

10. BIODIVERSITY

10.1 Introduction

This Environmental Report has been prepared with regard to the EIA Directive as well as best practice methodology from the EPA, under which, the analysis of impacts to biodiversity is an essential component of the EIA process, and so is a required chapter in any EIAR.

Under Article 6(3) of the Habitats Directive an 'appropriate assessment' of projects must be carried out to determine if significant effects are likely to arise to the integrity of Natura 2000 sites. An Appropriate Assessment Screening Report has been prepared as a separate stand-alone report.

10.2 Research Methodology

The assessment was carried out in accordance with the following best practice methodology: 'Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland' by the Institute of Ecology and Environmental Management (IEEM, 2016) and 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' by the Environmental Protection Agency (EPA, 2017).

A site visit was carried out on the 28th of June 2018. The site was surveyed in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2010). Habitats were identified in accordance with Fossitt's Guide to Habitats in Ireland (Fossitt, 2000). A species list for each habitat was compiled and these are presented in Appendix 10.A of this Chapter. Species abundance was determined using the DAFOR scale (D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare). This is a subjective form of habitat description commonly used in conjunction with habitat classifications. Sample digital photos were also taken. Data were then uploaded to the ArcView 9.2 GIS software suite.

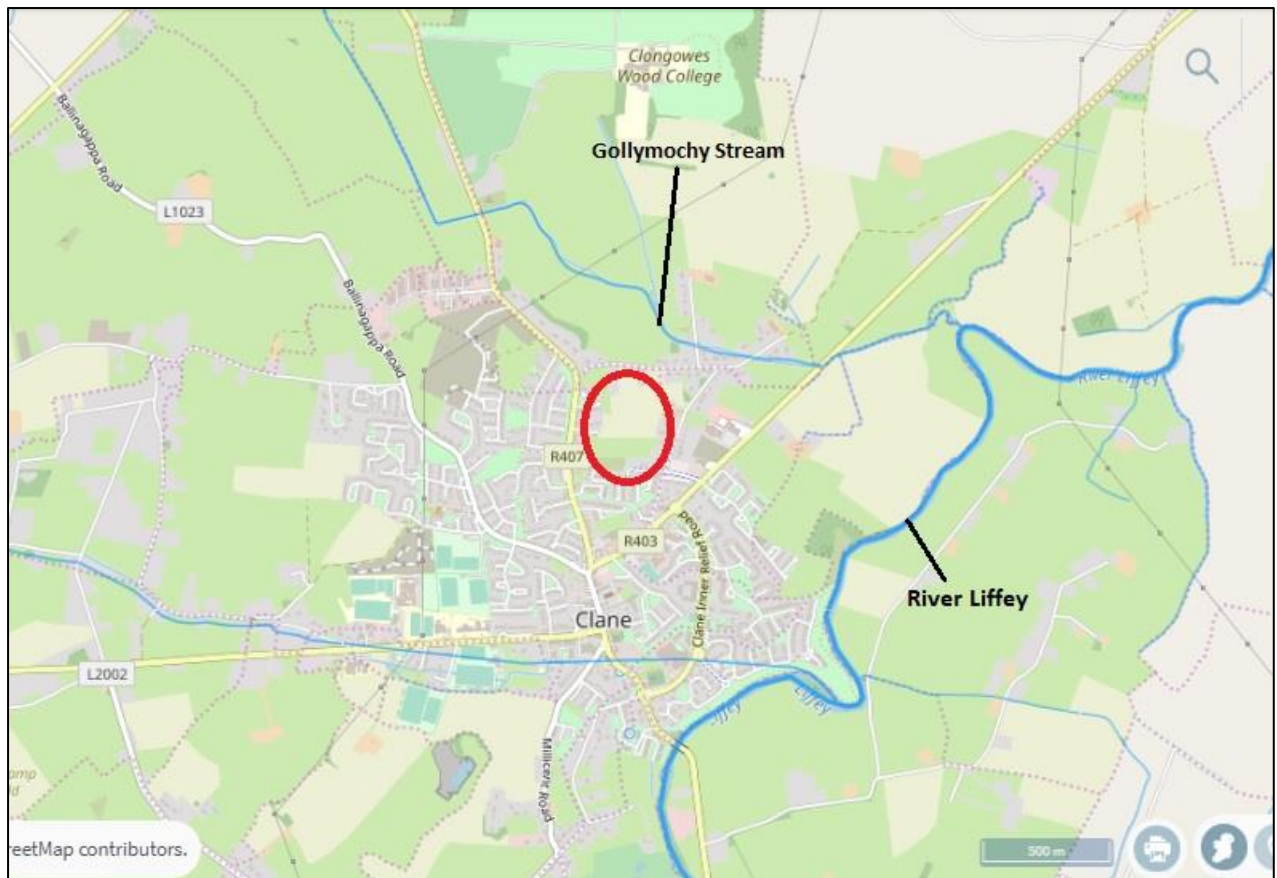
The nomenclature for vascular plants is taken from The New Flora of the British Isles (Stace, 2010) and for mosses and liverworts A Checklist and Census Catalogue of British and Irish Bryophytes (Hill et al., 2009).

June lies within the optimal period for general habitat surveys (Smith et al., 2010). It was thus possible to classify all habitats on the site to Fossitt level 3. It is also within the optimal season for bats and a dedicated bat survey was carried out by Brian Keely in June 2018. June lies within the optimal season for breeding birds but is outside the ideal season for surveying amphibians and larger mammals.

10.3 Receiving Environment

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). However, some impacts are not limited to this distance and so sensitive receptors further from the project footprint may need to be considered as this assessment progresses. This is shown in Figure 10.1 below.

Figure 10.1 Approximate 2km radius of proposed site. There are no areas designated for nature conservation within this zone (from www.epa.ie)



10.3.1 Literature Review

There are a number of designations for nature conservation in Ireland including National Park, National Nature Reserve, RAMSAR site, UNESCO Biosphere reserves, Special Protection Areas (SPA – Birds Directive), Special Areas of Conservation (SAC – Habitats Directive); and Natural Heritage Areas. The mechanism for these designations is through national or international legislation. Proposed NHAs (pNHA) are areas that have yet to gain full legislative protection. They are generally protected through the relevant County Development Plan. There is no system in Ireland for the designation of sites at a local, or county level. Within 2km of the site there are no areas designated for nature conservation.

The NPWS web site (www.npws.ie) contains a mapping tool that indicates historic records of legally protected species within a selected Ordnance Survey (OS) 10km grid square. The Capdoo site is located within the square N82 and no protected plant or animal species is recorded. It must be noted that this list cannot be seen as exhaustive and a lack of records should not be interpreted as an absence of protected species.

Water quality is monitored on an on-going basis by the Environmental Protection Agency (EPA). They assess the pollution status of a stretch of water by analysing the invertebrates living in the substrate as different species show varying sensitivities to pollution. They arrive at a 'Q-Value' where Q1 = grossly polluted and Q5 = pristine quality (Toner et al., 2005). The Capdoo site is within the catchment of the River Liffey. Mapping from OSI and the EPA show no water courses on these lands. A small stream, the Gollymochy, flows approximately 100m north

of the site boundary. The next downstream monitoring station is at Straffan, and here Q4 was also recorded in 2016.

There are no EPA monitoring points along this stream. The nearest monitoring point along the River Liffey, at Alexander Bridge upstream of Clane most recently (2016) showed Q4 conditions (unpolluted).

The EU's Water Framework Directive (WFD) stipulates that all water bodies are to attain 'good ecological status' by 2015 or, with exemptions, 2027 at the latest. This includes all rivers and the Liffey was originally located within the Eastern River Basin District. In 2010 the first River Basin Management Plan (RBMP) was published to address ecological issues and this included a 'programme of measures' which was to be completed. The stretch of the Liffey from its headwaters as far downstream as Celbridge is classified as 'good'. This classification indicates that current water quality is of a sufficient standard to meet the requirements of the WFD.

In 2018 a second RBMP was published and under which all water bodies in Ireland fall within a single River Basin District. The River Liffey now falls within the Eastern Region. This plan has identified 190 'priority areas for action' which will form the focus of resource allocation for the 2018-2021 period. A number of tributaries of the Liffey are among these areas, including the Lyreen and the Morrell.

10.3.2 Stakeholder Consultation

Because of the relatively low ecological sensitivity of the subject lands no third parties were contacted for nature conservation observations.

10.3.3 Plans or Policies Relating To Natural Heritage

10.3.3.1 Convention on Biological Diversity (CBD)

The protection of biodiversity is enshrined in the CBD to which Ireland is a signatory. As part of its commitment to this international treaty Ireland, as part of a wider European Union initiative, was committed to the halt in loss of biodiversity by the year 2010. This target was not met but in 2010 in Nagoya, Japan, governments from around the world set about redoubling their efforts and issued a strategy for 2020 called 'Living in Harmony with Nature'. In 2011 the Irish Government incorporated the goals set out in this strategy, along with its commitments to conservation biodiversity under national and EU law, in the second national biodiversity action plan (Dept. of Arts, Heritage and the Gaeltacht, 2011). A third plan was published in 2017.

10.3.3.2 Clane Local Area Plan (LAP) 2017-2023

Chapter 10 of the LAP discusses 'heritage and amenity' including the natural heritage (section 10.3). The following policy is particularly relevant to the current proposal:

HO3.5 To protect, conserve and enhance, wherever possible, wildlife habitats and species of local importance and to give appropriate consideration to maintaining existing local ecological corridors and linkages not otherwise protected by legislation.

Chapter 11 describes the importance of 'green infrastructure', and sets a strategic objective:

To protect, enhance and develop a multi-functional Green Infrastructure network by building an interconnected network of parks, open spaces, hedgerows, grasslands and watercourses.

Key green infrastructure features are mapped in the LAP and the relevant extract is reproduced in Figure 10.2.

Figure 10.2 Extract from the LAP's 'green infrastructure' map. Within the Capdoo lands there are high value hedgerows (green lines), moderate value hedgerows (orange lines) and 'key green infrastructure area' in green shading.



The following policies are especially relevant:

GIO1.1 To reduce fragmentation of the Green Infrastructure network and strengthen ecological links within Clane and to the wider regional network.

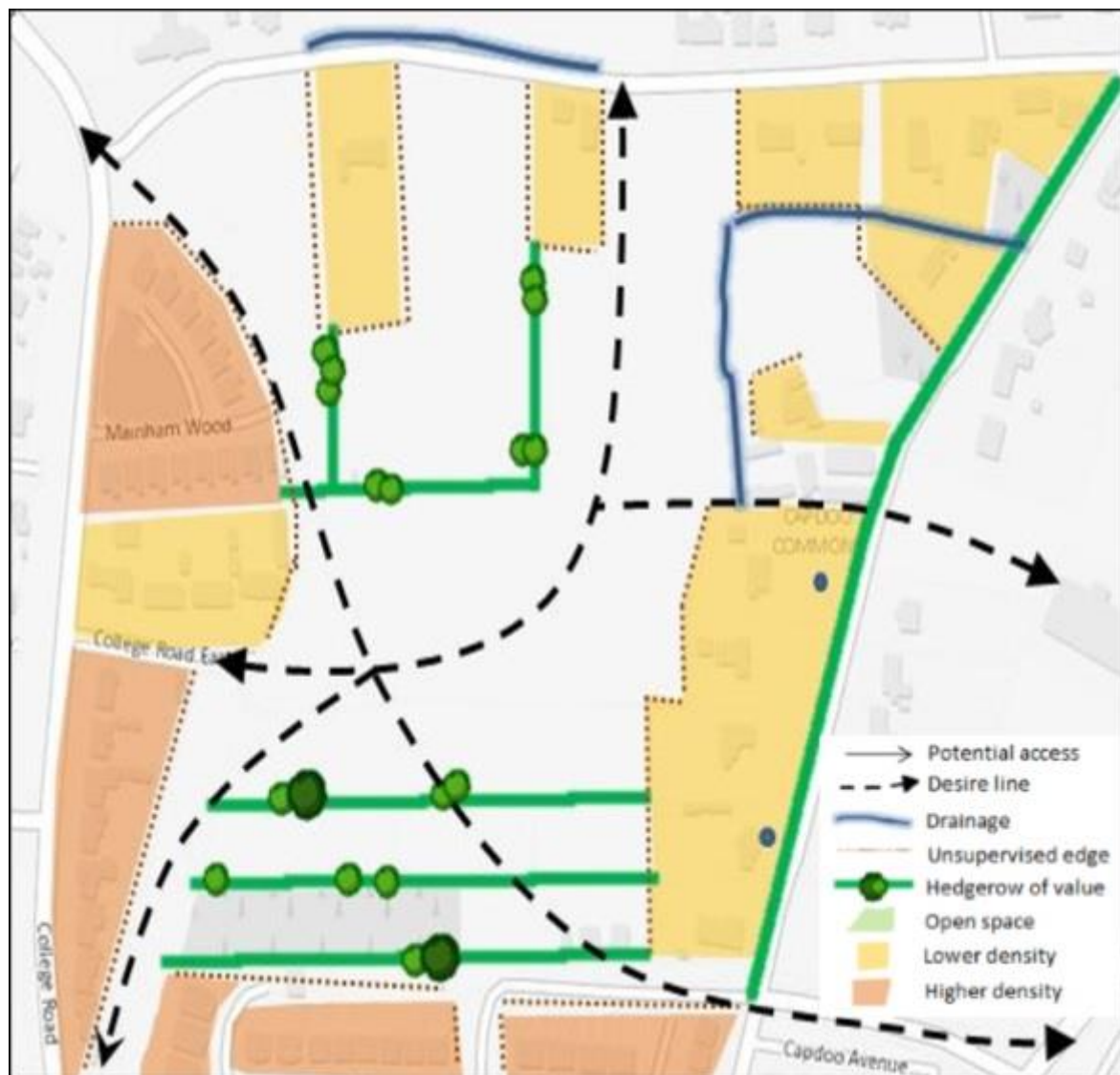
GIO1.2 To integrate Green Infrastructure as an essential component of all new developments and restrict development that would fragment or prejudice the Green Infrastructure Network.

GIO1.3 To seek to protect and enhance the biodiversity value and ecological function of the Green Infrastructure network.

GIO1.4 To ensure key trees, woodlands and hedgerows identified, and the linkages they provide to larger areas of green infrastructure and the wider countryside, are retained where appropriate and integrated into the design of new developments.

This is further emphasised within Section 12.2.2 which identifies the Clane lands as 'key development area (KDA) 2' and which highlights 'hedgerows of value' as shown in Figure 10.3.

Figure 10.3 Clane KDA2 extract.



10.3.3.3 2nd River Basin Management Plan

Under the Water Framework Directive (Directive 2000/60/EC) all Irish waters must achieve 'good ecological status' by 2027. This has highlighted 190 'priority areas for action' which will focus resources between the 2018-2021 period. The Liffey at Clane is assessed as of 'good' status.

