

[13] Kelleher, C. (2005) *International Bat Fieldcraft Workshop, Killarney, Co. Kerry.* National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

Brandt's bat *Myotis brandtii*

This species is known from five specimens found in Counties Wicklow (Mullen, 2007), Cavan, and Clare in 2003, a specimen in Kerry in 2005[14] and another in Tipperary in 2006.[15] No maternity roosts have yet been found. It is very similar to the whiskered bat and cannot be separated by the use of detectors. Its habits are similar to its sibling.

2.2.2.2 Family Rhinolophidae:

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.

2.2.2.3 Bat Roosts

Bats were originally cave and tree dwelling animals but many now find buildings just as suitable for their needs. Bats are social animals and most species congregate in large colonies during summer. These colonies consist mostly of females of every reproductive class, with some juvenile males from the previous year. Male bats normally roost individually or in small groups meeting up with the females in the late autumn-early winter, when it is time to mate. In summer, bats seek warm dry buildings in which they can give birth and suckle their young. In winter, they seek out places with a constant low temperature and high humidity where they can become torpid and hibernate during adverse weather conditions. However, bats do not hibernate continuously during winter and will awake and hunt during mild nights when there are insects available and it is energetically advantageous to forage.

Maternity Roosts

Maternity roosts are the most significant roosts and they are predominantly all-female aggregations that are formed from late May onwards and remain as a relatively cohesive unit until mid to late August. Not all female bats give birth annually. These females that do bear young in a given year avail of a suitable

[14] Kelleher, C. 2006a Nathusius pipistrelle Pipistrellus nathusii and Brandt's Bat Myotis brandtii - New Bat Species to Co. Kerry – Irish Naturalists' Journal 28: 258.

[15] Kelleher, C. 2006b Brandt's Bat Myotis brandtii, New Bat Species to Co. Tipperary. Irish Naturalists' Journal 28: 345.

building, tree and sometimes cave (or equivalent). The young are flightless for several weeks and hence are vulnerable to dangers such as tree felling and restoration, reinforcement or demolition of structures such as buildings and bridges.

Mating Roosts

Most bat species mate in autumn but pregnancy does not occur until the following spring. During this time males will take possession of a cavity in a building, tree, bridge, cave or mine and attract females to these sites to establish a harem. Male bats call both from a perch and in flight in much the same manner that male birds sing.

Hibernation Roosts

Bats have a high metabolic rate and in temperate countries, such as Ireland, flying insects are not available in sufficient numbers during winter to sustain bats. Therefore, bats hibernate during winter. In hibernation sites, bats are often completely inactive for several days and are extremely vulnerable to disturbance by human activities due to the time taken for them to become sufficiently active to allow escape. Hibernation may extend from November to the end of March, during which time bat activity will take place sporadically.

Night Roosts

These are roosts which are used as resting places for bats between foraging bouts. They also provide retreats for bats from predators or during inclement weather conditions. They also function as feeding perches and may be important for socialising.

2.2.3 *Alien Invasive Species*

The Convention on Biological Diversity defines alien species as 'alien species which become established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity'. Species recorded in 10km² O02 include Cherry Laurel, Giant Hogweed, Giant Knotweed, Indian Balsam, Japanese Knotweed and Rhododendron.

Japanese Knotweed

Japanese Knotweed is a tall, vigorous, ornamental plant that escaped cultivation in the late nineteenth century and has since become an aggressive invader in both rural and urban environments. The plant can grow up to 2-3 metres high and its root system can extend as deep as 2 metres into the ground and 7 metres laterally from the parent plant. The reason this plant is such a threat is due to the nature of its regeneration; cut fresh stems can produce fresh shoots and roots from nodes when immersed in soil or water.

Indian Knotweed

Indian Knotweed comprises bamboo-like stems as in other knotweeds and are usually green though it can have alternating red-green colouration. Flowers are loosely clustered and can range in colour from white to pink appearing in August – September. The leaf shape and size are this species distinguishing feature having long lanceolate leaves that are not as serrated as Indian Balsam.

Himalayan Balsam
Himalayan Balsam comprises hollow, brittle stems that are green to red early in the year, turning pink to red in summer. Flowers are trumpet shaped and pink in colour, often with spots and markings on the inside. The leaves are slender to elliptical with finely serrated edges and are opposite, or in whorls of 3-5. Seed pods are ca. 25 mm long that hang on red stalks and explode on touch when ripe. The roots are very shallow and the plant is easily uprooted by pulling the stem. Himalayan Balsam spreads solely by seeds, which are small and easily carried by wind or water.

