# A Bat Assessment of The Proposed Housing Development, Kilmashogue, County Dublin and an Evaluation for Potential Impacts on the Bat Fauna

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## Introduction

Bats constitute one quarter of the Irish mammal fauna. They are known to occur throughout much of the rural landscape and to a lesser extent, the urban environment even into Dublin city. In towns and cities, they more often occupy buildings and occasionally trees for short or long periods. Houses, farm buildings and other buildings are a vital element of the annual cycle of all Irish bat species and at no time more so than the period May to August, but many bats may also avail of buildings as hibernation sites.

In sites such as the proposed development site where there are several buildings, there is the potential for roosting within any one of the buildings if appropriate conditions are met to provide safe shelter from the elements and predation. Furthermore, trees within the site proposed for development may have roost potential. Changes to a site including demolition or building repair and restoration, tree and hedgerow removal may destroy roosts, placing bats at risk during such procedures and may reduce the options available to bats as a roosting site and may also affect their feeding and commuting activity.

Bats are protected by Irish and EU law and to prevent unlawful injury or death, it is essential that a full understanding of the site is available in advance to protect the resident bats from unintentional disturbance, injury, or death and to create a pathway by which a legal derogation and exemption may be designed in consultation with the National Parks and Wildlife Service of the Department of Department of Housing, Local Government and Heritage.

The site at Kilmashogue will undergo a change from an agricultural landscape bounded by a golf course to the east, M50 to the south and open lands to the west. There are two areas of

proposed development that are separated by a narrow finger of land. There will be vegetation clearance from some areas including tree felling and hedgerow removal and the construction of a large number of buildings in addition to the demolition of the existing buildings. A new road would be constructed through the site introducing traffic to the site. This will change the nature of the site removing the agricultural lands and further establishing a more urban character to these lands.

This assessment will address the potential for bat roosting within the site and identify the potential for impacts upon bat feeding and commuting within the lands that form the proposed site of construction based entirely upon a visual assessment of the lands and a walkover survey to determine the potential for roost sites within the trees on site.

Surveying was undertaken on the northern lands in May 2019 and both areas were surveyed in June 2020. This is a suitable period to look at the commencement of the breeding season when the single annual young are born and when females form the largest roost type (in the Irish context), the maternity roost. These roosts are typically in close proximity or within areas of good feeding. A bat detector assessment at this time can disclose the value of a site for feeding and how bats avail of a site in commuting to and from important sites including feeding sites and roosts.

**Methodology**

The proposed development site at Kilmashogue, County Dublin was examined from prior to sunset on 9th June 2020 for an hour and a half and again for an hour prior to sunrise on 10th June 2020 by two surveyors; one at the northern element of the proposal and a second to the southern element. Sunset was at 21.52 hours on 9th June and sunrise was at 04.58 hours on 10th June 2020. Each surveyor employed the use of a handheld Echometer 3 (EM3) full spectrum receiver with a screen displaying the ultrasonic signals received and also recording all ultrasonic signals received to a SD card for later analysis.

A Songmeter Mini was also placed on the windowsill of the house proposed for demolition in the northern site. A second Songmeter Mini was placed at the house at the southern section of the southern site. A Songmeter2BAT+ was placed at the ruined farm buildings to the north of this house.

Each surveyor walked around the perimeter of all buildings and the adjoining laneways from sunset onwards and following this, continued to walk along treelines and hedgerow throughout the two sites. Surveying recommenced at 04.00 hours on 10th June 2020 and examined the bat activity within the sites (north and south).

A previous assessment was undertaken of the northern section of the proposal in May 2019 and the results of this are included for comparison and completeness.

**Survey Constraints**

Weather conditions on 9th and 10th June 2020 were suited to surveying for bats. The temperature at sunset was 11 degrees Celsius, 90% cloud, dry and calm (no wind). There were occasional drops of rain at 22.24 hours, but this did not progress to rain. Prior to sunrise the temperature was 11 degrees Celsius. There was 70% cloud and conditions were dry. Surveying commenced prior to sunset 21.52 hours and sunrise was at 04.58 hours by which time surveying ceased. Weather conditions were highly suited to bat survey between these times.

The weather conditions in May 2019 varied, making assessment of bat activity within the site more difficult. The night of 6th May was cool (6°C) and dry and descended to 0°C by sunrise. The pre-dawn assessment on 23rd May was in good weather conditions with a temperature of 11°C by sunrise at 05.11 hours.

# Existing Environment

**Species of bat roosting within the site        None**

In June 2020, there were no roosts identified in any of the buildings. There were no signs indicating bat usage such as dropping or staining. In May 2019, no bats were seen or heard to emerge from the northern buildings or were noted in an area close to the buildings close to sunset (at or before sunset would indicate proximity to a roost for Leisler's bat and up to 15 minutes later than this for pipistrelles). Prior to sunrise on 23rd May, a soprano pipistrelle was noted at 04.49 hours and a second sighting was made at 04.53 hours. With sunrise at 05.11 hours, this would suggest close proximity to a roost site.

**Species of bat feeding within and around the site**

| | |
|---|---|
| Common pipistrelle | *Pipistrellus pipistrellus* |
| Soprano pipistrelle | *Pipistrellus pygmaeus* |
| Leisler's bat | *Nyctalus leisleri* |
| Brown long-eared bat | *Plecotus auritus* |

The main bat activity was of common pipistrelles, with more localised bat activity for soprano pipistrelles. The latter species was noted towards the emergence and return periods but was not seen to enter or emerge from any tree or building.

Leisler's bats were noted in both sections of the site and were more evident in more open areas rather than close to buildings or trees.

Brown long-eared bat signals were noted by a static monitor on two occasions at 22.34 and 22.45 hours in the southern site. This species is more difficult to detect than the other species and was probably more active within the site that the recordings suggest but no bats were seen to swarm or return to any structure and may be entering or passing through the site.