10.3.4 Site Survey

Aerial photography and historic mapping from the OSI show that this region has remained in agricultural use since historic times. It is close to the town of Clane and there have been some land use change in recent decades which has seen conversion of farming land to built surfaces. The lands are currently surrounded on all sides by residential housing or public roads.

10.3.4.1 Flora

The site was visited for this study on June 28th 2018 and habitats are described here with reference to the standard classification system (Fossitt, 2000). It was found that the lands comprise a series of agricultural fields with traditional field boundaries. There are no water courses or drainage ditches associated with these boundaries.

The fields were not in active production and so have reverted to **dry meadow – GS2**. They are predominantly composed of tall grasses of a variety of species (Sweet Vernal-grass *Anthoxanthum odoratum*, Common Couch *Elytrigia repens*, False Oat *Arrhenatherum elatius*, Timothy *Phleum pratense*, Cock's-foot *Dactylis glomerata*) with occasional herbaceous plants. These are mostly Thistles *Cirsium sp.*, Willowherbs *Epilobium sp.*, Vetches *Vicia sp.*, Ragwort *Senecio jacobaea* etc. The field to the far north-west appears to have been out of agricultural use for longer, with evidence of disturbed ground and development of **scrub – WS1**. This is a natural process whereby woody species invade grasslands and would ultimately result in tall woodland. Here there are some saplings of Hawthorn *Crataegus monogyna* and Ash *Fraxinus excelsior* while the field margins are mostly made up of Blackthorn *Prunus spinosa* or Brambles *Rubus fruticosus agg.* Together, these habitats provide resources for common invertebrates, small mammals and – in the case of scrub – nesting birds. They are of low local value to wildlife.

Field boundaries are either **hedgerows – WL1** or **treelines – WL2**. These can be similar in species composition and differ in that treelines are dominated by tall trees over 5m in height. Methodology is available from the Heritage Council which evaluates the quality of field boundaries based upon their age, species diversity and structure (Foulkes et al., 2013). These field divisions appear on historic OSI maps from 1888-1913 and so are of significant age. The northern (road) boundary appears as a townland boundary and so may be ancient (8th Century). Treelines and hedgerows dominated by non-native species such as Cherry Laurel *Prunus laurocerasus*, Leyland Cypress *Cuprocyparis leylandii*, or other horticultural species, or which are of poor structure and low species diversity are evaluated as of 'lower significance'. Elsewhere, boundaries are evaluated as 'higher significance' due to their age and species diversity. Trees and woody species typically comprise Ash, Hawthorn, Wych Elm *Ulmus glabra*, Ivy *Hedera helix*, Rose *Rosa sp.*, Honeysuckle *Lonicera periclymenum*, with occasional Hazel *Corylus avellana* and Crab Apple *Malus sylvestris*. Ground flora includes Herb Robert *Geranium robertianum*, Wood Avens *Geum urbanum* and Bush Vetch *Vicia sepium* along with the ferns: Soft-shield Fern *Polystichum setiferum*, Hart's-tongue *Asplenium scolopendrium* and Black Spleenwort *A. adiantum-nigrum*. These treelines and hedgerows are dense and well-structured, providing excellent habitat for a range of plants and animals, and are of high local value to biodiversity.

To the east there is a cluster of **buildings and artificial surfaces – BL3** which are the remains of a dwelling home and farm outhouses, including stables. They are overgrown with Brambles and Willow *Salix sp.* Near this area there is a small **mixed broadleaved woodland – WD1** with a variety of native and non-native trees, including Sycamore *Acer pseudoplatanus*, Ash, Elder *Sambucus nigra*, Cherry *Prunus sp.*, Cherry Laurel, Horse

Chestnut *Aesculus hippocastanum*, Birch *Betula sp.*, and Spruce *Picea sp.* It is of low local biodiversity value due to the large non-native component.

No plant species were found which is listed as alien invasive under Schedule 3 of S.I. 477 of 2011. No rare or threatened plant species was recorded.

There are no habitats which are examples of those listed in Annex I of the Habitats Directive while there is no evidence that species listed in Annex II of that Directive are present. All habitats described are shown as a habitat map in Figure 10.4 below.

Figure 10.4 **Habitat Map**



10.3.4.2 Fauna

The site survey included incidental sightings or proxy signs (prints, scats etc.) of faunal activity, while the presence of certain species can be concluded where there is suitable habitat within the known range of that species. Table 10.1 details those mammals that are protected under national or international legislation in Ireland.

Table 10.1 Protected mammals in Ireland and their known status within the zone of influence (Harris & Yalden, 2008)¹ Those that are greyed out indicate that there are no records of the species from the 2km square, O24J National Biodiversity Data Centre.

| Species | Level of Protection | Habitat ² | Red List Status ³ |
|---------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------|------------------------------|
| Otter <i>Lutra lutra</i> | Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000 | Rivers and wetlands | Near Threatened |
| Lesser horseshoe bat <i>Rhinolophus hipposideros</i> | | Disused, undisturbed old buildings, caves and mines | Least Concern |
| Grey seal <i>Halichoerus grypus</i> | Annex II & V Habitats Directive; Wildlife (Amendment) Act, 2000 | Coastal habitats | - |
| Common seal <i>Phocaena phocaena</i> | | | - |
| Whiskered bat <i>Myotis mystacinus</i> | Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000 | Gardens, parks and riparian habitats | Least Concern |
| Natterer's bat <i>Myotis nattereri</i> | | Woodland | Least Concern |
| Leisler's bat <i>Nyctalus leisleri</i> | | Open areas roosting in attics | Near Threatened |
| Brown long-eared bat <i>Plecotus auritus</i> | | Woodland | Least Concern |
| Common pipistrelle <i>Pipistrellus pipistrellus</i> | | Farmland, woodland and urban areas | Least Concern |
| Soprano pipistrelle <i>Pipistrellus pygmaeus</i> | | Rivers, lakes & riparian woodland | Least Concern |
| Daubenton's bat <i>Myotis daubentonii</i> | | Woodlands and bridges associated with open water | Least Concern |
| Nathusius' pipistrelle <i>Pipistrellus nathusii</i> | | Parkland, mixed and pine forests, riparian habitats | Least Concern |
| Irish hare <i>Lepus timidus hibernicus</i> | Annex V Habitats Directive; | Wide range of habitats | Least Concern |

¹ Excludes marine mammals

² Harris & Yalden, 2008

³ Marnell et al., 2009

| Species | Level of Protection | Habitat2 | Red List Status3 |
|-------------------------------------------------|--------------------------------|--------------------------------------------|------------------|
| Pine Marten <i>Martes martes</i> | Wildlife (Amendment) Act, 2000 | Broad-leaved and coniferous forest | Least Concern |
| Hedgehog <i>Erinaceus europaeus</i> | Wildlife (Amendment) Act, 2000 | Woodlands and hedgerows | Least Concern |
| Pygmy shrew <i>Sorex minutus</i> | | Woodlands, heathland, and wetlands | Least Concern |
| Red squirrel <i>Sciurus vulgaris</i> | | Woodlands | Near Threatened |
| Irish stoat <i>Mustela erminea hibernica</i> | | Wide range of habitats | Least Concern |
| Badger <i>Meles meles</i> | | Farmland, woodland and urban areas | Least Concern |
| Red deer <i>Cervus elaphus</i> | | Woodland and open moorland | Least Concern |
| Fallow deer <i>Dama dama</i> | | Mixed woodland but feeding in open habitat | Least Concern |
| Sika deer <i>Cervus nippon</i> | | Coniferous woodland and adjacent heaths | - |

The site survey found evidence of Fox *Vulpes vulpes* (scat) and this species is not subject to any legal protection or other conservation measures. No other direct evidence of mammal activity was noted.

Irish Hare was not noted but is widespread on agricultural land. While limited data are available on the distribution of Hedgehog, Pygmy Shrew and Irish Stoat, they are considered ubiquitous in the Irish countryside and suitable habitat is available for them (Lysaght & Marnell, 2016).

Features on the site are considered to be of moderate value to roosting Bats (Hundt, 2012) with a number of buildings. A detector survey was carried out by Brian Keely of Wildlife Surveys Ireland. This was carried out in June 2018, within the optimal period of bat activity. No roosts were recorded. Four species were recorded feeding: Leisler's Bat, Daubenton's Bat, Common Pipistrelle and Soprano Pipistrelle. In addition, a feeding perch of Brown Long-eared Bat was found within one of the stables. Linear woodland features, i.e. hedgerows and treelines, provide foraging opportunities and connections to other areas of value away from the site.

Recent records of Badgers are found on the National Biodiversity Data Centre website from this 10km square. June is suboptimal for Badger surveying as tall vegetation can obscure field signs, sett entrances etc. No setts or other signs, such as regularly used trails, latrines etc. were noted.

June is an optimal time for surveying breeding birds. Table 10.3.4.2.2 details those birds which were recorded during this survey. Hedgerows, treelines and scrub areas on the site provide breeding habitat for a number of common countryside and woodland species. The nest of a Barn Swallow *Hirundo rustica* was noted within one of the farm buildings.

As can be seen all birds noted are of 'low conservation concern' and on BirdWatch Ireland's green list, with the exception of Barn Swallow which is of 'medium conservation concern' (amber list; Colhoun & Cummins, 2013)⁴.

Of those species listed by BirdWatch Ireland as being of high conservation concern Grey Partridge *Perdix perdix*, Corncrake *Crex crex*, Barn Owl *Tyto alba* and Yellowhammer *Emberiza citrinella* were recorded as breeding in Kildare during the 2007-11 Bird Atlas project (Balmer et al., 2013). Barn Owl has been recorded within this 10km square. The buildings were inspected for their activity but none was found. There are no recent records for Corncrake and Grey Partridge. Yellowhammer are typically recorded from arable fields.

Table 10.2 Results of Breeding birds survey March 2018

| Species | | BoCCI |
|-------------------------------|--------------|-------|
| <i>Carduelis carduelis</i> | Goldfinch | Green |
| <i>Columba palumbus</i> | Wood pigeon | Green |
| <i>Erithacus rubecula</i> | Robin | Green |
| <i>Hirundo rustica</i> | Barn Swallow | Amber |
| <i>Parus ater</i> | Coal tit | Green |
| <i>Parus caeruleus</i> | Blue tit | Green |
| <i>Phylloscopus collybita</i> | Chiffchaff | Green |
| <i>Sylvia atricapilla</i> | Blackcap | Green |
| <i>Turdus merula</i> | Blackbird | Green |
| <i>Turdus philomelos</i> | Song Thrush | Green |

Common Lizard *Zootoca vivipara* is protected under the Wildlife Act 1976 and may be present on this site. Suitable habitat for spawning Common Frog *Rana temporaria* is not present. There are no open ponds which are suitable for Smooth Newt *Lissotriton vulgaris*.

There are no water courses on the site which could provide habitat for fish or aquatic invertebrates. The River Liffey meanwhile is of salmonid value with a run of Atlantic Salmon *Salmo salar* and Brown Trout *S. trutta*.

Most habitats, even highly altered ones, are likely to harbour a wide diversity of invertebrates. In Ireland only one insect is protected by law, the Marsh Fritillary butterfly *Euphydryas aurinia*, and this is not to be found on this type of farmland. Other protected invertebrates are confined to freshwater and wetland habitats and so are not present on this site. Butterflies were recorded during the survey and included Common Blue *Polyommatus icarus* and Ringlet *Aphantopus hyperantus*. These species are listed as 'least concern' in the Red Data List assessment of Irish butterflies (Regan et al., 2010). The Buff-tailed Bumblebee *Bombus terrestris* and the Red-tailed Bumblebee *B. pratorum* were also noted. These too are of 'least concern' (Fitzpatrick et al., 2006).

⁴ Colhoun & Cummins, 2013. Birds of Conservation Concern in Ireland. Green = Low; Amber = Medium; Red = High

10.3.4.3 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

In summary, it has been seen that the application site is not within any area that has been designated for nature conservation at a national or international level. There are no examples of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants. There are no plants which are listed as alien invasive species. Boundary features are of local significance for a range of wildlife, including protected species (birds, bats).

Significance criteria are available from guidance published by the National Roads Authority (NRA, 2009). From this an evaluation of the various habitats and ecological features on the site has been made and this is shown in table 10.3 below.

Table 10.3 Evaluation of the importance of habitats and species on the Donabate site

| Habitats | Evaluation |
|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hedgerows – WL1 (higher significance) Treelines – WL1 (higher significance) | Local Importance (High Value) |
| Dry meadows – GS1 Mixed broadleaved woodland – WD1 Hedgerows – WL1 (lower significance) Scrub – WS1 | Local Importance (Low Value). Sites containing small areas of semi-natural habitat that are of some local importance for wildlife, including Irish Hare and a pair of breeding Yellowhammer. |
| Buildings and artificial surfaces -BL3 Treelines – WL2 (lower significance) | Negligible ecological value. |

10.4 Characteristics of the Proposed Development

The project will require clearance of land within the red line boundary, including 1,376m of internal hedgerows and treelines. The construction phase will include the construction of the homes, installation of surface water, foul wastewater and water mains infrastructure, followed by building of the internal roads with standard materials and methods. Post-construction the proposed open spaces within the site will be landscaped, to include artificial lighting. The development includes a new link road from the Kilcock Road to Dublin Road, an upgrade of the road junction between this new road and Brooklands, and the provision of a creche.