Giant Hogweed
Giant Hogweed grows to extreme heights of 3-5 metres and displays an umbrella-shaped flower head up to 500mm across, supporting hundreds of small white flowers. Stems of this plant are green and hollow, sometimes displaying purple blotches and can be up to 100mm in diameter. Its leaves can expand up to 1.5 metres in width and have a jagged appearance with spiky ends. Seeds of Giant Hogweed can number from 20 – 50,000 a year.

Giant Rhubarb
Giant Rhubarb is a large herbaceous perennial which can grow up to 2 metres tall. The plant originates from South America and has large leathery leaves and leaf stalks with short pale bristles and weak spines. The flowering cone-like section of the plant can be up to 1 metre long and inflorescences like this can number up to 5 per plant leading to a huge amount of seed production. Orange/red fruits mature in late summer to early autumn. Giant Rhubarb is capable of reproducing up to 250,000 seeds per year and can also regenerate from small segments of rhizome, extending by 15cm a year once established.

Rhododendron
Rhododendron is a native of Asia and the Iberian Peninsula. Rhododendron shades out native species as well as invading their natural habitat. Rhododendron can grow as high as 3 metres and forms dense thickets. The plant can reproduce both via seed and vegetatively from the root.

2.3 Field-based Studies

The site was visited for the purposes of this report by Aisling Walsh on the 24th of June 2019. Habitats were identified and classified according to Fossitt (2000)[16] and Smith *et al.* (2011)[17]. During the survey, particular attention was given to the possible presence of Badgers, Bats and Invasive species.

A series of photographic plates are attached in Appendix B. A habitat map is shown as Figure 4.

2.3.1 Site Overview

The habitats on the site of the proposed works, which will be affected, consists mainly of hard-standing 'Buildings and Artificial Surfaces (BL3)', Amenity Grassland

[16] Fossitt, J. (2000). A *Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.
[17] Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011) Best practice guidance for habitat survey and mapping. The Heritage Council, Kilkenny.

(GA2), Earthbank (BL2) and Spoil and Bare Ground (ED2). A section of non-native Silver Fir treeline and Lawson Cypress and Leyland Cypress treeline (WL2) and Hedgerows (WL1) of both native variety (Gorse, Hawthorn, Elder and Bramble) and non-native planted Cherry Laurel form some of the boundaries.

The Buildings and Hardstanding (BL3), Amenity Grassland (GA2), Earthbank (BL2) and Spoil and Bare Ground (ED2) which makes up the majority of the site are all considered low biodiversity habitats with of low ecological value. The Treelines/Hedgerows that make up the boundary of the site will be retained where possible and are of local ecological importance.

In the wider area there are extensive areas of Gorse Scrub (WS1) and Dry-humid acid grassland (GS3), Improved Agricultural Grassland (GA1) with Upland Streams (FW1) and Drainage Ditches and Sitka Spruce plantations (WD4).

2.3.2 Bats

A bat activity survey of the site was carried out to on the 24th of June 2019 so ascertain which species were using the site and where most activity took place.

The equipment used included the Elekon Bat Logger M. Visual observations were taken with the aid of a powerful L.E.D. torch (AP Pros-Series 220 Lumens High Performance Spotlight). A Seek Thermal Reveal Pro High-Resolution Thermal Imaging Camera was also used along with a Teslong Borescope Inspection Camera for inspection of any crevices and ivy on trees.

The bat activity survey began at sunset 21.57 and lasted until 23.30. The survey was undertaken during favourable weather conditions e.g. dry with mild temperatures fluctuating mainly between 13 and 15°C in calm conditions.

The detector picked up frequencies between 25 kHz - 115 kHz as this frequency range is able to pick up the calls of all Irish bat species, including Lesser horseshoe bats.

2.3.3 Badgers

A badger survey of the site and areas within 100m of same (where possible) was undertaken on the 24th June 2019. This survey was undertaken during the daytime and involved walking the site. Evidence of use by badgers including latrines, hair, foraging activity (snuffle holes), commuting movements (badger tracks) or setts and bedding was sought. The survey followed standard methodology as outlined in *'Best Practice Guidance - Badger Surveys'* by Scottish Natural Heritage (2003) and other guidance, including the book *'How to find and identify mammals'* by Muir *et al* (2013).

2.3.4 Invasive Species

The site was surveyed on the 24th of June 2019, which is within the growth season of all the relevant invasive species listed for the 10km² grid square O02.

2.3.5 Evaluation

Ecological survey results were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local (from NRA, 2009) The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into two categories: local importance (higher value) and local importance (lower value).

3. RESULTS

3.1 Badgers

No badger setts were found on the site. They may be present in the wider landscape outside the site boundary within areas of scrub Gorse (*Ulex europeaus*) but would not be impacted by the proposed works as any setts would be well outside the zone of impact i.e. 50m during the breeding season at breeding or other significant setts (if present).