## Potential Impacts

### Loss of roosts

There are several buildings within the site that will be removed to facilitate the development. There are some trees with roost potential in the southern section of the site. These were devoid of evidence of bats when examined in 2020 and in the northern section in 2019. There is the possibility of occasional use by individuals that is very difficult or impossible to rule out without considerable levels of disruption to buildings or trees including slate removal, etc. There were no summer roosts within the site and there is no evidence of roosts of bats within the site from available data.

### Loss of cover for feeding and commuting

As bats most commonly feed along hedgerow and treelines and both trees and hedges provide shelter from wind and visibility to predators, the removal of vegetation can affect how a bat commutes through a site and feeds within the site. This may lead to a bat needing to fly over greater distances to find food and roosts.

### Increased light levels within the area

Housing requires lighting for access and safety and for convenience and display and this development would see the introduction of street lighting, house lighting, garden lighting and a reduction in the dark areas wherein most bat activity occurs.

### Impacts of changes to the site on resident and local bats

The reduction in cover and lighting alterations to the site will have a long-term to permanent slight negative impact on the bat population of the region. This will act cumulatively with other changes to the area associated with housing or other construction.

## Proposed Mitigation

### *Re-examination of all buildings and mature trees for bats*
To ensure that bats have not entered the buildings and are not placed at risk following a delay in demolition, all buildings shall be re-checked prior to demolition.

### *Planting of vegetation*
Wherever 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), 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.

### *Lighting*
Lighting should be controlled to avoid light pollution of green areas and should be targeted to areas of human activity and for priority security areas. Motion-activated sensor lighting is preferable to reduce light pollution. None of the remaining mature trees or trees proposed for planting shall be illuminated.

- Dark corridor for movement of bats along the grounds of the site. Lighting should be directed downwards away from the treetops.
- All luminaires shall lack UV elements when manufactured and shall be LED
- A warm white spectrum (ideally <2700 Kelvin) shall be adopted to reduce blue light component
- Luminaires shall feature peak wavelengths higher than 550nm
- Tree crowns shall remain unilluminated
- Planting shall provide areas of darkness suitable for bats to feed and commute

## Impacts Upon Bats Following Mitigation
Given the likelihood that further development will follow this proposal, it is predicted that there will be a slight to moderate negative impact upon bats within the area of long-term to permanent duration. There are no rare bat species within the site and there are no roosts confirmed to be lost from the proposal. This will be confirmed at the time of demolition. Measures to provide roosts, limit light pollution and plant trees and shrubs sensitively will ensure some feeding can continue within and around the site, but this was limited in May 2019.
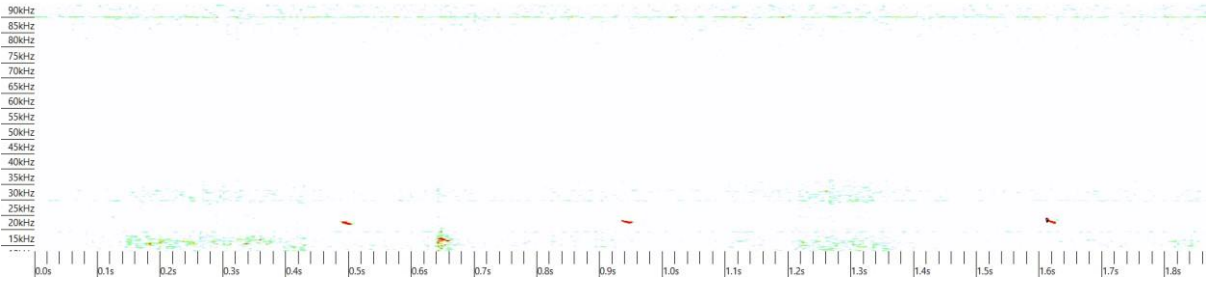
Faint Leisler's bat signal at 21.42 hours recorded from within the site on 9th May 2019
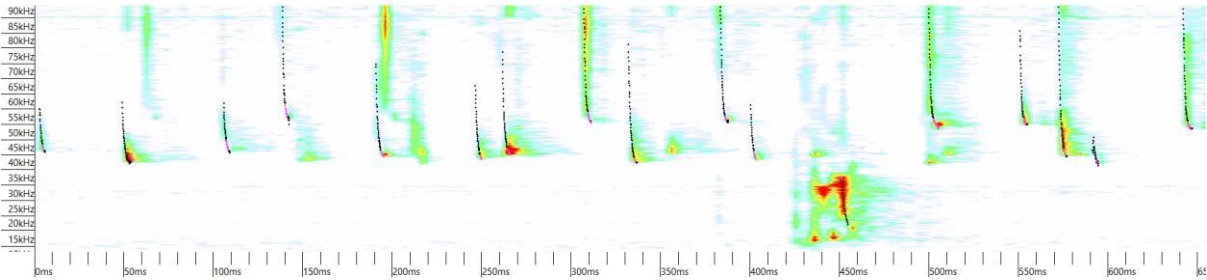