10.5 Potential Impact of the Proposed Development

This section provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation. Methodology for determining the significance of an impact has been

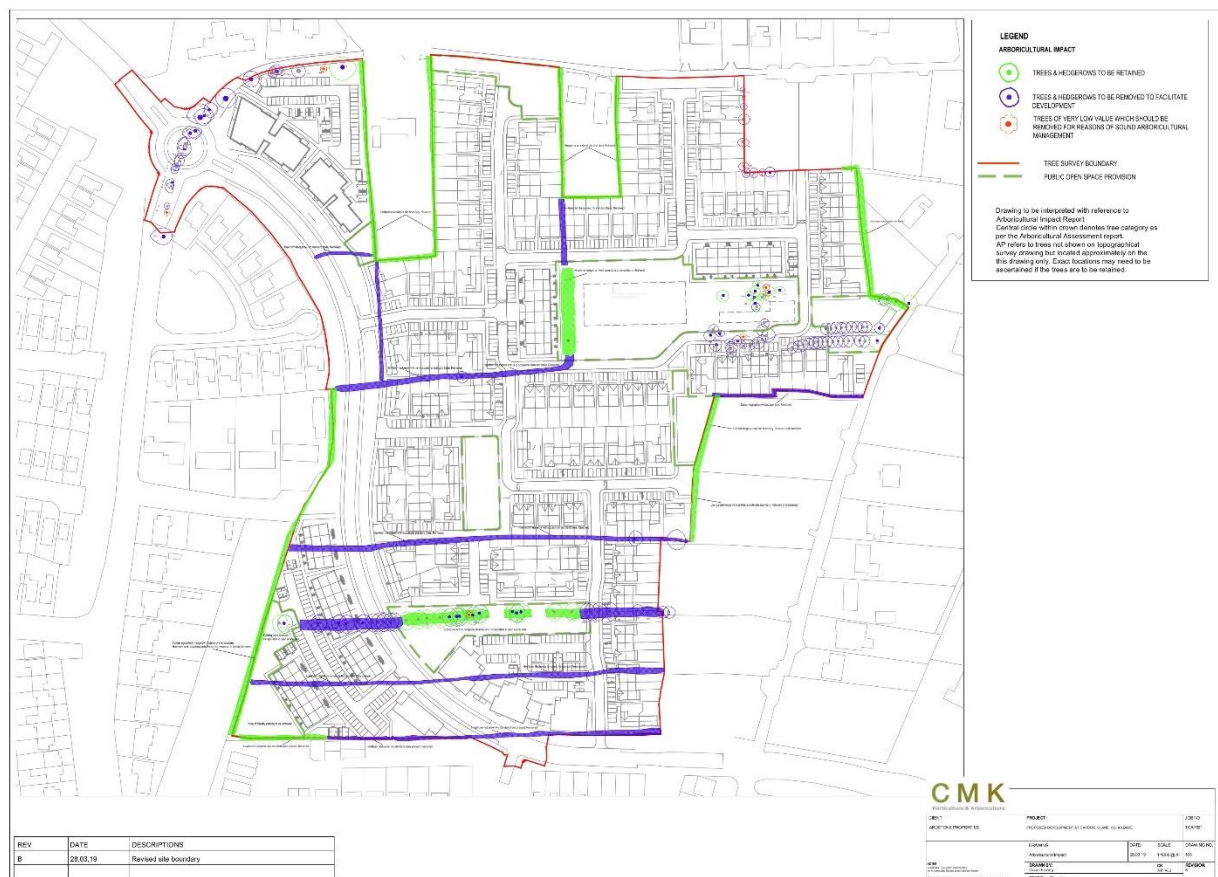
published by the EPA. This is based on the valuation of the ecological feature in question and the scale of the predicted impact.

10.5.1 Construction Phase

The following potential impacts are likely to occur during the construction phase in the absence of mitigation:

1. The removal of habitats including scrub, dry meadow, treeline and hedgerows. The total loss of higher significance hedgerow is calculated at 630m while the total loss of higher significance treeline is 215m. The area of scrub to be removed is estimated at 1,000m². In addition, the broadleaved woodland (approximately 1160m² in extent) is to be largely removed, although some individual trees are to be retained in its northern portion. Approximately 1,160m of higher significance hedgerow and treeline, both internally and along external boundaries, are to be retained.

Figure 10.5 Drawing showing trees and linear woodlands to be removed (in blue) and those to be retained (in green).



2. The direct mortality of species during land clearance. This impact is most acute during the bird breeding season which can be assumed to last from March to August inclusive. No bat roosts were found within the site however the farm buildings provide suitable roosts. The bat report has recommended that an inspection be carried out immediately prior to demolition please see Appendix 10.B.

3. Pollution of water courses through the ingress of silt, oils and other toxic substances. There are no water courses on the site although the land is within the catchment of the River Liffey, which is of significant fisheries value. The risk of pollution however is very low and this effect is therefore considered not to be significant. Nevertheless, best site management practice should be followed to avoid pollution.
4. Damage to hedgerows to be retained. Hedgerows that are to be conserved are at risk from the movement of machinery and storage of materials that can compact soil. This in turn can damage the root structure of trees and other vegetation, leading to long-term impacts such as vulnerability to disease.

10.5.2 Operation Phase

The following potential impacts are likely to occur during the operation phase in the absence of mitigation:

5. Impacts to species through the disruption of ecological corridors/green infrastructure. The site context is suburban in nature with existing built development and roads. These features can contribute to habitat fragmentation however this is something which affects some species more than others. Large mammals, for instance, can find it difficult to move through such a landscape although birds and flying insects are less affected. Bats may be impacted through the loss of foraging routes (hedgerows and treelines) and many species are known to follow these routes closely. The loss of hedgerow habitat will result in a loss of potential breeding grounds for bird species as well as smaller mammals such as Hedgehog, Irish Stoat, Irish Hare and Pygmy Shrew. Although the recorded species on the site are not of special conservation concern, this aspect of the project will result in an overall diminishment of the 'green infrastructure'.
6. The subject development will result in additional volumes of foul wastewater. Wastewater from the development will be treated at the Osberstown wastewater treatment plant. This is licenced by the EPA to discharge treated effluent to the River Liffey (licence no. D0002-01). It has a capacity to treat wastewater for a population equivalent (P.E.) of 130,000. The Annual Environmental Report (AER) for 2017 shows that the average loading was well within this capacity while the standard of effluent was fully compliant with emission limit values set under the Urban Wastewater Treatment Directive. Monitoring of the receiving water (i.e. the River Liffey) takes place at points upstream and downstream of the discharge point. The AER states that "The discharge from the wastewater treatment plant may have an impact on the Water Framework Directive status. However, the upstream BOD is close to the EQS threshold and improvements in the sewer network are expected to lead to further improvements in the receiving water quality." This development will increase demand on the treatment plant however suspected pollution issues are not related to the treatment plant capacity.
7. Pollution of water from surface water run-off. The Greater Dublin Strategic Drainage Study (2005) identified issues of urban expansion leading to an increased risk of flooding in the city and a deterioration of water quality. This arises where soil and natural vegetation, which is permeable to rainwater and slows its flow, is replaced with impermeable hard surfaces. Various SUDS features have been incorporated into the proposed development as part of the sustainable urban drainage design. A new surface water network is to be constructed and this will outfall to the Gollymochy Stream to the north-east of the site. This outfall will pass along rural roads and will not cross areas of semi-natural habitat. Run-off is to be attenuated in underground storage tanks prior to controlled release

via an oil/grit interceptor. Permeable paving will reduce volumes entering this system. In this way the quality and quantity of surface water will be retained at a 'greenfield' standard.

8. Disturbance to species from increased human activity (including vehicle traffic, noise, artificial light, pets etc.). This effect must be considered in the context of the existing environment, which is already close to high density residential areas and transport infrastructure, which are either existing or underway. This brings with it noise and light pollution, which will both increase with this development. Artificial lighting is known to have impacts on animal activity through both attractive and repellent forces. The effects are species and location specific, for instance some Bats are attracted to lights as prey items become concentrated around light sources (Rich & Longcore, 2006 eds). However other species may be deterred. Impacts are also related to the type of lighting used and so the ultimate impact is dependent on the species of Bat that may be present within the zone of influence and the final design of lighting for the project. Brown Long-eared Bat, Whiskered bat, Natterer's bat, Daubenton's bat and Lesser Horseshoe Bat are considered by Bat Conservation Ireland as being most susceptible to lighting effects. Brown Long-eared Bat and Daubenton's Bat were both recorded on this site. The details of lighting will only be provided post-planning. Mitigation has therefore been recommended to address this impact, and the proposed lighting scheme amended accordingly.

There has been little study meanwhile on the effects of noise on terrestrial animals however it is believed that many species can adapt to elevated ambient noise levels. Given the site location it is considered that the species present are not especially sensitive to this type of disturbance.

The introduction of household pets, particularly cats, has been a cause of concern given the degree to which they prey on wild mammals and birds. There is no known research on this issue from Ireland. However, the UK's Royal Society for the Protection of Birds states on its website that "*despite the large numbers of birds killed [estimated at up to 55 million per annum in the UK], there is no scientific evidence that predation by cats in gardens is having any impact on bird populations UK-wide.*"⁵

9. Creation of landscaped areas including areas of open space and landscaping of the road margin. This will consist of native species and non-native species (but will avoid any that are considered alien invasive⁶) and will create additional habitat for birds and invertebrates.

⁵ <http://www.rspb.org.uk/advice/gardening/unwantedvisitors/cats/birddeclines.aspx>

⁶ Listed on Schedule 3 of S.I. 477 of 2011 or as 'most unwanted' by Invasive Species Ireland

10. Impacts to protected areas. There are no areas protected for nature conservation within the vicinity of the site. Treated wastewater passes to the River Liffey, and although the river is not designated for nature conservation, the point at which it enters the Irish Sea, at Dublin Bay, is subject to a number of such designations. An AA Screening has been carried out and this found that significant negative effects to these is not likely to occur.

Table 3.3 of the EPA guidance note sets out the criteria for determining the significance of impacts.

Table 10.4 Nature of predicted impacts in the absence of mitigation

| Impact | | Direct/ Indirect | Cumulative | Duration ⁷ | Reversible? | Positive/ Negative |
|---------------------------|-------------------------------------------------------|---------------------|------------|-----------------------|-------------|-----------------------|
| Construction Phase | | | | | | |
| 1 | Habitat loss | Direct | Yes | Permanent | No | Negative |
| 2 | Species Mortality | Direct | No | Permanent | No | Negative |
| 3 | Pollution of water courses | Indirect | Yes | Temporary | Yes | Negative |
| 4 | Damage to hedgerows to be retained | Indirect | No | Permanent | No | Negative |
| Operation Phase | | | | | | |
| 5 | Habitat fragmentation incl. loss green infrastructure | Indirect | Yes | Permanent | Yes | Negative |
| 6 | Wastewater | Indirect | Yes | Permanent | Yes | Neutral |
| 7 | Surface water run-off | Indirect | Yes | Permanent | Yes | Neutral |
| 8 | Disturbance to species during operation | Indirect | Yes | Permanent | Yes | Negative |
| 9 | Landscaping | Direct | Yes | Permanent | Yes | Positive |
| 10 | Impacts to protected areas | Indirect | No | Temporary | Yes | Negative |

Table 10.5 below assesses the scale and likelihood of the predicted impacts of the proposed development in the absence of mitigation.

⁷ Temporary: up to 1 year; Short-term: 1-7 years; Medium-term: 7-15 years; Long-term: 15-60 years; Permanent: >60 years (NRA, 2006)

Table 10.5 Scale and likelihood of predicted impacts in the absence of mitigation.

| Impact | | Magnitude | As proportion of resource | Likelihood |
|---------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|
| Construction Phase | | | | |
| 1 | Habitat loss | 215m higher significance treeline | 43% | Certain |
| | | 290m lower significance treeline | 100% | |
| | | 629m higher significance hedgerow | 41% | |
| | | 242m lower significance hedgerow | 45% | |
| | | ~1,000m ² of scrub | 100% | |
| | | ~1,160m ² of broadleaved woodland | 80% | |
| | | Remaining areas of meadow grassland and buildings | 100% | |
| 2 | Mortality to animals during construction | Not possible to quantity | N/A | Likely but magnitude depends on timing of works |
| 3 | Pollution of water | Not possible to quantity but the River Liffey is a sensitive water course | N/A | Unlikely |
| 4 | Damage to hedgerow to be retained | Approximately 1,169m of hedgerow and treeline are to be retained | Could affect 100% | Likely but depends upon site practices |
| Operation Phase | | | | |
| 5 | Loss of green infrastructure | Approximately 844m of higher significance hedgerow and treeline habitat are to be removed however this will be offset to some extent by new landscaping. | Will affect all the species using these hedges | Certain |
| 6 | Wastewater pollution | Not possible to quantify | N/A | No impacts are likely |
| 7 | Surface water pollution | Not possible to quantify | N/A | No impacts are likely |

| Impact | | Magnitude | As proportion of resource | Likelihood |
|--------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------|
| Construction Phase | | | | |
| 8 | Disturbance to species from increased human activity (incl. noise/ lighting/ pets) | Bats that are present are among the more sensitive species. Lighting effects will be minimised at the lighting design stage | Could impact upon much of the remaining biodiversity off the site although many species considered to be resilient | Possible |
| 9 | Creation of new landscaped areas | New planting will provide habitat for nesting birds and/or invertebrates | Open space and road margin will incorporate new biodiversity features | Certain. |
| 10 | Impacts to protected areas | No effects | NA | No impacts are likely |

Tables 10.4 to 10.5 are combined to determine the level of significance of any given impact. This is shown in Table 10.6.

Table 10.6 Significance level of likely impacts in the absence of mitigation

| Impact | | Significance |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Construction phase | | |
| 1a | Habitat loss of features of negligible or local value (lower importance): dry meadow, scrub, buildings, lower significance hedgerows & treelines. | Not significant |
| 1b | Habitat loss of features of high local value: higher significance hedgerows and treelines. | Significant – permanent loss of high local value features |
| 2 | Mortality to animals during construction | Significant – permanent impacts to species with legal protection (nesting birds and mammals) |
| 3 | Pollution of water during construction phase | Imperceptible |
| 4 | Damage to hedgerows to be retained | Significant – permanent impacts to a large part of a locally important habitat |

| Impact | | Significance |
|--------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|
| Construction phase | | |
| 5 | Loss of green infrastructure | Significant |
| 6 | Wastewater pollution | Imperceptible |
| 7 | Surface water pollution | Imperceptible |
| 8 | Disturbance to species from human disturbance | Significant – possible loss of sensitive bat species |
| 9 | Landscaping | Not significant over the long term through additional planting and habitat creation |
| 10 | Protected areas | Imperceptible |

Overall it can be seen that a number of potential significant impacts are predicted to occur as a result of this project in the absence of mitigation.

10.5.3 Do Nothing Impact

There are no immediate threats to the hedgerow habitats or species of interest assuming current agricultural management practices continue. The Capdoo link road has been permitted under a Part 8 application.

Water quality may improve in the Liffey catchment with the implementation of the Water Framework Directive over the 2018-2021 period.

10.6 Remedial and Reductive Measures

These measures include avoidance, reduction and constructive mitigation measures as set out in Section 4.7 of the Development Management Guidelines. Under the EIA Directive, where significant negative effects are predicted to arise from a project then mitigation measures are required.

This report has identified a number of impacts that were assessed as 'moderate negative' and therefore mitigation is needed to reduce the severity of these potential effects, which are summarised below in Table 10.7.

Table 10.7 'Moderate Negative' Impacts for Which Mitigation Required

| No. | Phase | Impact |
|-----|--------------------|------------------------------------------|
| 1 | Construction Phase | Loss of habitat |
| 2 | Construction Phase | Mortality to animals during construction |
| 3 | Construction Phase | Damage to hedgerows to be retained |
| 4 | Construction Phase | Water pollution |

| | | |
|---|-----------------|-------------------------------|
| 5 | Operation Phase | Loss of Green Infrastructure |
| 5 | Operation Phase | Impacts to Bats from lighting |

10.6.1 Mitigation Measures Proposed

The following mitigation measures are proposed for the development:

10.6.1.1 Construction Phase

Mitigation by offset: Loss of habitat and Green Infrastructure

To offset the loss of higher significance hedgerow and treelines it is proposed to create new, biodiversity planting within areas of public open space and along both margins of the new link road. This is estimated to be 500m long and ~6m wide in total, providing a total area of new habitat of 3,000m². The species to be planted include a wide range of native trees and shrubs while the maintenance plan is intended involve minimal interference – i.e. no use of herbicide sprays, no cutting or mowing – effectively allowing for new linear woodlands to emerge. This planting will effectively create a new biodiversity corridor which will provide connectivity for the species which are currently recorded in this location. While this woodland will take time to mature it will ultimately compensate for the loss of hedgerows and green infrastructure arising from the development.