3.2 Bats

No evidence of bats such as bat droppings, staining or smearing were found at any potential entry point to the buildings for retention (e.g. the wooden log cabin and pump house). Holes and/or cracks on these structures were examined in detail using a torch and borescope where necessary but no bat droppings or signs of bats were recorded. None of the trees on the site (which will be retained) had bat potential. Overall the site was very open and exposed and while bat activity was recorded (as expected), it was considered to be a low level of activity in the experience of the assessor - possibly due to the lack of tall continuous hedgerows. The best native hedgerow for commuting/feeding bats was towards the entrance to the site (to be retained) and the Silver Fir treeline (to be retained), see Figure 4. The most frequent bat species by far was Leisler's Bat which emerges early and has a frequency call that can travel further than other species meaning many calls picked up on the detector were from outside the site.

During the bat activity survey a total of 4 species of the 9 species resident in Ireland (and 6 previously recorded in the 10km Grid Square O02) were recorded. The Lesser Horseshoe Bat was not recorded as expected (Lesser horseshoe does not occur in the east of Ireland with the closest record west of Craughwell, Co. Galway (Grid M4719).

The results of the bat survey are summarized in Table 3 with the complete dataset of bat species identified in real time in the field using the Elekon Batlogger M detector presented in Appendix C.

Table 3 Bat Results Summary Data – June 13th 2019 between 21.54 and 23.30

Species Name - Common	Species Name - Latin	Total Number of Calls	Number of Occurrences	Peak Frequency (kHz)
Common Pipistrelle	*Pipistrellus pipistrellus*	63	6	46.5
Soprano Pipistrelle	*Pipistrellus pipistrellus*	42	2	55.5
Leisler's Bat	*Nyctalus leisleri*	402	42	26.9
Brown Long Eared Bat	*Plecotus auritus*	34	4	21.0

3.3 Invasive Alien Species

No restricted invasive species (as listed on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011*) were recorded on the site during the survey. Some hedgerows were of planted Cherry Laurel hedging - a species that can be invasive in woodland habitats - however; this species does not have any legal restrictions, and would not be spread by construction works, so it is not considered to be a constraint.

Section 4 of this report provides a set of recommendations for Best Practice management measures that should be adhered to during construction works in order to avoid the introduction of invasive species within the site.

3.4 Other Mammals

No other protected mammals were seen on the site.

There were no visual sightings of pygmy shrew, however, sightings and field signs are rare (e.g. no reliable feeding signs or droppings). The species nests in long grasses in dense vegetation or under rocks or logs, occurring wherever adequate insect food exists. Given the minimum territory size of 200 m2 (Hayden and Harrington, 2001). There may be several territories within the footprint of the proposed works however are likely to be located towards the boundaries which will not be affected. Breeding is from April to October (Hayden and Harrington, 2001).

There were no visual sightings of hedgehog or field signs observed during field surveys. Hedgehogs are nocturnal and the survey coincided with the evening/night time bat survey. There is suitable hedgerows along the boundaries for nesting and hibernating which will not be impacted by the proposed works. Breeding is from May to October (Hayden and Harrington, 2001).

There is potentially suitable habitat for Red Squirrel along the treelines. No dreys were recorded in any trees within the footprint of the proposed works.

Fox *Vulpes vulpes* signs were found across the site. While Rabbits *Oryctolagus cuniculus* and rabbit signs were observed on site and rabbit burrows, active and inactive, were frequent. These species are not protected however will not be impacted by proposed works.

3.5 Nesting Birds

Birds recorded using the site included common garden species:

- Black-billed Magpie (Pica pica)
- Blue Tit (Cyanistes caeruleus)
- Chaffinch (Fringilla coelebs)
- Coal Tit (Periparus ater)
- Common Blackbird (Turdus merula)
- Eurasian Jackdaw (Corvus monedula)
- European Goldfinch (Carduelis carduelis)
- European Greenfinch (Carduelis chloris)
- European Robin (Erithacus rubecula)
- Great Tit (Parus major)
- Grey Wagtail (Motacilla cinerea)
- Rook (Corvus frugilegus)
- Song Thrush (Turdus philomelos)
- Winter Wren (Troglodytes troglodytes)

4. RECOMMENDATIONS

4.1 Badgers

There were no Badger Setts found on the site so recommendations are not required.

4.2 Bats

There was no evidence found in the current survey that any of the existing buildings on the site or trees are being used by bats, and no evidence of previous use by bats was recorded. The existing buildings, if demolished in the future (subject to planning) are not of importance to bats and are rated as being of Local Importance (lower value). The landscape of the study area has a low rating for bats and coupled with the unsuitable conditions that exist, the proposed works is not considered to represent a risk to bats.