Common and soprano pipistrelle with soprano pipistrelle social call along the road outside the site entrance at 23.01 hours

| Table 1: BCIreland data | | | | |
|---|---|---|---|---|
| Search parameters: Roosts Transects Ad-hoc observation sites with observations of all bats within 1000m of O1463825674. | | | | |
| Roosts | | | | |
| Name | Grid reference | Address | Species observed | |
| Whitechurch Church of Ireland | O147257 | Whitechurch; County Dublin | Plecotus auritus | |
| Ad-hoc observations | | | | |
| Survey | Grid reference | Date | Species | |
| Dublin Bat Group surveys | O1526 | 18/08/1999 | Nyctalus leisleri | |
| EIS and Road Surveys - Kelleher | O1500026000 | 22/06/2005 | Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus | |
| EIS and Road Surveys - Kelleher | O1500025000 | 22/06/2005 | Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus | |
| EIS surveys - Keeley | O1555026200 | 01/06/2004 | Myotis daubentonii; Myotis mystacinus; Myotis mystacinus/brandtii; Nyctalus leisleri; Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus | |
| Wilson | O1424 | 02/09/2009 | Myotis nattereri; Myotis spp.; Nyctalus leisleri; Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus; Pipistrellus spp. (45kHz/55kHz); Plecotus auritus | |
| Niamh Roche | O1526 | 28/07/1999 | Nyctalus leisleri; Pipistrellus pipistrellus (45kHz); Pipistrellus pygmaeus | |

**Bat activity Kilmashogue May 9ᵗʰ, 2019, and within the site on May 23ʳᵈ, 2019**

Legend

| | |
|---|---|
| Green circle | Common pipistrelle |
| Blue arrow | Soprano pipistrelle travelling along perimeter hedge |
| Blue circle | Soprano pipistrelle        Dark blue circle    Both Common and Soprano pipistrelle |
| Yellow circle | Leisler's bat        Yellow arrow Leisler's bat travelling along perimeter hedge |

**Bat activity on the southern area of the site based on handheld detector recordings June 2020**

Green paddle        Common pipistrelle            Blue paddle      Soprano pipistrelle
Yellow paddle       Leisler's bat

**Bat activity on the northern area of the site based on handheld detector recordings June 2020**

Green oval –    Common pipistrelle      Green arrow –    Common pipistrelle feeding
Blue circle –     Soprano pipistrelle      Blue arrow –     Soprano pipistrelle commuting
Yellow oval –    Leisler's bat

## Table 2: EM3 handheld for northern site June 2020

| | | OUT FILE FS | OUT FILE ZC | AUTO ID | PULSES | MATCHING | MATCH RATIO | MANUAL ID |
|---|---|---|---|---|---|---|---|---|
| 1 | | EM3__20110101_075917_000.wav | | NYCLEI | 16 | 9 | 0.563000 | |
| 2 | | EM3__20110101_075816_000.wav | | NoID | 2 | 0 | 0.000000 | PIP |
| 3 | | EM3__20110101_081203_000.wav | | NoID | 10 | 0 | 0.000000 | PIP |
| 4 | | EM3__20110101_132301_000.wav | | NoID | 20 | 0 | 0.000000 | Noise |
| 5 | | EM3__20110101_132331_000.wav | | NoID | 19 | 0 | 0.000000 | PIPPIP |
| 6 | | EM3__20110101_132503_000.wav | | NoID | 2 | 0 | 0.000000 | Noise |
| 7 | | EM3__20110101_132346_000.wav | | NoID | 5 | 0 | 0.000000 | Noise |
| 8 | | EM3__20110101_132316_000.wav | | NoID | 11 | 0 | 0.000000 | PIP |
| 9 | | EM3__20110101_132604_000.wav | | NoID | 30 | 0 | 0.000000 | Noise |
| 10 | | EM3__20110101_132534_000.wav | | NoID | 34 | 0 | 0.000000 | Noise |
| 11 | | EM3__20110101_132417_000.wav | | NoID | 4 | 0 | 0.000000 | PIP |
| 12 | | EM3__20110101_132518_000.wav | | NoID | 3 | 0 | 0.000000 | PIP |
| 13 | | EM3__20110101_132447_000.wav | | NoID | 8 | 0 | 0.000000 | PIP |
| 14 | | EM3__20110101_133040_000.wav | | NoID | 2 | 0 | 0.000000 | Noise |
| 15 | | EM3__20110101_132619_000.wav | | NoID | 17 | 0 | 0.000000 | PIP |
| 16 | | EM3__20110101_132549_000.wav | | NoID | 18 | 0 | 0.000000 | PIP |
| 17 | | EM3__20110101_065544_000.wav | | Noise | | | | Noise |
| 18 | | EM3__20110101_065412_000.wav | | Noise | | | | Noise |
| 19 | | EM3__20110101_070324_000.wav | | Noise | | | | Noise |
| 20 | | EM3__20110101_065645_000.wav | | Noise | | | | Noise |
| 21 | | EM3__20110101_065342_000.wav | | Noise | | | | Noise |
| 22 | | EM3__20110101_065919_000.wav | | Noise | | | | Noise |
| 23 | | EM3__20110101_065514_000.wav | | Noise | | | | Noise |
| 24 | | EM3__20110101_065443_000.wav | | Noise | | | | Noise |
| 25 | | EM3__20110101_065747_000.wav | | Noise | | | | Noise |
| 26 | | EM3__20110101_065949_000.wav | | Noise | | | | |