Mitigation by prevention: Mortality to animals during construction

The removal of hedgerows or scrub will not take place from March to August inclusive as per the Wildlife Act. If this is unavoidable then vegetation subject to removal will first be inspected for signs of breeding birds. It is an offence to destroy or interfere with a bird's nest or eggs. If no nesting is occurring then vegetation can be removed within 48 hours. If nesting is found then vegetation can only be destroyed under licence from the NPWS.

The following text is taken from the Bat Survey Report:

"The buildings shall be checked for bats immediately prior to demolition by a bat specialist. If bats are found at this stage, a derogation must be sought from NPWS with any additional mitigation requirements. If bats are not found at this point but are found at any stage of the building work, NPWS must be contacted and any work that may affect bats (demolition, scaffolding etc.) must be halted until an agreed strategy with NPWS is in place. Work that would NOT affect bats must be agreed with a bat specialist as many operations that would not be considered harmful may have unexpected consequences."

Mitigation by prevention: Protection of hedgerows during the construction phase

To avoid this the developer will follow the guidance from the National Roads Authority in establishing root protection areas (RPA) along hedgerows to be retained. The NRA gives the following equation for calculating the root protection area (RPA) (NRA, unknown year):

$$\text{RPA(m}^2\text{)} = \pi(\text{stem diameter mm } 12)/1,000) \times 2$$

The RPA gives the area around which there should be no disturbance or compaction of soil. This will be calculated for the largest tree within each hedgerow. Prior to construction this area will be clearly labelled 'sensitive ecological zone', fenced off with durable materials and instruction given to construction personnel not to disturb this buffer zone. As a rule of thumb this buffer zone will extend at least to the canopy of the trees concerned.

Mitigation by reduction

Pollution to water courses

Although significant effects to freshwater courses are not predicted it is nevertheless appropriate that best site management practices will be in place to minimise pollution to the greatest degree feasible. As such, guidelines from Inland Fisheries Ireland (IFI, 2016) will be followed. This includes designating storage areas for dangerous substances (oils, fuels etc.) and ensuring that only silt-free run-off enters water courses. To this end, appropriately sized silt traps will be employed. These measures will be given in greater detail in a Construction Management Plan.

10.6.1.2 Operation Phase

Mitigation by reduction: Disturbance to species from human activity

Lighting on the site will conform to Bat Conservation Ireland's guidance for minimising impacts to bats from artificial lighting (BCI, 2010). This will include minimising light spatially and temporally and avoiding the use of high pressure sodium or metal halide bulbs. The increasing use of LED lighting has energy-saving benefits but uncertain impacts to bats. Available research indicates that it has little impact on *Pipistrellus* or *Nyctalus* sp., among the genus of Bats known to be present on the subject site (Stone et al., 2012).

The following text is taken from the Bat Survey Report:

"...light spillage must be prevented by using caps on street lighting, sensor timers, and low-level lighting(bollard) on footpaths etc. At least one dark corridor must be retained or provided along or through the new development, along hedgerow or through green space."

Mitigation by reduction: Bats

No significant effects are expected to occur to bats, however there is an opportunity to enhance habitats for these protected species. The following text is taken from the bat survey report:

"Planting of vegetation"

Where there is an opportunity to provide vegetative cover, native and local plant species should be employed including typical plants such as oak (the greatest value for most wildlife), ash, hawthorn, blackthorn, elder, gorse, bramble, in addition to other species such as dog rose with an encouragement of species such as Clematis and other species attractive to moths. Ash from within the site should be used to provide ash trees as it is advised not to bring ash from other sites until "Ash Dieback" has run its course".

The planned planting will include many of the species listed and will provide new foraging habitat for bats.

Mitigation by enhancement: Bats

The following text is taken from the bat survey report:

"A range of bat boxes shall be fitted on the site. two 2FN boxes, one 1W1 box, two NHBS Kent boxes, and one wooden double chamber bat box (all available from nhbs.com). These should be placed on trees (or poles) which have no underlying branches, as bats need to drop to fly. These boxes should be placed at least 3 metres high, and ideally along lines of hedgerow."

10.7 Predicted Impact of the Proposed Development

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

10.7.1 Construction Phase

There will be some temporary residual impacts to biodiversity arising from this project comprising:

1. The removal of hedgerow habitats will result in some mortality to species. This is predicted to be **not significant**.
2. There will be a temporary loss of green infrastructure until such time as new planting becomes established. This is predicted to be **not significant** given that the species recorded from the site are not of conservation concern and can be expected to recolonise the new habitats which will be created.
3. Enforcing the root protection zone along hedgerows to be retained will ensure that impacts to these locally important habitats will be **neutral**.

10.7.2 Operation Phase

According to the Bat Survey Report, with mitigation, the development *"will have no direct impact upon the conservation status of any bat species"*.

10.8 Interactions and Cumulative Impacts

A number of the identified impacts can also act cumulatively with other impacts from similar developments in this area of Clane. These primarily arise through the urbanisation of the town's hinterland as provided for by land use zoning and include: loss of habitats and species, particularly hedgerows; pollution from surface water run-off and pollution from wastewater generation.

This development can be viewed alongside the permitted construction of a link road to the south as well as additional residential development in the town, as provided for under the Local Area Plan. This will see the

conversion of all these lands from agricultural to a combination of built and amenity space. This process can impact upon species in a cumulative manner, species of high conservation concern are not known to be present.

The key environmental interactions with biodiversity is water and landscaping. A series of mitigation measures are proposed in the Water Chapter of this Environmental Report document to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard. With these mitigation measures in place, interaction between Biodiversity and water is considered to be neutral, and the interaction between biodiversity and landscaping is considered to be neutral/positive.

10.9 Monitoring

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant. Section 10.7 summaries the likely impacts arising from this project. Mitigation measures are proposed with a high degree of confidence and further monitoring is not proposed.

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Appendix 10.A Species list for habitats identified from the Capdoo site

The nomenclature for vascular plants is taken from the *New Flora of the British Isles* (Stace, 2010). Scientific names for mosses comes from *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2008) while common names are taken from *Mosses and Liverworts of Britain and Ireland* (Atherton et al. eds., 2010). Species indicated with an asterisk '*' are known to have been introduced to Ireland by humans.

| Treeline - WL2 | | DAFOR |
|-------------------------------|--------------|-------|
| <i>Acer pseudoplatanus</i> * | Sycamore | O |
| <i>Crataegus monogyna</i> | Hawthorn | F |
| <i>Fraxinus excelsior</i> | Ash | F |
| <i>Galium aparine</i> | Cleavers | F |
| <i>Geranium robertianum</i> | Herb-Robert | F |
| <i>Hedera helix</i> | Common Ivy | A |
| <i>Heracleum sphondylium</i> | Hogweed | O |
| <i>Picea sitchensis</i> * | Sitka Spruce | O |
| <i>Prunus spinosa</i> | Blackthorn | F |
| <i>Rosa sp.</i> | Roses | O |
| <i>Rubus fruticosus agg.</i> | Brambles | A |
| <i>Sambucus nigra</i> | Elder | O |
| <i>Symphoricarpos albus</i> * | Snowberry | O |
| <i>Ulmus glabra</i> | Wych Elm | O |
| <i>Vicia sepium</i> | Bush Vetch | O |

| Hedgerow - WL1 | | DAFOR |
|----------------------------------|------------------|-------|
| <i>Acer pseudoplatanus</i> * | Sycamore | O |
| <i>Agrostis stolonifera</i> | Creeping Bent | O |
| <i>Asplenium adiantum-nigrum</i> | Black Spleenwort | O |
| <i>Asplenium scolopendrium</i> | Hart's-tongue | O |
| <i>Calystegia sepium</i> | Hedge Bindweed | O |
| <i>Centaurea nigra</i> | Common Knapweed | R |
| <i>Corylus avellana</i> | Hazel | R |
| <i>Crataegus monogyna</i> | Hawthorn | F |
| <i>Dactylis glomerata</i> | Cock's-foot | O |
| <i>Fraxinus excelsior</i> | Ash | F |
| <i>Galium aparine</i> | Cleavers | O |
| <i>Geum urbanum</i> | Wood Avens | O |
| <i>Glechoma hederacea</i> | Ground-ivy | O |
| <i>Hedera helix</i> | Common Ivy | A |
| <i>Heracleum sphondylium</i> | Hogweed | F |
| <i>Ligustrum vulgare</i> | Wild Privet | O |
| <i>Malus sylvestris</i> | Crab Apple | R |
| <i>Polystichum setiferum</i> | Soft Shield-fern | O |
| <i>Prunus spinosa</i> | Blackthorn | F |
| <i>Rosa sp.</i> | Roses | O |
| <i>Rubus fruticosus agg.</i> | Brambles | A |
| <i>Sambucus nigra</i> | Elder | F |
| <i>Ulmus glabra</i> | Wych Elm | O |
| <i>Urtica dioica</i> | Common Nettle | O |

| Dry Meadow - GS2 | | DAFOR |
|--------------------------------|----------------------------|-------|
| <i>Acer pseudoplatanus</i> * | Sycamore (sapling) | O |
| <i>Anacamptis pyramidalis</i> | Pyramidal Orchid | R |
| <i>Anthoxanthum odoratum</i> | Sweet Vernal-grass | A |
| <i>Arrhenatherum elatius</i> | False Oat-grass | F |
| <i>Betula sp.</i> | Birch (sapling) | O |
| <i>Briza media</i> | Quaking-grass | F |
| <i>Carex flacca</i> | Glaucous Sedge | F |
| <i>Carex hirta</i> | Hairy Sedge | R |
| <i>Centaurea nigra</i> | Common Knapweed | O |
| <i>Chamerion angustifolium</i> | Rosebay Willowherb | O |
| <i>Cirsium arvense</i> | Creeping Thistle | A |
| <i>Elytrigia repens</i> | Common Couch | O |
| <i>Epilobium hirsutum</i> | Great Willowherb | O |
| <i>Filipendula ulmaria</i> | Meadowsweet | R |
| <i>Fraxinus excelsior</i> | Ash (sapling) | O |
| <i>Galium verum</i> | Lady's Bedstraw | R |
| <i>Heracleum sphondylium</i> | Hogweed | O |
| <i>Hypochoeris radicata</i> | Cat's-ear | O |
| <i>Iris pseudacorus</i> | Yellow Iris | R |
| <i>Lathyrus pratensis</i> | Meadow Vetchling | O |
| <i>Leucanthemum vulgare</i> | Oxeye Daisy | R |
| <i>Lotus corniculatus</i> | Common Bird's-foot-trefoil | O |
| <i>Plantago lanceolata</i> | Ribwort Plantain | F |
| <i>Potentilla anserina</i> | Silverweed | O |
| <i>Potentilla reptans</i> | Creeping Cinquefoil | O |
| <i>Primula veris</i> | Cowslip | O |
| <i>Prunella vulgaris</i> | Selfheal | O |
| <i>Rubus fruticosus agg.</i> | Brambles | O |
| <i>Senecio jacobaea</i> | Common Ragwort | O |
| <i>Stellaria graminea</i> | Lesser Stitchwort | O |
| <i>Trifolium pratense</i> | Red Clover | F |
| <i>Vicia cracca</i> | Tufted Vetch | O |

| Broadleaved Woodland - WD1 | | DAFOR |
|---------------------------------|----------------|-------|
| <i>Acer pseudoplatanus</i> * | Sycamore | O |
| <i>Aesculus hippocastanum</i> * | Horse-chestnut | O |
| <i>Betula sp.</i> | Birch | O |
| <i>Crataegus monogyna</i> | Hawthorn | O |
| <i>Fraxinus excelsior</i> | Ash | O |
| <i>Hedera helix</i> | Common Ivy | F |
| <i>Picea sitchensis</i> * | Sitka Spruce | O |
| <i>Prunus avium</i> | Wild Cherry | O |
| <i>Prunus laurocerasus</i> * | Cherry Laurel | O |
| <i>Sambucus nigra</i> | Elder | O |
| <i>Ulmus glabra</i> | Wych Elm | O |
| <i>Urtica dioica</i> | Common Nettle | F |

Appendix 10.B Bat Survey

A bat assessment of the site at Capdoo, Clane Co Kildare

For Ardstone Homes



By Brian Keeley B.Sc. (Hons) in Zool. MCIEEM

Donna Mullen M.P.P.M

Maio, Tierworker, Kells Co Meath, A82VE86

Date of survey 27 June 2018

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For

Openfield Ecological Services

Pádraic Fogarty MSc, MIEMA

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Summary Results

This site has moderate roosting potential for bats. No roosts were found; however, a brown long eared feeding perch was found beside the stables.

(1) Brown long eared bat – *Plecotus auritus*

Other bats found feeding/ commuting

There was a lot of feeding activity within the site, along the hedgerows.

(2) Leisler's bat – *Nyctalus leisleri*

(3) Soprano pipistrelle – *Pipistrellus pygmaeus*

(4) Common pipistrelle – *Pipistrellus pipistrellus*

(5) Daubenton's bat – *Myotis daubentonii*

Mitigation Measures

(1) The buildings shall be checked for bats immediately prior to demolition by a bat specialist (Contact donnamullen@wildlifesurveys.net or briankeeley@wildlifesurveys.net). If bats are found at this stage, a derogation must be sought from NPWS with any additional mitigation requirements. If bats are not found at this point but are found at any stage of the building work, NPWS must be contacted and any work that may affect bats (demolition, scaffolding etc.) must be halted until an agreed strategy with NPWS is in place. Work that would NOT affect bats must be agreed with a bat specialist as many operations that would not be considered harmful may have unexpected consequences.

(2) Wherever practicable, mature and semi mature hedgerow should be retained to provide feeding for bats. If necessary, some of the existing hedgerow can be moved to a different location within the site. (Contact Drew Haslam drewrhaslam@gmail.com for mature hedgerow moving). This could be achieved to the south-west where the open space meets the road. Native species should be used where possible in any new planting.

(3) A range of bat boxes shall be fitted on the site. two 2FN boxes, one 1W1 box, two NHBS Kent boxes, and one wooden double chamber bat box (all available from nhbs.com). These should be placed on trees (or poles) which have no underlying branches, as bats need to drop to fly. These boxes should be placed at least 3 metres high, and ideally along lines of hedgerow.