The following general precautionary measure is recommended nonetheless. If a bat is observed at any time during demolition of any structures (subject to Planning Permission), work must stop immediately. The Bat Helpline (1800 405 000) should then be called before further works proceed.

As the landscape is open and they activity survey found low numbers giving the ambient weather conditions and time of year, it is recommended that bat friendly planting is used during landscaping and a series of 3 bat boxes be erected on the site to provide roosting opportunities, see Appendix D.

In addition, to ensure absolutely no impacts to bats using the nearby treelines and hedgerows for foraging, the following lighting mitigation should be undertaken.

4.2.1 Appropriate luminaire specifications.

Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following shall be considered when choosing luminaires which will minimise the effect on bat species:

- Only illuminate what needs to be illuminated – minimise or prevent light spill to the site boundaries to the sides and rear of site where the Lesser Horseshoe Bat was found to forage and commute. A modest light to the front of dwelling should not affect bat species.
- If lighting a pathway for example, the light ideally would be directed at the path only, with no up-light or illumination of nearby trees or hedgerows.
- Downward lighting can be reflected from bright surfaces, so using Black Tarmac instead of bright gravel or concrete for the Pathway may be a consideration.
- Shielding of Luminaires & Light – adding shields/baffles to stand between the luminaire and the flight path.
- Type of Light – generally warm coloured lighting (e.g. HPS) seems to be less disruptive than colder coloured lighting (e.g. Metal Halide). Minimising or

eliminating UV light is recommended. LED lighting has no U.V., HPS has a little (0.2%), and Metal Halide (2%-7%).

- Lighting Controls – the peak time for feeding for bats is dusk. This is when they exit the roost to go foraging. If the lighting was switched off for this period, or at lower light output, this would benefit bats. In addition, the lighting could be controlled by occupancy/motion sensors so that it would remain off/low if there was no pedestrian traffic nearby.
- LED luminaires shall be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) shall be adopted to reduce blue light component.
- Luminaires shall feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- 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 shall only be as directed by the lighting professional.
- Column heights shall be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control shall be used – See ILP Guidance for the Reduction of Obtrusive Light.[18]
- Luminaires shall always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting shall 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.

4.3 Invasive Alien Species

The intended construction methodology shall contain measures for avoiding the introduction of non-native alien invasive species and will follow best practice guidance documents. The measures outlined in the '*Horticulture Code of Good Practice*'[19], "*Guidelines on the Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads*" (NRA, 2010)[20] and the '*IFI Biosecurity Protocol for Field Survey Work*'[21] should be adhered to for example high-pressure steam cleaning, with water > 40°C for machinery and sprayed with Virkon™ antiseptic.

Quarries supplying material for the project should be able to give written confirmation to the client that material from their depot is free of non-native invasive species and noxious weeds.

[18] http://www.wiltshire.gov.uk/guidance-notes-for-the-reduction-of-obtrusive-light.pdf
[19] Kelly, J. 2012. Horticulture code of good practice to prevent the introduction and spread of invasive non-native species. V2.0. Prepared as part of Invasive Species Ireland.
[20] NRA (2010) Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf
[21] IFI (2010) *IFI Biosecurity Protocol for Field Survey Work. Inland Fisheries Ireland.*

4.4 General Ecology

It is recommended that landscaping uses native Irish Tree species; see Appendix E for a suggested list. This will benefit the general ecology of the site and may increase the biodiversity of the site. Erecting a total of 3 No. bird boxes will provide additional nesting opportunities for nesting birds in the area. Details on these can be found in Appendix F.

5. CONCLUSION

Overall the site the habitats on the site are considered of low biodiversity with the best habitats being the native hedgerow found in parts of the site boundary. As these will all be retained there will be no loss to habitats representing local ecological importance for the area.

The open landscape on the site meant that the landscape suitability index for bats was 'Low', however with 3 No. bat boxes erected as part of this project it is anticipated that roosting opportunities for bats will be enhanced; furthermore a bat friendly lighting system is proposed with bat friendly landscaping.

There were no alien invasive species on the site or adjacent to it so with precautionary measures in place no introduction of species such as Japanese Knotweed are envisaged.

From a general ecological point of view all other species noted on site were common in the wider area and not protected e.g. foxes and rabbits. Birds using the site were of the common garden variety, and as all hedgerows and treelines will be retained and therefore are no impacts predicted from the proposed retention and building works.

To conclude this ecological assessment report found limited ecological value on the site. Any habitats of local ecological importance will be retained and any proposed works will have no negative implications for protected species in the wider landscape setting. Landscaping to include native tree species, bat friendly planting with bat and bird boxes will provide a positive impact for biodiversity.

6. REFERENCES

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