| | | OUT FILE FS | OUT FILE ZC | AUTO ID | PULSES | MATCHING | MATCH RATIO | MANUAL ID |
|---|---|---|---|---|---|---|---|---|
| 509 | | EM3__20110101_135706_000.wav | | Noise | | | | |
| 510 | | EM3__20110101_135430_000.wav | | Noise | | | | |
| 511 | | EM3__20110101_135225_000.wav | | Noise | | | | |
| 512 | | EM3__20110101_135153_000.wav | | Noise | | | | |
| 513 | | EM3__20110101_134949_000.wav | | Noise | | | | |
| 514 | | EM3__20110101_135122_000.wav | | Noise | | | | |
| 515 | | EM3__20110101_135327_000.wav | | Noise | | | | |
| 516 | | EM3__20110101_135051_000.wav | | Noise | | | | |
| 517 | | EM3__20110101_135256_000.wav | | Noise | | | | |
| 518 | | EM3__20110101_075730_000.wav | | PIPNAT | 2 | 2 | 1.000000 | PIP |
| 519 | | EM3__20110101_075006_000.wav | | PIPPIP | 69 | 67 | 0.971000 | |
| 520 | | EM3__20110101_080018_000.wav | | PIPPIP | 32 | 32 | 1.000000 | |
| 521 | | EM3__20110101_075948_000.wav | | PIPPIP | 29 | 29 | 1.000000 | |
| 522 | | EM3__20110101_081507_000.wav | | PIPPIP | 33 | 21 | 0.636000 | |
| 523 | | EM3__20110101_074327_000.wav | | PIPPIP | 19 | 19 | 1.000000 | |
| 524 | | EM3__20110101_075021_000.wav | | PIPPIP | 20 | 19 | 0.950000 | |
| 525 | | EM3__20110101_074312_000.wav | | PIPPIP | 16 | 16 | 1.000000 | |
| 526 | | EM3__20110101_075122_000.wav | | PIPPIP | 15 | 15 | 1.000000 | |
| 527 | | EM3__20110101_081304_000.wav | | PIPPIP | 15 | 15 | 1.000000 | |
| 528 | | EM3__20110101_081452_000.wav | | PIPPIP | 29 | 15 | 0.517000 | |
| 529 | | EM3__20110101_075801_000.wav | | PIPPIP | 14 | 14 | 1.000000 | |
| 530 | | EM3__20110101_081522_000.wav | | PIPPIP | 24 | 14 | 0.583000 | |
| 531 | | EM3__20110101_075933_000.wav | | PIPPIP | 13 | 13 | 1.000000 | |
| 532 | | EM3__20110101_130047_000.wav | | PIPPIP | 16 | 13 | 0.813000 | |
| 533 | | EM3__20110101_081249_000.wav | | PIPPIP | 13 | 12 | 0.923000 | |
| 534 | | EM3__20110101_081553_000.wav | | PIPPIP | 14 | 11 | 0.786000 | |
| 535 | | EM3__20110101_132245_000.wav | | PIPPIP | 27 | 10 | 0.370000 | |
| 536 | | EM3__20110101_075831_000.wav | | PIPPIP | 9 | 9 | 1.000000 | |
| 537 | | EM3__20110101_080003_000.wav | | PIPPIP | 7 | 7 | 1.000000 | |
| 538 | | EM3__20110101_080034_000.wav | | PIPPIP | 6 | 6 | 1.000000 | |
| 539 | | EM3__20110101_080049_000.wav | | PIPPIP | 5 | 5 | 1.000000 | |
| 540 | | EM3__20110101_081233_000.wav | | PIPPIP | 5 | 5 | 1.000000 | |
| 541 | | EM3__20110101_075224_000.wav | | PIPPIP | 4 | 4 | 1.000000 | |
| 542 | | EM3__20110101_074515_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 543 | | EM3__20110101_075239_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 544 | | EM3__20110101_075902_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 545 | | EM3__20110101_075714_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 546 | | EM3__20110101_132230_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 547 | | EM3__20110101_125946_000.wav | | PIPPYG | 27 | 27 | 1.000000 | PIPPIP |
| 548 | | EM3__20110101_125901_000.wav | | PIPPYG | 25 | 23 | 0.920000 | PIPPIP |
| 549 | | EM3__20110101_130539_000.wav | | PIPPYG | 22 | 22 | 1.000000 | |
| 550 | | EM3__20110101_081148_000.wav | | PIPPYG | 15 | 14 | 0.933000 | |
| 551 | | EM3__20110101_125845_000.wav | | PIPPYG | 11 | 11 | 1.000000 | |
| 552 | | EM3__20110101_125931_000.wav | | PIPPYG | 10 | 10 | 1.000000 | |
| 553 | | EM3__20110101_125916_000.wav | | PIPPYG | 5 | 5 | 1.000000 | |
| 554 | | EM3__20110101_072201_000.wav | | PIPPYG | 4 | 4 | 1.000000 | |
| 555 | | EM3__20110101_071422_000.wav | | PIPPYG | 3 | 3 | 1.000000 | |

Table 3: Song meter mini sound files – placed by window of the house overnight (northern section)