(4) Both brown long eared bats and Daubenton's bats are light intolerant, so light spillage must be prevented by using caps on street lighting, sensor timers, and low-level lighting(bollard) on footpaths etc. At least one dark corridor must be retained or provided along or through the new development, along hedgerow or through green space.

Desktop Study.

Distribution data.



Common pipistrelle distribution in Kildare



Leisler's bat distribution in Kildare



Daubenton's bat distribution in Kildare



Soprano pipistrelle distribution in Kildare



Brown long eared bat distribution in Kildare

Thanks to Bat Conservation Ireland for their data. All data in this report will be logged with them.

Methodology for Bat Survey

Bat Survey - Equipment

Exide Lamp

Petzl Tikka Head torch

One SM2 Bat plus time expansion detector and analysis software

Two EM3 time expansion detector and kaleidoscope analysis software

The SM2 detector was placed outside the house on the windowsill, both EM3 detectors were hand held. The survey commenced at 21.30 hours. The buildings were visually checked for droppings and signs of bat usage.

Surveying continued until approximately 23.30 hours and recommenced at 03.45 hours and continued until 04.50 hours.

The SM2 detector was left in place for overnight to record bat activity.

Date 27 June 2018

Weather Conditions

19°C – 13°C warm, dry night. Good insect activity.

Habitat Classification

GA1(improved agricultural grassland) WL1 (hedgerows) WL2 (treelines) BL1 (stonework) BL3 (buildings)

Species recorded

- (1) Brown long eared bat – *Plecotus auritus*
- (2) Leisler's bat – *Nyctalus leisleri*
- (3) Soprano pipistrelle – *Pipistrellus pygmaeus*
- (4) Common pipistrelle – *Pipistrellus pipistrellus*
- (5) Daubenton's bat – *Myotis daubentonii*

The buildings have moderate potential as bat roosts. Several bat droppings were found beside the stables behind the house. It is likely that this building is used as a feeding perch by a long-eared bat. No bats were seen in any building.

A Leisler's bat flew south over the farmyard at 22.10 on at least 2 occasions. At 22.27 a common pipistrelle flew over the yard from the north. A second common pipistrelle flew into the barn to feed at 22.35 hours. Common pipistrelles fed around the stables and house until 22.48. A common pipistrelle was present in the garden south of the yard at 22.47 hours and in the next garden at 22.49 hours. A soprano pipistrelle and common pipistrelle were present towards the hedgerow eastern corner and garden edge at 22.56 hours. A soprano pipistrelle was again close to here at 22.58 hours.

A brown long eared bat was recorded flying near the house at 22.49 hours, and a soprano pipistrelle was seen in the corner of the garden, backing onto the field from 22.53 – 23.02 hours.

A Leisler's bat was noted mid-hedge at 22.59 hours towards the southern section of the site. Common pipistrelle activity was high on the western edge of the site at 23.04 hours and for several minutes (up to 23.11 hours).

Common pipistrelle activity was present along the most southern hedge up to 23.14 hours with soprano pipistrelle activity in the eastern area at 23.16 and 23.18 hours.



Droppings of brown long eared bat on the wall of the stables (left)

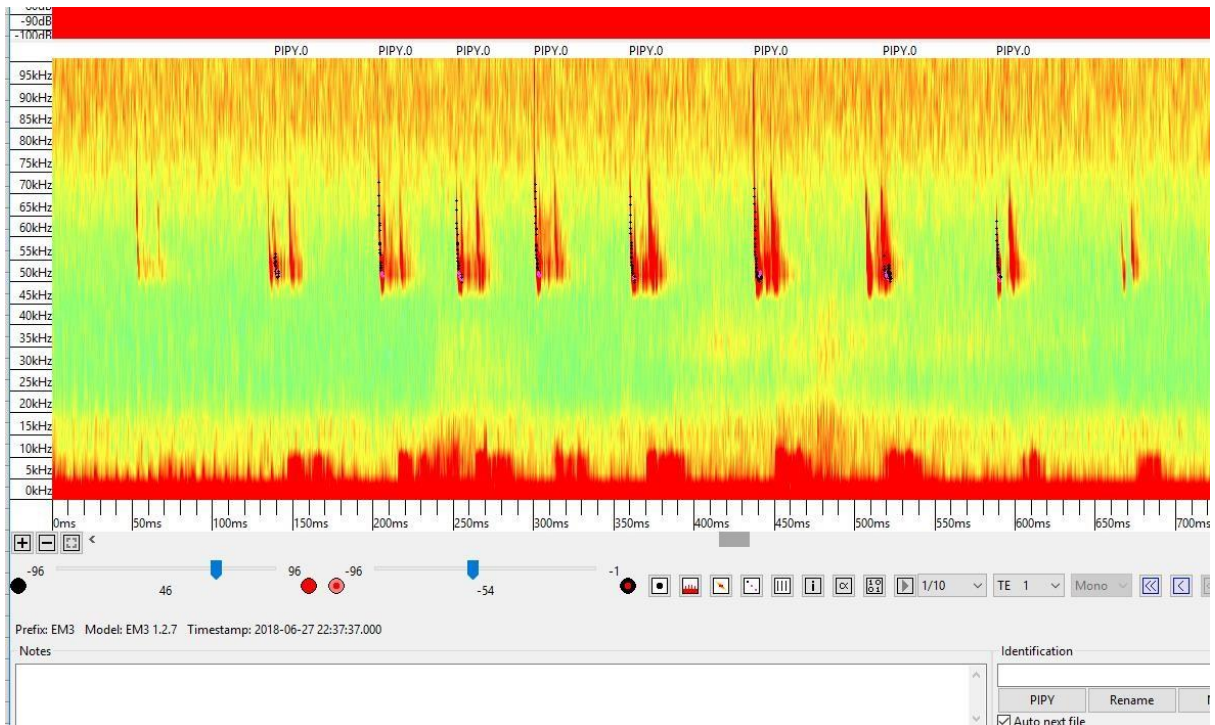


Droppings and wings – brown long eared bat feeding perch (right)

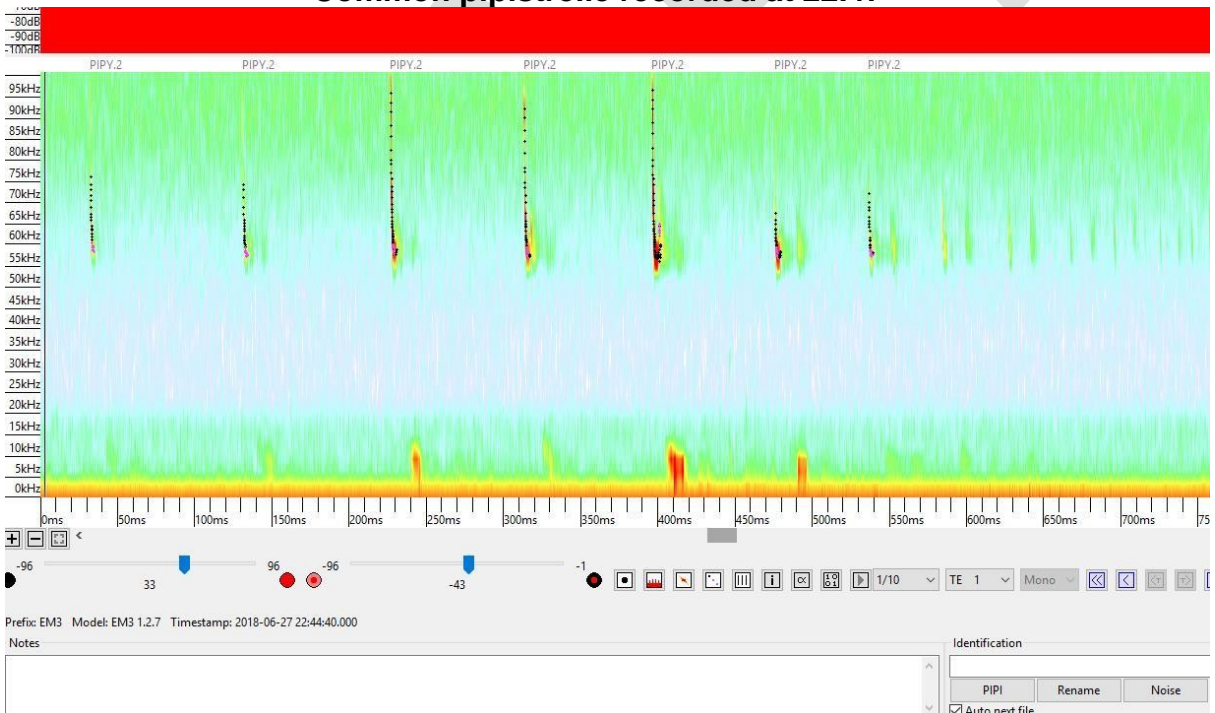
Common pipistrelle activity was high along the public road up to 23.28 hours including at the gateway to the farmyard. A Myotis bat was noted along the road at 23.22 hours.

Soprano and common pipistrelle activity was still present around the house when surveying paused at 23.30 hours

Prior to dawn soprano pipistrelle and Leisler's bat activity was present at the north-western corner of the site (03.57 hours) while pipistrelles were noted along the perimeter hedge at 03.50 hours. Common pipistrelle activity was present along the thick hedge to the west of the farmyard at 04.12 hours and 04.16 hours with a Leisler's bat arriving at this time also.

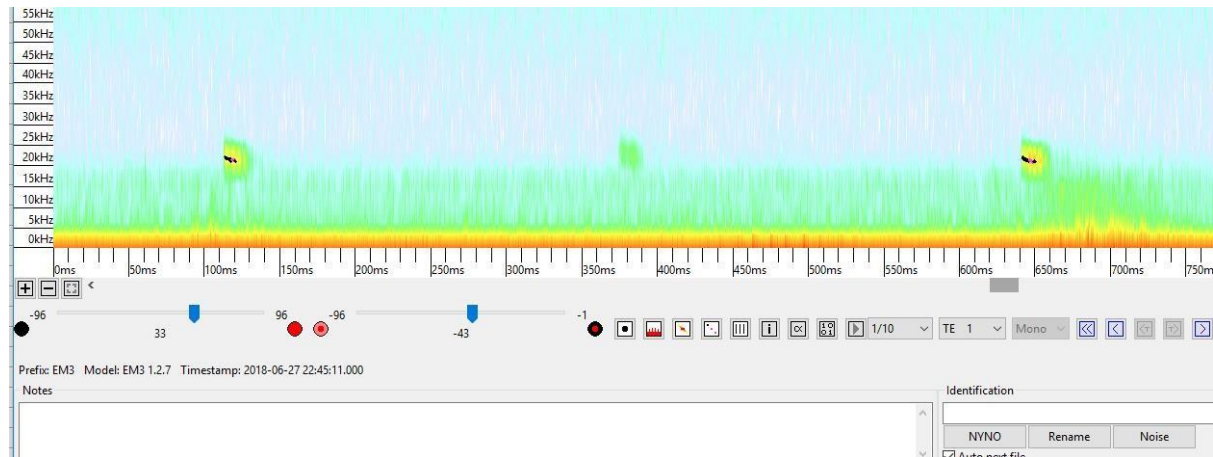


Common pipistrelle recorded at 22.47



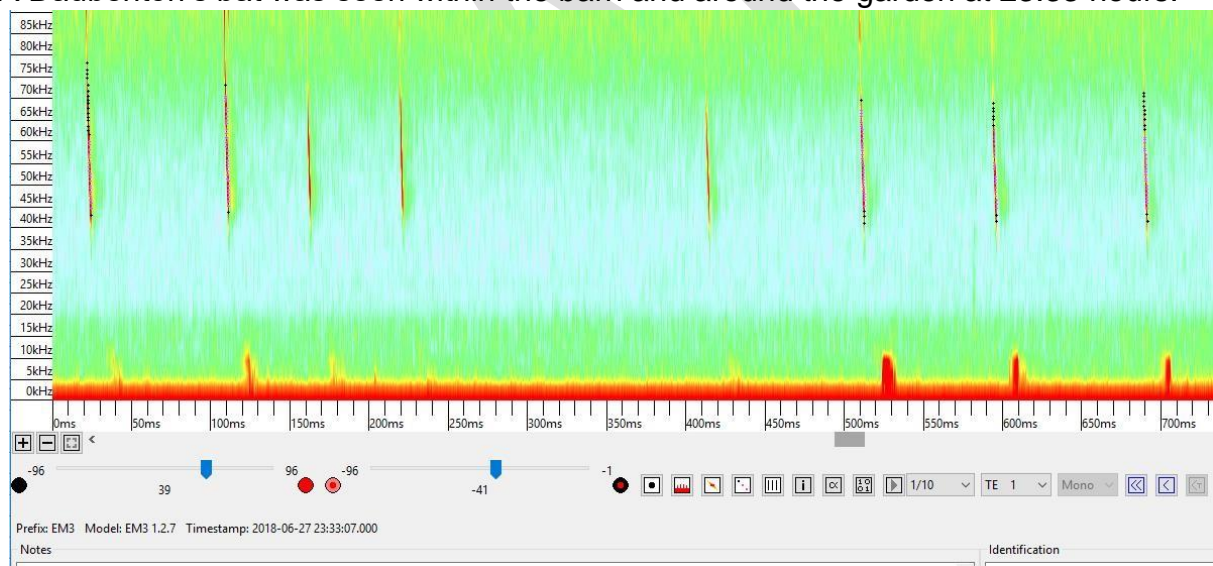
Soprano pipistrelle feeding in garden

An analysis of the hedgerow found a high level of activity of common pipistrelles, feeding around the western edge of the field hedge around an ash tree. A soprano pipistrelle was also recorded along the hedgerow at the eastern field, and a Leisler's bat was recorded within the main field. Leisler's activity was recorded occasionally throughout the night.



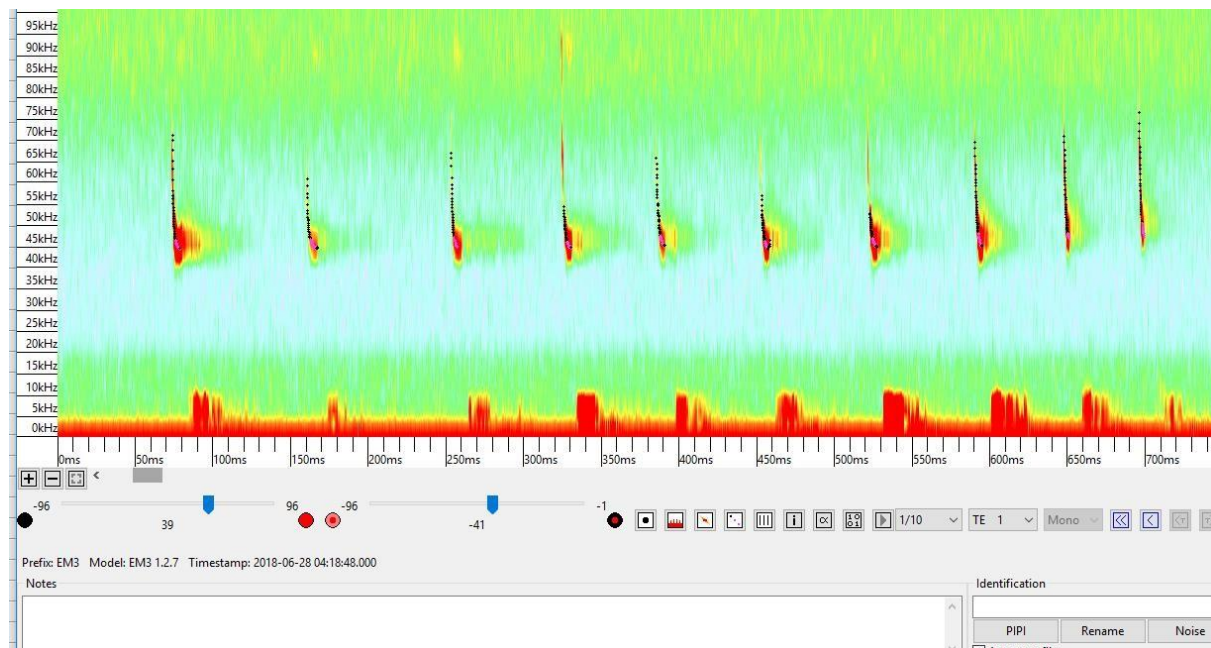
Leisler's bat recorded at 22.48

A Daubenton's bat was seen within the barn and around the garden at 23.33 hours.



Daubenton's bat flying around the barn

At 03.51 hours, three common pipistrelles flew above the barn, in a westerly direction. It is likely that one of the nearby houses is a roost. Common pipistrelles were seen commuting along the northwest hedgerow and along the front of the house until 04.21 hours. A soprano pipistrelle flew along the road at 04.03 hours and a Leisler's bat was recorded in the distance at 04.14 hours.



Common pipistrelle commuting through the site at 4.19

No bats were seen swarming at the buildings and no bats entered the buildings.

Discussion

Although no bats were found within the buildings, there is some potential for bat usage. A brown long eared bat feeding perch was found within the stables. Bats were not seen to emerge from or enter any structure on site and the most probable conclusion is that bats were roosting in houses, buildings, tree or other sites surrounding the subject site.

Bat activity was noted along all hedgerow and bats feed throughout the site. In all, one species was frequently encountered (common pipistrelle). All other species were less common and brown long-eared bat presence was marked by one observation and was also inferred from feeding signs within an outbuilding

Leisler's bat activity was noted at sunset and prior to dawn while Daubenton's bat activity was noted during the night, feeding in the barn and along the main road and avenue.

Potential Impacts

Roosts

Loss of potential roost spaces within the house, sheds stables and barn will have a mild long-term negative effect on the resident and local bat fauna.

Feeding

Five species of bats were found to be feeding on the site, and there was considerable feeding activity along the hedgerows. Loss of hedgerow will have a mild to moderate long-term impact on the bat population.

Lighting may be a secondary cause of feeding disruption as bats are typically unwilling to fly through lighting to and from their roosts and many avoid lights at their feeding area.

Mitigation Measures

(1) The buildings shall be checked for bats immediately prior to demolition by a bat specialist (Contact donnamullen@wildlifesurveys.net or briankeeley@wildlifesurveys.net). If bats are found at this stage, a derogation must be sought from NPWS with any additional mitigation requirements. If bats are not found at this point but are found at any stage of the building work, NPWS must be contacted and any work that may affect bats (demolition, scaffolding etc.) must be halted until an agreed strategy with NPWS is in place. Work that would NOT affect bats must be agreed with a bat specialist as many operations that would not be considered harmful may have unexpected consequences.

(2) At least 500 metres of mature and semi mature hedgerow should be retained. If necessary, some of the existing hedgerow can be moved. (Contact Drew Haslam drewrhaslam@gmail.com for mature hedgerow moving)

(3) A range of bat boxes should be fitted on the site. two 2FN boxes, one 1W1 box, two NHBS Kent boxes, and one wooden double chamber bat box (all available from nhbs.com). These should be placed on trees (or poles) which have no underlying branches, as bats need to drop to fly. These boxes should be placed at least 3 metres high, and ideally along lines of hedgerow.

(4) Both brown long eared bats and Daubenton's bats are light intolerant, so light spillage must be prevented by using caps on street lighting, sensor timers, and low-level lighting(bollard) on footpaths etc. At least one dark corridor must be retained or provided along or through the new development, along hedgerow or through green space.

Appendix

Bat Biology

Female bats gather in groups known as maternity roosts in summer to have their young. They generally have one baby each year, so are slow to reproduce, and disturbance of a maternity roost can be catastrophic.

In winter bats move to old stonework, trees and caves to hibernate. They are especially vulnerable here as they are slow to awaken, and if repointing is carried out, they can easily become entombed.

All Irish bats are insectivorous and do not eat our food or chew wiring in a house. Each bat eats over 1000 insects per night, so they act as a natural insecticide. They do not generally cause any problems in buildings as they do not chew or bring in nesting material. Water tanks in attics should always be covered, to prevent bats or other animals from falling in.

Legislation;

Bats are protected under the 1996 Wildlife Act, the 2000 Wildlife (Amendment) Act, Stat Ist 94 of 1997, Stat Ist 378 of 2005, The Habitats Directive, The Bonn and Bern Convention, and the Euro bats agreement.

The European Community (Natural Habitats) Regulations S.I. No 94 of 1997 states:

23(1) The minister shall take the requisite measures to establish a system of strict protection for the fauna consisting of the animal species set out in Part 1 of the First Schedule prohibiting –

a) All forms of deliberate capture or killing of specimens of those species in the wild.

1. The deterioration or destruction of breeding sites or resting places of those species.

The EU Habitats Directive

Article 12(1) of the 'Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora (Habitats Directive) states:

“Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV(a) and their natural range, prohibiting:

a) all forms of deliberate capture or killing of specimens of these species in the wild;

b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;

- c) deliberate destruction or taking of eggs from the wild;
- d. deterioration or destruction of breeding sites or resting places.”

The EU Habitats Directive (92/43/EEC) lists all Irish bat species in Annex IV and one Irish species, the lesser horseshoe bat (*Rhinolophus hipposideros*), in Annex II. Annex II includes animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation (SACs) because they are endangered, rare, vulnerable or endemic. Annex IV includes various species that require strict protection. Article 11 of the Habitats Directive requires member states to monitor all species listed in the Habitats Directive and Article 17 requires States to report to the EU on the findings of monitoring schemes.

The Bern and Bonn Conventions

Ireland is also a signatory to a number of conservation agreements pertaining to bats such as the Bern and Bonn Conventions. The European Bats Agreement (EUROBATS) is an agreement under the Bonn Convention. Ireland and the UK are two of the 31 signatories. The Agreement has an Action Plan with priorities for implementation. Devising strategies for monitoring of populations of selected bat species in Europe is among the resolutions of EUROBATS.

1.3.1 The Berne Convention

Article 6 of the ‘Convention on the Conservation of European Wildlife and Natural Habitats’ (Berne Convention) reads:

“Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II. The following will in particular be prohibited for these species:

- a) all forms of deliberate capture and keeping and deliberate killing;
- b) the deliberate damage to or destruction of breeding or resting sites;
- c) the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation, insofar as disturbance would be significant in relation to the objectives of this Convention; ...

Appendix II lists strictly protected fauna species and this list includes “Microchiroptera, all species except *Pipistrellus pipistrellus*”.

The EUROBATS Agreement

The ‘Agreement on the Conservation of Populations of European Bats’ (EUROBATS) was negotiated under the ‘Convention for the Conservation of Migratory Wild Species’ (Bonn Convention) and came into force in January 1994. The legal

protection of bats and their habitats are given in Article III as fundamental obligations:

“1. Each Party shall prohibit the deliberate capture, keeping or killing of bats except under permit from its competent authority

2. Each Party shall identify those sites within its own area of jurisdiction which are important for the conservation status, including for the shelter and protection, of bats. It shall, taking into account as necessary economic and social considerations, protect such sites from damage or disturbance. In addition, each Party shall endeavour to identify and protect important feeding areas for bats from damage or disturbance.”

The Agreement covers all European bat species.

Contact Details:

The phone number for Bat Conservation Ireland is 086 4049468. Their website is www.batconservationireland.org. I can be contacted at 087 7454233. My email is donnamullen@wildlifesurveys.net, and web site is www.wildlifesurveys.net

SM2 analysis – from windowsill

Results

File Help

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EM3, handheld recorder

 Results

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| 62 | | EM3_20180627_223003.wav | EM3_0_20180627_223003_000 | Noise | 0 | 0 | 0.000000 | |
| 63 | | EM3_20180627_223033.wav | EM3_0_20180627_223033_000 | Noise | 0 | 0 | 0.000000 | |
| 64 | | EM3_20180627_223103.wav | EM3_0_20180627_223103_000 | Noise | 0 | 0 | 0.000000 | |
| 65 | | EM3_20180627_223134.wav | EM3_0_20180627_223134_000 | Noise | 0 | 0 | 0.000000 | |
| 66 | | EM3_20180627_223204.wav | EM3_0_20180627_223204_000 | Noise | 0 | 0 | 0.000000 | |
| 67 | | EM3_20180627_223234.wav | EM3_0_20180627_223234_000 | Noise | 0 | 0 | 0.000000 | |
| 68 | | EM3_20180627_223304.wav | EM3_0_20180627_223304_000 | Noise | 0 | 0 | 0.000000 | |
| 69 | | EM3_20180627_223335.wav | EM3_0_20180627_223335_000 | Noise | 0 | 0 | 0.000000 | |
| 70 | | EM3_20180627_223405.wav | EM3_0_20180627_223405_000 | Noise | 0 | 0 | 0.000000 | |
| 71 | | EM3_20180627_223435.wav | EM3_0_20180627_223435_000 | Noise | 1 | 0 | 0.000000 | |
| 72 | | EM3_20180627_223505.wav | EM3_0_20180627_223505_000 | Noise | 1 | 0 | 0.000000 | |
| 73 | | EM3_20180627_223536.wav | EM3_0_20180627_223536_000 | Noise | 1 | 0 | 0.000000 | |
| 74 | | EM3_20180627_223606.wav | EM3_0_20180627_223606_000 | Noise | 0 | 0 | 0.000000 | |
| 75 | | EM3_20180627_223636.wav | EM3_0_20180627_223636_000 | Noise | 0 | 0 | 0.000000 | |
| 76 | | EM3_20180627_223706.wav | EM3_0_20180627_223706_000 | Noise | 0 | 0 | 0.000000 | |
| 77 | | EM3_20180627_223737.wav | EM3_0_20180627_223737_000 | PIPY | 8 | 8 | 0.571581 | |
| 78 | | EM3_20180627_223807.wav | EM3_0_20180627_223807_000 | Noise | 1 | 0 | 0.000000 | |
| 79 | | EM3_20180627_223837.wav | EM3_0_20180627_223837_000 | Noise | 0 | 0 | 0.000000 | |
| 80 | | EM3_20180627_223907.wav | EM3_0_20180627_223907_000 | Noise | 0 | 0 | 0.000000 | |
| 81 | | EM3_20180627_223938.wav | EM3_0_20180627_223938_000 | Noise | 0 | 0 | 0.000000 | |
| 82 | | EM3_20180627_224008.wav | EM3_0_20180627_224008_000 | Noise | 0 | 0 | 0.000000 | |
| 83 | | EM3_20180627_224038.wav | EM3_0_20180627_224038_000 | Noise | 0 | 0 | 0.000000 | |
| 84 | | EM3_20180627_224108.wav | EM3_0_20180627_224108_000 | PIPY | 6 | 6 | 0.506738 | |
| 85 | | EM3_20180627_224139.wav | EM3_0_20180627_224139_000 | Noise | 0 | 0 | 0.000000 | |
| 86 | | EM3_20180627_224209.wav | EM3_0_20180627_224209_000 | PIPI | 24 | 22 | 0.334981 | PIPI |
| 87 | | EM3_20180627_224239.wav | EM3_0_20180627_224239_000 | Noise | 0 | 0 | 0.000000 | |