| | OUT FILE FS | OUT FILE ZC | AUTO ID | PULSES | MATCHING | MATCH RATIO | MANUAL ID |
|---|---|---|---|---|---|---|---|
| 1 | SMU00479_20200609_215435_000.wav | | NYCLEI | 24 | 24 | 1.000000 | |
| 2 | SMU00479_20200609_220508_000.wav | | NYCLEI | 17 | 17 | 1.000000 | |
| 3 | SMU00479_20200609_215303_000.wav | | NYCLEI | 16 | 16 | 1.000000 | |
| 4 | SMU00479_20200610_040256_000.wav | | NYCLEI | 16 | 16 | 1.000000 | |
| 5 | SMU00479_20200609_223418_000.wav | | NYCLEI | 14 | 14 | 1.000000 | |
| 6 | SMU00479_20200610_001230_000.wav | | NYCLEI | 13 | 13 | 1.000000 | |
| 7 | SMU00479_20200609_224055_000.wav | | NYCLEI | 12 | 12 | 1.000000 | |
| 8 | SMU00479_20200610_010509_000.wav | | NYCLEI | 7 | 7 | 1.000000 | |
| 9 | SMU00479_20200609_224224_000.wav | | NYCLEI | 5 | 5 | 1.000000 | |
| 10 | SMU00479_20200609_225548_000.wav | | NYCLEI | 5 | 5 | 1.000000 | |
| 11 | SMU00479_20200609_233802_000.wav | | NYCLEI | 5 | 5 | 1.000000 | |
| 12 | SMU00479_20200610_005549_000.wav | | NYCLEI | 5 | 5 | 1.000000 | |
| 13 | SMU00479_20200609_223939_000.wav | | NYCLEI | 4 | 4 | 1.000000 | |
| 14 | SMU00479_20200610_002439_000.wav | | NYCLEI | 4 | 4 | 1.000000 | |
| 15 | SMU00479_20200610_002319_000.wav | | NYCLEI | 4 | 4 | 1.000000 | |
| 16 | SMU00479_20200610_024228_000.wav | | NYCLEI | 4 | 4 | 1.000000 | |
| 17 | SMU00479_20200610_024437_000.wav | | NYCLEI | 4 | 4 | 1.000000 | |
| 18 | SMU00479_20200609_232405_000.wav | | NYCLEI | 3 | 3 | 1.000000 | |
| 19 | SMU00479_20200610_020500_000.wav | | NYCLEI | 3 | 3 | 1.000000 | |
| 20 | SMU00479_20200609_221820_000.wav | | NoID | 5 | 0 | 0.000000 | |
| 21 | SMU00479_20200610_003022_000.wav | | NoID | 4 | 0 | 0.000000 | |
| 22 | SMU00479_20200610_042235_000.wav | | NoID | 7 | 0 | 0.000000 | |
| 23 | SMU00479_20200609_213920_000.wav | | Noise | | | | |
| 47 | SMU00479_20200610_050034_000.wav | | Noise | | | | |
| 48 | SMU00479_20200610_045934_000.wav | | Noise | | | | |
| 49 | SMU00479_20200610_050002_000.wav | | Noise | | | | |
| 50 | SMU00479_20200609_223841_000.wav | | PIPNAT | 25 | 24 | 0.960000 | PIP |
| 51 | SMU00479_20200609_225053_000.wav | | PIPNAT | 18 | 17 | 0.944000 | PIP |
| 52 | SMU00479_20200610_042240_000.wav | | PIPNAT | 15 | 15 | 1.000000 | PIP |
| 53 | SMU00479_20200610_013804_000.wav | | PIPNAT | 12 | 9 | 0.750000 | PIP |
| 54 | SMU00479_20200609_221231_000.wav | | PIPNAT | 3 | 3 | 1.000000 | PIP |
| 55 | SMU00479_20200610_023451_000.wav | | PIPPIP | 37 | 36 | 0.973000 | |
| 56 | SMU00479_20200610_013730_000.wav | | PIPPIP | 23 | 23 | 1.000000 | |
| 57 | SMU00479_20200609_225211_000.wav | | PIPPIP | 25 | 23 | 0.920000 | |
| 58 | SMU00479_20200609_225223_000.wav | | PIPPIP | 20 | 20 | 1.000000 | |
| 59 | SMU00479_20200610_015553_000.wav | | PIPPIP | 17 | 16 | 0.941000 | |
| 60 | SMU00479_20200610_012034_000.wav | | PIPPIP | 15 | 15 | 1.000000 | |
| 61 | SMU00479_20200610_020341_000.wav | | PIPPIP | 15 | 15 | 1.000000 | |
| 62 | SMU00479_20200610_033829_000.wav | | PIPPIP | 13 | 13 | 1.000000 | |
| 63 | SMU00479_20200610_013951_000.wav | | PIPPIP | 14 | 13 | 0.929000 | |
| 64 | SMU00479_20200610_035313_000.wav | | PIPPIP | 12 | 12 | 1.000000 | |
| 65 | SMU00479_20200610_013015_000.wav | | PIPPIP | 11 | 11 | 1.000000 | |
| 66 | SMU00479_20200609_225218_000.wav | | PIPPIP | 12 | 11 | 0.917000 | |
| 67 | SMU00479_20200610_020138_000.wav | | PIPPIP | 10 | 10 | 1.000000 | |
| 68 | SMU00479_20200609_230329_000.wav | | PIPPIP | 9 | 9 | 1.000000 | |
| 69 | SMU00479_20200610_034029_000.wav | | PIPPIP | 8 | 8 | 1.000000 | |
| 70 | SMU00479_20200609_230234_000.wav | | PIPPIP | 7 | 7 | 1.000000 | |
| 71 | SMU00479_20200610_014520_000.wav | | PIPPIP | 7 | 7 | 1.000000 | |
| 72 | SMU00479_20200610_021758_000.wav | | PIPPIP | 8 | 6 | 0.750000 | |
| 73 | SMU00479_20200609_234728_000.wav | | PIPPYG | 29 | 27 | 0.931000 | |
| 74 | SMU00479_20200609_221619_000.wav | | PIPPYG | 18 | 17 | 0.944000 | PIPPYG |
| 75 | SMU00479_20200610_031830_000.wav | | PIPPYG | 18 | 16 | 0.889000 | PIPPYG |
| 76 | SMU00479_20200609_221424_000.wav | | PIPPYG | 11 | 11 | 1.000000 | PIP |
| 77 | SMU00479_20200610_021812_000.wav | | PIPPYG | 13 | 11 | 0.846000 | PIPPYG |
| 78 | SMU00479_20200609_225244_000.wav | | PIPPYG | 10 | 7 | 0.700000 | PIPPYG |
| 79 | SMU00479_20200609_231020_000.wav | | PIPPYG | 6 | 6 | 1.000000 | PIPPYG |

# Table 4: Sound files EM3 Handheld (northern section)

| | OUT FILE FS | OUT FILE ZC | AUTO ID | PULSES | MATCHING | MATCH RATIO | MANUAL ID |
|---|---|---|---|---|---|---|---|
| 1 | EM3__20110101_075917_000.wav | | NYCLEI | 16 | 9 | 0.563000 | |
| 2 | EM3__20110101_075816_000.wav | | NoID | 2 | 0 | 0.000000 | PIP |
| 3 | EM3__20110101_081203_000.wav | | NoID | 10 | 0 | 0.000000 | PIP |
| 4 | EM3__20110101_132301_000.wav | | NoID | 20 | 0 | 0.000000 | Noise |
| 5 | EM3__20110101_132331_000.wav | | NoID | 19 | 0 | 0.000000 | PIPPIP |
| 6 | EM3__20110101_132503_000.wav | | NoID | 2 | 0 | 0.000000 | Noise |
| 7 | EM3__20110101_132346_000.wav | | NoID | 5 | 0 | 0.000000 | Noise |
| 8 | EM3__20110101_132316_000.wav | | NoID | 11 | 0 | 0.000000 | PIP |
| 9 | EM3__20110101_132604_000.wav | | NoID | 30 | 0 | 0.000000 | Noise |
| 10 | EM3__20110101_132534_000.wav | | NoID | 34 | 0 | 0.000000 | Noise |
| 11 | EM3__20110101_132417_000.wav | | NoID | 4 | 0 | 0.000000 | PIP |
| 12 | EM3__20110101_132518_000.wav | | NoID | 3 | 0 | 0.000000 | PIP |
| 13 | EM3__20110101_132447_000.wav | | NoID | 8 | 0 | 0.000000 | PIP |
| 14 | EM3__20110101_133040_000.wav | | NoID | 2 | 0 | 0.000000 | Noise |
| 15 | EM3__20110101_132619_000.wav | | NoID | 17 | 0 | 0.000000 | PIP |
| 16 | EM3__20110101_132549_000.wav | | NoID | 18 | 0 | 0.000000 | PIP |
| 17 | EM3__20110101_065544_000.wav | | Noise | | | | Noise |
| 18 | EM3__20110101_065412_000.wav | | Noise | | | | Noise |
| 19 | EM3__20110101_070324_000.wav | | Noise | | | | Noise |
| 20 | EM3__20110101_065645_000.wav | | Noise | | | | Noise |
| 21 | EM3__20110101_065342_000.wav | | Noise | | | | Noise |
| 22 | EM3__20110101_065919_000.wav | | Noise | | | | Noise |
| 23 | EM3__20110101_065514_000.wav | | Noise | | | | Noise |
| 24 | EM3__20110101_065443_000.wav | | Noise | | | | Noise |
| 25 | EM3__20110101_065747_000.wav | | Noise | | | | Noise |
| 26 | EM3__20110101_065949_000.wav | | Noise | | | | |

| | OUT FILE FS | OUT FILE ZC | AUTO ID | PULSES | MATCHING | MATCH RATIO | MANUAL ID |
|---|---|---|---|---|---|---|---|
| 509 | EM3__20110101_135706_000.wav | | Noise | | | | |
| 510 | EM3__20110101_135430_000.wav | | Noise | | | | |
| 511 | EM3__20110101_135225_000.wav | | Noise | | | | |
| 512 | EM3__20110101_135153_000.wav | | Noise | | | | |
| 513 | EM3__20110101_134949_000.wav | | Noise | | | | |
| 514 | EM3__20110101_135122_000.wav | | Noise | | | | |
| 515 | EM3__20110101_135327_000.wav | | Noise | | | | |
| 516 | EM3__20110101_135051_000.wav | | Noise | | | | |
| 517 | EM3__20110101_135256_000.wav | | Noise | | | | |
| 518 | EM3__20110101_075730_000.wav | | PIPNAT | 2 | 2 | 1.000000 | PIP |
| 519 | EM3__20110101_075006_000.wav | | PIPPIP | 69 | 67 | 0.971000 | |
| 520 | EM3__20110101_080018_000.wav | | PIPPIP | 32 | 32 | 1.000000 | |
| 521 | EM3__20110101_075948_000.wav | | PIPPIP | 29 | 29 | 1.000000 | |
| 522 | EM3__20110101_081507_000.wav | | PIPPIP | 33 | 21 | 0.636000 | |
| 523 | EM3__20110101_074327_000.wav | | PIPPIP | 19 | 19 | 1.000000 | |
| 524 | EM3__20110101_075021_000.wav | | PIPPIP | 20 | 19 | 0.950000 | |
| 525 | EM3__20110101_074312_000.wav | | PIPPIP | 16 | 16 | 1.000000 | |
| 526 | EM3__20110101_075122_000.wav | | PIPPIP | 15 | 15 | 1.000000 | |
| 527 | EM3__20110101_081304_000.wav | | PIPPIP | 15 | 15 | 1.000000 | |
| 528 | EM3__20110101_081452_000.wav | | PIPPIP | 29 | 15 | 0.517000 | |
| 529 | EM3__20110101_075801_000.wav | | PIPPIP | 14 | 14 | 1.000000 | |
| 530 | EM3__20110101_081522_000.wav | | PIPPIP | 24 | 14 | 0.583000 | |
| 531 | EM3__20110101_075933_000.wav | | PIPPIP | 13 | 13 | 1.000000 | |
| 532 | EM3__20110101_130047_000.wav | | PIPPIP | 16 | 13 | 0.813000 | |
| 533 | EM3__20110101_081249_000.wav | | PIPPIP | 13 | 12 | 0.923000 | |
| 534 | EM3__20110101_081553_000.wav | | PIPPIP | 14 | 11 | 0.786000 | |
| 535 | EM3__20110101_132245_000.wav | | PIPPIP | 27 | 10 | 0.370000 | |
| 536 | EM3__20110101_075831_000.wav | | PIPPIP | 9 | 9 | 1.000000 | |
| 537 | EM3__20110101_080003_000.wav | | PIPPIP | 7 | 7 | 1.000000 | |
| 538 | EM3__20110101_080034_000.wav | | PIPPIP | 6 | 6 | 1.000000 | |
| 539 | EM3__20110101_080049_000.wav | | PIPPIP | 5 | 5 | 1.000000 | |
| 540 | EM3__20110101_081233_000.wav | | PIPPIP | 5 | 5 | 1.000000 | |
| 541 | EM3__20110101_075224_000.wav | | PIPPIP | 4 | 4 | 1.000000 | |
| 542 | EM3__20110101_074515_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 543 | EM3__20110101_075239_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 544 | EM3__20110101_075902_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 545 | EM3__20110101_075714_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 546 | EM3__20110101_132230_000.wav | | PIPPIP | 2 | 2 | 1.000000 | |
| 547 | EM3__20110101_125946_000.wav | | PIPPYG | 27 | 27 | 1.000000 | PIPPIP |
| 548 | EM3__20110101_125901_000.wav | | PIPPYG | 25 | 23 | 0.920000 | PIPPIP |
| 549 | EM3__20110101_130539_000.wav | | PIPPYG | 22 | 22 | 1.000000 | |
| 550 | EM3__20110101_081148_000.wav | | PIPPYG | 15 | 14 | 0.933000 | |
| 551 | EM3__20110101_125845_000.wav | | PIPPYG | 11 | 11 | 1.000000 | |
| 552 | EM3__20110101_125931_000.wav | | PIPPYG | 10 | 10 | 1.000000 | |
| 553 | EM3__20110101_125916_000.wav | | PIPPYG | 5 | 5 | 1.000000 | |
| 554 | EM3__20110101_072201_000.wav | | PIPPYG | 4 | 4 | 1.000000 | |
| 555 | EM3__20110101_071422_000.wav | | PIPPYG | 3 | 3 | 1.000000 | |