| | FOLDER | IN FILE | OUT FILE | AUTO ID | PULSES | MATCHING | MARGIN | MANUAL ID |
|-----|--------|--------------------------|----------------------------|---------|--------|----------|----------|---------------|
| 86 | | EM3__20180627_224209.wav | EM3__0_20180627_224209_000 | PIPI | 24 | 22 | 0.334981 | PIPI |
| 87 | | EM3__20180627_224239.wav | EM3__0_20180627_224239_000 | Noise | 0 | 0 | 0.000000 | |
| 88 | | EM3__20180627_224310.wav | EM3__0_20180627_224310_000 | Noise | 0 | 0 | 0.000000 | |
| 89 | | EM3__20180627_224340.wav | EM3__0_20180627_224340_000 | Noise | 0 | 0 | 0.000000 | |
| 90 | | EM3__20180627_224410.wav | EM3__0_20180627_224410_000 | Noise | 0 | 0 | 0.000000 | |
| 91 | | EM3__20180627_224440.wav | EM3__0_20180627_224440_000 | PIPI | 17 | 10 | 0.273904 | PIPI |
| 92 | | EM3__20180627_224511.wav | EM3__0_20180627_224511_000 | NYNO | 2 | 2 | 0.560939 | leislars |
| 93 | | EM3__20180627_224541.wav | EM3__0_20180627_224541_000 | Noise | 0 | 0 | 0.000000 | |
| 94 | | EM3__20180627_224611.wav | EM3__0_20180627_224611_000 | Noise | 0 | 0 | 0.000000 | |
| 95 | | EM3__20180627_224641.wav | EM3__0_20180627_224641_000 | Noise | 0 | 0 | 0.000000 | |
| 96 | | EM3__20180627_224712.wav | EM3__0_20180627_224712_000 | PIPI | 31 | 24 | 0.217961 | PIPI |
| 97 | | EM3__20180627_224742.wav | EM3__0_20180627_224742_000 | Noise | 0 | 0 | 0.000000 | |
| 98 | | EM3__20180627_224812.wav | EM3__0_20180627_224812_000 | MYBR | 4 | 3 | 0.256214 | Brown long es |
| 99 | | EM3__20180627_224843.wav | EM3__0_20180627_224843_000 | NYNO | 20 | 10 | 0.158026 | NYNO |
| 100 | | EM3__20180627_224913.wav | EM3__0_20180627_224913_000 | Noise | 0 | 0 | 0.000000 | Noise |
| 101 | | EM3__20180627_224943.wav | EM3__0_20180627_224943_000 | Noise | 0 | 0 | 0.000000 | |
| 102 | | EM3__20180627_225013.wav | EM3__0_20180627_225013_000 | Noise | 0 | 0 | 0.000000 | |
| 103 | | EM3__20180627_225044.wav | EM3__0_20180627_225044_000 | Noise | 0 | 0 | 0.000000 | |
| 104 | | EM3__20180627_225114.wav | EM3__0_20180627_225114_000 | Noise | 0 | 0 | 0.000000 | |
| 105 | | EM3__20180627_225144.wav | EM3__0_20180627_225144_000 | Noise | 0 | 0 | 0.000000 | |
| 106 | | EM3__20180627_225214.wav | EM3__0_20180627_225214_000 | Noise | 0 | 0 | 0.000000 | |
| 107 | | EM3__20180627_225245.wav | EM3__0_20180627_225245_000 | Noise | 0 | 0 | 0.000000 | |
| 108 | | EM3__20180627_225315.wav | EM3__0_20180627_225315_000 | Noise | 1 | 0 | 0.000000 | |
| 109 | | EM3__20180627_225345.wav | EM3__0_20180627_225345_000 | Noise | 0 | 0 | 0.000000 | |
| 110 | | EM3__20180627_225415.wav | EM3__0_20180627_225415_000 | PIPI | 28 | 20 | 0.343335 | PIPI |
| 111 | | EM3__20180627_225446.wav | EM3__0_20180627_225446_000 | Noise | 0 | 0 | 0.000000 | |
| 112 | | EM3__20180627_225516.wav | EM3__0_20180627_225516_000 | Noise | 0 | 0 | 0.000000 | |
| 113 | | EM3__20180627_225546.wav | EM3__0_20180627_225546_000 | Noise | 0 | 0 | 0.000000 | |
| 114 | | EM3__20180627_225617.wav | EM3__0_20180627_225617_000 | Noise | 0 | 0 | 0.000000 | |
| 115 | | EM3__20180627_225647.wav | EM3__0_20180627_225647_000 | Noise | 0 | 0 | 0.000000 | |
| 116 | | EM3__20180627_225717.wav | EM3__0_20180627_225717_000 | Noise | 0 | 0 | 0.000000 | |
| 117 | | EM3__20180627_225747.wav | EM3__0_20180627_225747_000 | Noise | 0 | 0 | 0.000000 | |
| 118 | | EM3__20180627_225818.wav | EM3__0_20180627_225818_000 | Noise | 0 | 0 | 0.000000 | |
| 119 | | EM3__20180627_225848.wav | EM3__0_20180627_225848_000 | Noise | 0 | 0 | 0.000000 | |
| 120 | | EM3__20180627_225918.wav | EM3__0_20180627_225918_000 | Noise | 0 | 0 | 0.000000 | |
| 121 | | EM3__20180627_225948.wav | EM3__0_20180627_225948_000 | Noise | 0 | 0 | 0.000000 | |
| 122 | | EM3__20180627_230019.wav | EM3__0_20180627_230019_000 | Noise | 0 | 0 | 0.000000 | |
| 123 | | EM3__20180627_230049.wav | EM3__0_20180627_230049_000 | Noise | 0 | 0 | 0.000000 | |
| 124 | | EM3__20180627_230119.wav | EM3__0_20180627_230119_000 | Noise | 0 | 0 | 0.000000 | |
| 125 | | EM3__20180627_230150.wav | EM3__0_20180627_230150_000 | Noise | 0 | 0 | 0.000000 | |
| 126 | | EM3__20180627_230220.wav | EM3__0_20180627_230220_000 | Noise | 0 | 0 | 0.000000 | |
| 127 | | EM3__20180627_230250.wav | EM3__0_20180627_230250_000 | Noise | 0 | 0 | 0.000000 | |
| 128 | | EM3__20180627_230320.wav | EM3__0_20180627_230320_000 | Noise | 0 | 0 | 0.000000 | |
| 129 | | EM3__20180627_230351.wav | EM3__0_20180627_230351_000 | Noise | 0 | 0 | 0.000000 | |

| | FOLDER | IN FILE | OUT FILE | AUTO ID | PULSES | MATCHING | MARGIN | MANUAL ID |
|-----|--------|--------------------------|----------------------------|---------|--------|----------|----------|-----------|
| 129 | | EM3__20180627_230351.wav | EM3__0_20180627_230351_000 | Noise | 0 | 0 | 0.000000 | |
| 130 | | EM3__20180627_230421.wav | EM3__0_20180627_230421_000 | Noise | 0 | 0 | 0.000000 | |
| 131 | | EM3__20180627_230451.wav | EM3__0_20180627_230451_000 | NYNO | 18 | 10 | 0.199009 | Leislars |
| 132 | | EM3__20180627_230522.wav | EM3__0_20180627_230522_000 | Noise | 0 | 0 | 0.000000 | |
| 133 | | EM3__20180627_230552.wav | EM3__0_20180627_230552_000 | Noise | 0 | 0 | 0.000000 | |
| 134 | | EM3__20180627_230622.wav | EM3__0_20180627_230622_000 | Noise | 0 | 0 | 0.000000 | |
| 135 | | EM3__20180627_230652.wav | EM3__0_20180627_230652_000 | Noise | 0 | 0 | 0.000000 | |
| 136 | | EM3__20180627_230723.wav | EM3__0_20180627_230723_000 | PIPI | 44 | 41 | 0.344212 | PIPI |
| 137 | | EM3__20180627_230753.wav | EM3__0_20180627_230753_000 | Noise | 0 | 0 | 0.000000 | |
| 138 | | EM3__20180627_230823.wav | EM3__0_20180627_230823_000 | Noise | 0 | 0 | 0.000000 | |
| 139 | | EM3__20180627_230853.wav | EM3__0_20180627_230853_000 | Noise | 0 | 0 | 0.000000 | |
| 140 | | EM3__20180627_230924.wav | EM3__0_20180627_230924_000 | Noise | 0 | 0 | 0.000000 | |
| 141 | | EM3__20180627_230954.wav | EM3__0_20180627_230954_000 | Noise | 0 | 0 | 0.000000 | |
| 142 | | EM3__20180627_231024.wav | EM3__0_20180627_231024_000 | Noise | 0 | 0 | 0.000000 | |
| 143 | | EM3__20180627_231054.wav | EM3__0_20180627_231054_000 | Noise | 0 | 0 | 0.000000 | |
| 144 | | EM3__20180627_231125.wav | EM3__0_20180627_231125_000 | Noise | 0 | 0 | 0.000000 | |
| 145 | | EM3__20180627_231155.wav | EM3__0_20180627_231155_000 | Noise | 0 | 0 | 0.000000 | |
| 146 | | EM3__20180627_231225.wav | EM3__0_20180627_231225_000 | Noise | 0 | 0 | 0.000000 | |
| 147 | | EM3__20180627_231256.wav | EM3__0_20180627_231256_000 | Noise | 1 | 0 | 0.000000 | |
| 148 | | EM3__20180627_231326.wav | EM3__0_20180627_231326_000 | Noise | 0 | 0 | 0.000000 | |
| 149 | | EM3__20180627_231356.wav | EM3__0_20180627_231356_000 | Noise | 0 | 0 | 0.000000 | |
| 150 | | EM3__20180627_231426.wav | EM3__0_20180627_231426_000 | Noise | 1 | 0 | 0.000000 | |
| 151 | | EM3__20180627_231457.wav | EM3__0_20180627_231457_000 | Noise | 0 | 0 | 0.000000 | |
| 152 | | EM3__20180627_231527.wav | EM3__0_20180627_231527_000 | Noise | 0 | 0 | 0.000000 | |
| 153 | | EM3__20180627_231557.wav | EM3__0_20180627_231557_000 | PIPI | 10 | 10 | 0.535039 | PIPI |
| 154 | | EM3__20180627_231628.wav | EM3__0_20180627_231628_000 | Noise | 0 | 0 | 0.000000 | |
| 155 | | EM3__20180627_231658.wav | EM3__0_20180627_231658_000 | Noise | 0 | 0 | 0.000000 | |
| 156 | | EM3__20180627_231728.wav | EM3__0_20180627_231728_000 | PIPI | 25 | 25 | 0.638804 | PIPI |
| 157 | | EM3__20180627_231758.wav | EM3__0_20180627_231758_000 | PIPI | 36 | 27 | 0.283370 | |
| 158 | | EM3__20180627_231829.wav | EM3__0_20180627_231829_000 | Noise | 1 | 0 | 0.000000 | |
| 159 | | EM3__20180627_231859.wav | EM3__0_20180627_231859_000 | BABA | 5 | 2 | 0.073353 | Pipy |
| 160 | | EM3__20180627_231929.wav | EM3__0_20180627_231929_000 | NYLE | 16 | 12 | 0.189280 | |
| 161 | | EM3__20180627_231959.wav | EM3__0_20180627_231959_000 | Noise | 0 | 0 | 0.000000 | |
| 162 | | EM3__20180627_232030.wav | EM3__0_20180627_232030_000 | PIPY | 5 | 4 | 0.256313 | PIPY |
| 163 | | EM3__20180627_232100.wav | EM3__0_20180627_232100_000 | Noise | 0 | 0 | 0.000000 | |
| 164 | | EM3__20180627_232130.wav | EM3__0_20180627_232130_000 | Noise | 0 | 0 | 0.000000 | |
| 165 | | EM3__20180627_232201.wav | EM3__0_20180627_232201_000 | Noise | 0 | 0 | 0.000000 | |
| 166 | | EM3__20180627_232231.wav | EM3__0_20180627_232231_000 | Noise | 1 | 0 | 0.000000 | |
| 167 | | EM3__20180627_232301.wav | EM3__0_20180627_232301_000 | MYBE | 2 | 2 | 0.269183 | Noise |
| 168 | | EM3__20180627_232331.wav | EM3__0_20180627_232331_000 | Noise | 1 | 0 | 0.000000 | |
| 169 | | EM3__20180627_232402.wav | EM3__0_20180627_232402_000 | Noise | 0 | 0 | 0.000000 | |
| 170 | | EM3__20180627_232432.wav | EM3__0_20180627_232432_000 | Noise | 0 | 0 | 0.000000 | |
| 171 | | EM3__20180627_232502.wav | EM3__0_20180627_232502_000 | Noise | 0 | 0 | 0.000000 | |
| 172 | | EM3__20180627_232533.wav | EM3__0_20180627_232533_000 | MYBE | 3 | 2 | 0.142479 | Noise |

| | FOLDER | IN FILE | OUT FILE | AUTO ID | PULSES | MATCHING | MARGIN | MANUAL ID |
|-----|--------|--------------------------|----------------------------|---------|--------|----------|----------|---------------|
| 172 | | EM3__20180627_232533.wav | EM3__0_20180627_232533_000 | MYBE | 3 | 2 | 0.142479 | Noise |
| 173 | | EM3__20180627_232603.wav | EM3__0_20180627_232603_000 | MYBE | 2 | 2 | 0.277750 | Noise |
| 174 | | EM3__20180627_232633.wav | EM3__0_20180627_232633_000 | Noise | 0 | 0 | 0.000000 | |
| 175 | | EM3__20180627_232703.wav | EM3__0_20180627_232703_000 | Noise | 1 | 0 | 0.000000 | |
| 176 | | EM3__20180627_232734.wav | EM3__0_20180627_232734_000 | Noise | 0 | 0 | 0.000000 | |
| 177 | | EM3__20180627_232804.wav | EM3__0_20180627_232804_000 | Noise | 0 | 0 | 0.000000 | |
| 178 | | EM3__20180627_232834.wav | EM3__0_20180627_232834_000 | Noise | 0 | 0 | 0.000000 | |
| 179 | | EM3__20180627_232904.wav | EM3__0_20180627_232904_000 | Noise | 0 | 0 | 0.000000 | |
| 180 | | EM3__20180627_232935.wav | EM3__0_20180627_232935_000 | Noise | 0 | 0 | 0.000000 | |
| 181 | | EM3__20180627_233005.wav | EM3__0_20180627_233005_000 | Noise | 0 | 0 | 0.000000 | |
| 182 | | EM3__20180627_233035.wav | EM3__0_20180627_233035_000 | Noise | 0 | 0 | 0.000000 | |
| 183 | | EM3__20180627_233106.wav | EM3__0_20180627_233106_000 | PINA | 26 | 12 | 0.155897 | Pipi |
| 184 | | EM3__20180627_233136.wav | EM3__0_20180627_233136_000 | Noise | 0 | 0 | 0.000000 | |
| 185 | | EM3__20180627_233206.wav | EM3__0_20180627_233206_000 | Noise | 0 | 0 | 0.000000 | |
| 186 | | EM3__20180627_233236.wav | EM3__0_20180627_233236_000 | PIPI | 6 | 5 | 0.327460 | PIPI |
| 187 | | EM3__20180627_233307.wav | EM3__0_20180627_233307_000 | MYBR | 9 | 7 | 0.324730 | Daubenton's b |
| 188 | | EM3__20180627_233337.wav | EM3__0_20180627_233337_000 | NoID | 2 | 0 | 0.000000 | |
| 189 | | EM3__20180627_233407.wav | EM3__0_20180627_233407_000 | MYDAU | 5 | 3 | 0.319500 | MYDAU |
| 190 | | EM3__20180627_233438.wav | EM3__0_20180627_233438_000 | PIPY | 65 | 39 | 0.136594 | PIPY |
| 191 | | EM3__20180627_233508.wav | EM3__0_20180627_233508_000 | Noise | 0 | 0 | 0.000000 | |
| 192 | | EM3__20180627_233538.wav | EM3__0_20180627_233538_000 | Noise | 0 | 0 | 0.000000 | |
| 193 | | EM3__20180628_033954.wav | EM3__0_20180628_033954_000 | Noise | 0 | 0 | 0.000000 | |
| 194 | | EM3__20180628_034025.wav | EM3__0_20180628_034025_000 | PIPI | 10 | 8 | 0.371216 | |
| 195 | | EM3__20180628_034055.wav | EM3__0_20180628_034055_000 | PINA | 6 | 4 | 0.204237 | |
| 196 | | EM3__20180628_034126.wav | EM3__0_20180628_034126_000 | Noise | 0 | 0 | 0.000000 | |
| 197 | | EM3__20180628_034156.wav | EM3__0_20180628_034156_000 | Noise | 0 | 0 | 0.000000 | |
| 198 | | EM3__20180628_034226.wav | EM3__0_20180628_034226_000 | Noise | 0 | 0 | 0.000000 | |
| 199 | | EM3__20180628_034256.wav | EM3__0_20180628_034256_000 | Noise | 0 | 0 | 0.000000 | |
| 200 | | EM3__20180628_034327.wav | EM3__0_20180628_034327_000 | Noise | 0 | 0 | 0.000000 | |
| 201 | | EM3__20180628_034357.wav | EM3__0_20180628_034357_000 | Noise | 0 | 0 | 0.000000 | |
| 202 | | EM3__20180628_034427.wav | EM3__0_20180628_034427_000 | Noise | 0 | 0 | 0.000000 | |
| 203 | | EM3__20180628_034458.wav | EM3__0_20180628_034458_000 | Noise | 0 | 0 | 0.000000 | |
| 204 | | EM3__20180628_034528.wav | EM3__0_20180628_034528_000 | Noise | 0 | 0 | 0.000000 | |
| 205 | | EM3__20180628_034558.wav | EM3__0_20180628_034558_000 | Noise | 0 | 0 | 0.000000 | |
| 206 | | EM3__20180628_034629.wav | EM3__0_20180628_034629_000 | Noise | 0 | 0 | 0.000000 | |
| 207 | | EM3__20180628_034659.wav | EM3__0_20180628_034659_000 | Noise | 0 | 0 | 0.000000 | |
| 208 | | EM3__20180628_034729.wav | EM3__0_20180628_034729_000 | Noise | 0 | 0 | 0.000000 | |
| 209 | | EM3__20180628_034759.wav | EM3__0_20180628_034759_000 | Noise | 0 | 0 | 0.000000 | |
| 210 | | EM3__20180628_034830.wav | EM3__0_20180628_034830_000 | Noise | 0 | 0 | 0.000000 | |
| 211 | | EM3__20180628_034900.wav | EM3__0_20180628_034900_000 | Noise | 0 | 0 | 0.000000 | |
| 212 | | EM3__20180628_034930.wav | EM3__0_20180628_034930_000 | Noise | 0 | 0 | 0.000000 | |
| 213 | | EM3__20180628_035001.wav | EM3__0_20180628_035001_000 | PIPI | 10 | 9 | 0.400100 | PIPI |
| 214 | | EM3__20180628_035031.wav | EM3__0_20180628_035031_000 | Noise | 0 | 0 | 0.000000 | |