Table 5: EM3 Handheld monitor for southern site June 2020

| DATE | TIME | AUTO ID | PULSES | MANUAL ID |
|------|------|---------|--------|-----------|
| 09/06/2020 | 21:52:16 | NYLE | 9 | NYLE |
| 09/06/2020 | 21:52:36 | NYLE | 4 | NYLE |
| 09/06/2020 | 21:55:00 | NYLE | 4 | NYLE |
| 09/06/2020 | 22:08:43 | PIPY | 23 | PIPY |
| 09/06/2020 | 22:09:04 | PIPY | 6 | PIPY |
| 09/06/2020 | 22:09:24 | PIPY | 69 | PIPY |
| 09/06/2020 | 22:10:44 | PIPI | 25 | PIPI |
| 09/06/2020 | 22:13:04 | PIPI | 28 | PIPI |
| 09/06/2020 | 22:13:25 | PIPI | 10 | PIPI |
| 09/06/2020 | 22:13:45 | PIPI | 77 | PIPI |
| 09/06/2020 | 22:14:05 | PIPI | 119 | PIPI |
| 09/06/2020 | 22:14:25 | PIPI | 271 | PIPI |
| 09/06/2020 | 22:14:45 | PIPI | 150 | PIPI |
| 09/06/2020 | 22:15:05 | PIPI | 75 | PIPI |
| 09/06/2020 | 22:15:45 | PIPI | 22 | PIPI |
| 09/06/2020 | 22:17:26 | NYLE | 5 | NYLE |
| 09/06/2020 | 22:17:46 | NYLE | 5 | NYLE |
| 09/06/2020 | 22:21:26 | PIPI | 47 | PIPI |
| 09/06/2020 | 22:21:47 | PIPI | 17 | PIPI |
| 09/06/2020 | 22:22:07 | PIPI | 34 | |
| 09/06/2020 | 22:23:07 | PIPI | 14 | |
| 09/06/2020 | 22:23:27 | PIPI | 14 | |
| 09/06/2020 | 22:25:28 | NYLE | 6 | |
| 09/06/2020 | 22:29:49 | PIPI | 28 | |
| 09/06/2020 | 22:31:10 | PIPI | 26 | |
| 09/06/2020 | 22:34:51 | PIPI | 13 | |
| 09/06/2020 | 22:35:10 | PIPI | 46 | |
| 09/06/2020 | 22:35:31 | PIPI | 66 | |
| 09/06/2020 | 22:35:51 | PIPI | 7 | |
| 09/06/2020 | 22:38:31 | PIPI | 35 | |
| 09/06/2020 | 22:38:52 | PIPI | 58 | |
| 09/06/2020 | 22:39:12 | PIPI | 17 | |
| 09/06/2020 | 22:40:12 | NYLE | 14 | |
| 09/06/2020 | 22:40:32 | NYLE | 2 | |
| 09/06/2020 | 22:41:12 | PIPI | 26 | |
| 09/06/2020 | 22:41:32 | PIPY | 8 | |
| 09/06/2020 | 22:41:52 | PIPY | 120 | |
| 09/06/2020 | 22:42:12 | PIPI | 186 | |
| 09/06/2020 | 22:42:32 | PIPY | 26 | |
| 09/06/2020 | 22:45:31 | PIPI | 17 | |
| 09/06/2020 | 22:46:11 | PIPI | 2 | |
| 09/06/2020 | 22:50:33 | PIPI | 7 | |

| DATE | TIME | AUTO ID | PULSES | |
|---|---|---|---|---|
| 09/06/2020 | 22:50:53 | PIPI | 84 | |
| 09/06/2020 | 22:51:13 | PIPI | 105 | |
| 09/06/2020 | 22:51:34 | PIPI | 78 | |
| 09/06/2020 | 22:51:54 | PIPI | 62 | |
| 09/06/2020 | 22:52:14 | PIPI | 27 | |
| 09/06/2020 | 22:52:54 | PIPI | 5 | |
| 09/06/2020 | 23:10:01 | PIPI | 6 | |
| 09/06/2020 | 23:10:21 | PIPI | 56 | |
| 10/06/2020 | 04:08:26 | PIPI | 2 | |
| 10/06/2020 | 04:29:55 | PIPY | 14 | PIPY |
| 10/06/2020 | 04:45:41 | NYLE | 3 | NYLE |