| | FOLDER | IN FILE | OUT FILE | AUTO ID | PULSES | MATCHING | MARGIN | MANUAL ID |
|-----|--------|--------------------------|----------------------------|---------|--------|----------|----------|-------------|
| 214 | | EM3__20180628_035101.wav | EM3__0_20180628_035101_000 | Noise | 0 | 0 | 0.000000 | |
| 215 | | EM3__20180628_035101.wav | EM3__0_20180628_035101_000 | Noise | 0 | 0 | 0.000000 | |
| 216 | | EM3__20180628_035132.wav | EM3__0_20180628_035132_000 | Noise | 0 | 0 | 0.000000 | |
| 217 | | EM3__20180628_035202.wav | EM3__0_20180628_035202_000 | Noise | 0 | 0 | 0.000000 | |
| 218 | | EM3__20180628_035232.wav | EM3__0_20180628_035232_000 | Noise | 0 | 0 | 0.000000 | |
| 219 | | EM3__20180628_035303.wav | EM3__0_20180628_035303_000 | Noise | 0 | 0 | 0.000000 | |
| 220 | | EM3__20180628_035333.wav | EM3__0_20180628_035333_000 | Noise | 0 | 0 | 0.000000 | |
| 221 | | EM3__20180628_035403.wav | EM3__0_20180628_035403_000 | Noise | 0 | 0 | 0.000000 | |
| 222 | | EM3__20180628_035433.wav | EM3__0_20180628_035433_000 | Noise | 0 | 0 | 0.000000 | |
| 223 | | EM3__20180628_035504.wav | EM3__0_20180628_035504_000 | Noise | 0 | 0 | 0.000000 | |
| 224 | | EM3__20180628_035534.wav | EM3__0_20180628_035534_000 | PIPI | 19 | 19 | 0.714533 | PIPI |
| 225 | | EM3__20180628_035604.wav | EM3__0_20180628_035604_000 | Noise | 0 | 0 | 0.000000 | |
| 226 | | EM3__20180628_035635.wav | EM3__0_20180628_035635_000 | Noise | 0 | 0 | 0.000000 | |
| 227 | | EM3__20180628_035705.wav | EM3__0_20180628_035705_000 | Noise | 0 | 0 | 0.000000 | |
| 228 | | EM3__20180628_035735.wav | EM3__0_20180628_035735_000 | Noise | 0 | 0 | 0.000000 | |
| 229 | | EM3__20180628_035806.wav | EM3__0_20180628_035806_000 | Noise | 0 | 0 | 0.000000 | |
| 230 | | EM3__20180628_035836.wav | EM3__0_20180628_035836_000 | Noise | 0 | 0 | 0.000000 | |
| 231 | | EM3__20180628_035906.wav | EM3__0_20180628_035906_000 | Noise | 0 | 0 | 0.000000 | |
| 232 | | EM3__20180628_035937.wav | EM3__0_20180628_035937_000 | Noise | 0 | 0 | 0.000000 | |
| 233 | | EM3__20180628_040007.wav | EM3__0_20180628_040007_000 | Noise | 0 | 0 | 0.000000 | |
| 234 | | EM3__20180628_040037.wav | EM3__0_20180628_040037_000 | Noise | 0 | 0 | 0.000000 | |
| 235 | | EM3__20180628_040108.wav | EM3__0_20180628_040108_000 | Noise | 0 | 0 | 0.000000 | |
| 236 | | EM3__20180628_040138.wav | EM3__0_20180628_040138_000 | Noise | 0 | 0 | 0.000000 | |
| 237 | | EM3__20180628_040208.wav | EM3__0_20180628_040208_000 | Noise | 0 | 0 | 0.000000 | |
| 238 | | EM3__20180628_040238.wav | EM3__0_20180628_040238_000 | Noise | 0 | 0 | 0.000000 | |
| 239 | | EM3__20180628_040309.wav | EM3__0_20180628_040309_000 | PIPY | 17 | 15 | 0.342797 | PIPY |
| 240 | | EM3__20180628_040339.wav | EM3__0_20180628_040339_000 | PIPI | 33 | 29 | 0.409137 | PIPI |
| 241 | | EM3__20180628_040409.wav | EM3__0_20180628_040409_000 | PINA | 29 | 20 | 0.197585 | Common pipi |
| 242 | | EM3__20180628_040440.wav | EM3__0_20180628_040440_000 | PIPI | 30 | 23 | 0.393073 | PIPI |
| 243 | | EM3__20180628_040510.wav | EM3__0_20180628_040510_000 | Noise | 0 | 0 | 0.000000 | |
| 244 | | EM3__20180628_040540.wav | EM3__0_20180628_040540_000 | Noise | 0 | 0 | 0.000000 | |
| 245 | | EM3__20180628_040610.wav | EM3__0_20180628_040610_000 | Noise | 0 | 0 | 0.000000 | |
| 246 | | EM3__20180628_040641.wav | EM3__0_20180628_040641_000 | Noise | 0 | 0 | 0.000000 | |
| 247 | | EM3__20180628_040711.wav | EM3__0_20180628_040711_000 | Noise | 0 | 0 | 0.000000 | |
| 248 | | EM3__20180628_040741.wav | EM3__0_20180628_040741_000 | Noise | 0 | 0 | 0.000000 | |
| 249 | | EM3__20180628_040812.wav | EM3__0_20180628_040812_000 | PIPI | 40 | 32 | 0.346181 | PIPI |
| 250 | | EM3__20180628_040842.wav | EM3__0_20180628_040842_000 | Noise | 0 | 0 | 0.000000 | |
| 251 | | EM3__20180628_040912.wav | EM3__0_20180628_040912_000 | Noise | 0 | 0 | 0.000000 | |
| 252 | | EM3__20180628_040943.wav | EM3__0_20180628_040943_000 | Noise | 0 | 0 | 0.000000 | |
| 253 | | EM3__20180628_041013.wav | EM3__0_20180628_041013_000 | Noise | 0 | 0 | 0.000000 | |
| 254 | | EM3__20180628_041043.wav | EM3__0_20180628_041043_000 | Noise | 0 | 0 | 0.000000 | |
| 255 | | EM3__20180628_041114.wav | EM3__0_20180628_041114_000 | PIPI | 41 | 37 | 0.495782 | PIPI |
| 256 | | EM3__20180628_041144.wav | EM3__0_20180628_041144_000 | Noise | 0 | 0 | 0.000000 | |
| 257 | | EM3__20180628_041214.wav | EM3__0_20180628_041214_000 | Noise | 0 | 0 | 0.000000 | |

| | FOLDER | IN FILE | OUT FILE | AUTO ID | PULSES | MATCHING | MARGIN | MANUAL ID |
|-----|--------|--------------------------|----------------------------|---------|--------|----------|----------|------------|
| 257 | | EM3__20180628_041214.wav | EM3__0_20180628_041214_000 | Noise | 0 | 0 | 0.000000 | |
| 258 | | EM3__20180628_041244.wav | EM3__0_20180628_041244_000 | Noise | 0 | 0 | 0.000000 | |
| 259 | | EM3__20180628_041315.wav | EM3__0_20180628_041315_000 | Noise | 0 | 0 | 0.000000 | |
| 260 | | EM3__20180628_041345.wav | EM3__0_20180628_041345_000 | PIPI | 26 | 26 | 0.348901 | PIPI |
| 261 | | EM3__20180628_041415.wav | EM3__0_20180628_041415_000 | Noise | 0 | 0 | 0.000000 | |
| 262 | | EM3__20180628_041446.wav | EM3__0_20180628_041446_000 | NYLE | 7 | 5 | 0.160753 | NYLE |
| 263 | | EM3__20180628_041516.wav | EM3__0_20180628_041516_000 | PIPY | 3 | 3 | 0.720447 | Noise |
| 264 | | EM3__20180628_041546.wav | EM3__0_20180628_041546_000 | Noise | 0 | 0 | 0.000000 | |
| 265 | | EM3__20180628_041616.wav | EM3__0_20180628_041616_000 | Noise | 0 | 0 | 0.000000 | |
| 266 | | EM3__20180628_041647.wav | EM3__0_20180628_041647_000 | Noise | 0 | 0 | 0.000000 | |
| 267 | | EM3__20180628_041717.wav | EM3__0_20180628_041717_000 | Noise | 0 | 0 | 0.000000 | |
| 268 | | EM3__20180628_041747.wav | EM3__0_20180628_041747_000 | Noise | 0 | 0 | 0.000000 | |
| 269 | | EM3__20180628_041818.wav | EM3__0_20180628_041818_000 | Noise | 1 | 0 | 0.000000 | |
| 270 | | EM3__20180628_041848.wav | EM3__0_20180628_041848_000 | PIPI | 26 | 25 | 0.491459 | PIPI |
| 271 | | EM3__20180628_041918.wav | EM3__0_20180628_041918_000 | Noise | 0 | 0 | 0.000000 | |
| 272 | | EM3__20180628_041949.wav | EM3__0_20180628_041949_000 | PIPI | 12 | 7 | 0.118448 | PIPI |
| 273 | | EM3__20180628_042019.wav | EM3__0_20180628_042019_000 | Noise | 0 | 0 | 0.000000 | Noise |
| 274 | | EM3__20180628_042049.wav | EM3__0_20180628_042049_000 | PIPI | 8 | 8 | 0.657651 | PIPI |
| 275 | | EM3__20180628_042119.wav | EM3__0_20180628_042119_000 | Noise | 0 | 0 | 0.000000 | Noise |
| 276 | | EM3__20180628_042150.wav | EM3__0_20180628_042150_000 | PINA | 18 | 8 | 0.115579 | Common pip |
| 277 | | EM3__20180628_042220.wav | EM3__0_20180628_042220_000 | Noise | 0 | 0 | 0.000000 | |
| 278 | | EM3__20180628_042250.wav | EM3__0_20180628_042250_000 | Noise | 0 | 0 | 0.000000 | |
| 279 | | EM3__20180628_042321.wav | EM3__0_20180628_042321_000 | Noise | 0 | 0 | 0.000000 | |
| 280 | | EM3__20180628_042351.wav | EM3__0_20180628_042351_000 | Noise | 0 | 0 | 0.000000 | |
| 281 | | EM3__20180628_042421.wav | EM3__0_20180628_042421_000 | Noise | 0 | 0 | 0.000000 | |
| 282 | | EM3__20180628_042452.wav | EM3__0_20180628_042452_000 | Noise | 0 | 0 | 0.000000 | |
| 283 | | EM3__20180628_042522.wav | EM3__0_20180628_042522_000 | Noise | 0 | 0 | 0.000000 | |
| 284 | | EM3__20180628_042552.wav | EM3__0_20180628_042552_000 | Noise | 0 | 0 | 0.000000 | |
| 285 | | EM3__20180628_042623.wav | EM3__0_20180628_042623_000 | Noise | 0 | 0 | 0.000000 | |
| 286 | | EM3__20180628_042653.wav | EM3__0_20180628_042653_000 | Noise | 0 | 0 | 0.000000 | |
| 287 | | EM3__20180628_042723.wav | EM3__0_20180628_042723_000 | Noise | 0 | 0 | 0.000000 | |
| 288 | | EM3__20180628_042753.wav | EM3__0_20180628_042753_000 | Noise | 0 | 0 | 0.000000 | |
| 289 | | EM3__20180628_042824.wav | EM3__0_20180628_042824_000 | Noise | 0 | 0 | 0.000000 | |
| 290 | | EM3__20180628_042854.wav | EM3__0_20180628_042854_000 | Noise | 0 | 0 | 0.000000 | |
| 291 | | EM3__20180628_042924.wav | EM3__0_20180628_042924_000 | Noise | 0 | 0 | 0.000000 | |
| 292 | | EM3__20180628_042955.wav | EM3__0_20180628_042955_000 | Noise | 0 | 0 | 0.000000 | |
| 293 | | EM3__20180628_043025.wav | EM3__0_20180628_043025_000 | Noise | 0 | 0 | 0.000000 | |
| 294 | | EM3__20180628_043055.wav | EM3__0_20180628_043055_000 | Noise | 0 | 0 | 0.000000 | |
| 295 | | EM3__20180628_043126.wav | EM3__0_20180628_043126_000 | Noise | 0 | 0 | 0.000000 | |
| 296 | | EM3__20180628_043156.wav | EM3__0_20180628_043156_000 | Noise | 0 | 0 | 0.000000 | |
| 297 | | EM3__20180628_043226.wav | EM3__0_20180628_043226_000 | Noise | 0 | 0 | 0.000000 | |
| 298 | | EM3__20180628_043257.wav | EM3__0_20180628_043257_000 | Noise | 0 | 0 | 0.000000 | |
| 299 | | EM3__20180628_043327.wav | EM3__0_20180628_043327_000 | Noise | 0 | 0 | 0.000000 | |
| 300 | | EM3__20180628_043357.wav | EM3__0_20180628_043357_000 | Noise | 0 | 0 | 0.000000 | |