Table 6: SM2 Stone ruins in southern site

| DATE | TIME | AUTO ID | PULSES | MANUAL ID |
|---|---|---|---|---|
| 09/06/2020 | 21:56:13 | NYLE | 3 | NYLE |
| 09/06/2020 | 21:56:21 | PIPY | 7 | NYLE |
| 09/06/2020 | 21:56:21 | NYLE | 6 | NYLE |
| 09/06/2020 | 21:56:46 | NYLE | 3 | NYLE |
| 09/06/2020 | 22:00:02 | NYLE | 4 | NYLE |
| 09/06/2020 | 22:00:23 | NYLE | 4 | NYLE |
| 09/06/2020 | 22:10:44 | PIPI | 6 | PIPI |
| 09/06/2020 | 22:17:25 | NYLE | 3 | NYLE |
| 09/06/2020 | 22:22:56 | PIPI | 3 | PIPI |
| 09/06/2020 | 22:25:27 | NYLE | 3 | NYLE |
| 09/06/2020 | 22:34:48 | NoID | 1 | Brown long-eared bat |
| 09/06/2020 | 22:45:40 | PLAUR | 2 | Brown long-eared bat |
| 09/06/2020 | 22:56:13 | NYLE | 2 | NYLE |
| 09/06/2020 | 23:56:33 | PIPI | 10 | PIPI |
| 10/06/2020 | 01:54:44 | PIPI | 5 | PIPI |
| 10/06/2020 | 02:15:34 | PIPI | 7 | PIPI |
| 10/06/2020 | 02:47:03 | NYLE | 2 | NYLE |
| 10/06/2020 | 04:19:12 | PIPI | 3 | PIPI |
| 10/06/2020 | 04:24:52 | NYLE | 6 | NYLE |
| 10/06/2020 | 04:45:52 | NYLE | 7 | NYLE |
| 10/06/2020 | 04:45:54 | NYLE | 3 | NYLE |

Table 8: Bat data recorded om EM3 on 9th May 2019 (all outside of the site)
There was no data from the SM2 positioned within the site

| DATE | TIME | AUTO ID | MANUAL ID |
|---|---|---|---|
| 09/05/2019 | 21:42:50 | NYLE | NYLE |
| 09/05/2019 | 22:58:52 | PIPI | PIPI PIPY |
| 09/05/2019 | 22:59:22 | PIPY | PIPY |
| 09/05/2019 | 22:59:52 | PIPY | PIPY |
| 09/05/2019 | 23:00:22 | PIPY | PIPY |
| 09/05/2019 | 23:00:55 | PIPY | PIPY |
| 09/05/2019 | 23:01:25 | PIPI | PIPI PIPY |
| 09/05/2019 | 23:04:27 | PIPI | PIPI PIPY |
| 09/05/2019 | 23:04:57 | PIPY | PIPI PIPY |
| 09/05/2019 | 23:05:57 | PIPY | PIPY |
| 09/05/2019 | 23:06:27 | PIPI | PIPI |
| 09/05/2019 | 23:06:57 | PIPI | PIPI |
| 09/05/2019 | 23:07:27 | PIPI | PIPI |

Table 9: Bat data recorded on SM2 within site prior to sunrise on 23rd May 2019

| DATE | TIME | AUTO ID | MANUAL ID |
|---|---|---|---|
| 23/05/2019 | 04:35:01 | NoID | PIPI |
| 23/05/2019 | 05:01:31 | NYLE | NYLE |

Table 10: Bat data recorded on EM3 around and within site prior to sunrise on 23rd May 2019

| DATE | TIME | AUTO ID | MANUAL ID |
|------|------|---------|-----------|
| 23/05/2019 | 03:54:49 | PIPI | PIPI |
| 23/05/2019 | 03:55:49 | PIPY | PIPY |
| 23/05/2019 | 03:56:50 | PIPY | PIPY |
| 23/05/2019 | 03:57:20 | PIPY | PIPY |
| 23/05/2019 | 03:58:50 | PIPI | PIPI |
| 23/05/2019 | 04:01:21 | PIPY | PIPI PIPY |
| 23/05/2019 | 04:04:52 | PIPI | PIPI |
| 23/05/2019 | 04:05:22 | PIPY | PIPY NYLE |
| 23/05/2019 | 04:05:52 | PIPY | PIPY |
| 23/05/2019 | 04:06:22 | PIPI | PIPI PIPY |
| 23/05/2019 | 04:06:53 | PIPI | PIPI |
| 23/05/2019 | 04:08:53 | PIPI | PIPI |
| 23/05/2019 | 04:09:23 | PIPY | PIPY |
| 23/05/2019 | 04:09:53 | PIPY | PIPI PIPY |
| 23/05/2019 | 04:49:22 | PIPY | PIPY |
| 23/05/2019 | 04:53:23 | PIPY | PIPY |
| 23/05/2019 | 04:59:25 | NYLE | NYLE |

**Buildings in the southern section of the site**

The Mini detector was placed at the house on the right for emergence and return. The SM2 was placed at the Stone Ruin (bottom left) from these periods. No droppings or staining or evidence of bats were visible on or in the buildings that were accessible (the house was mainly

A Bat Assessment of The Proposed Housing Development, Northern Section of
Kilmashogue, County Dublin and an Evaluation for
Potential Impacts on the Bat Fauna 2020



Placement of Songmeter Mini on the windowsill at the house

Buzzards are nesting in this tree at the northern corner of the site



Damage to fascia board would allow bat access

Temperature of the house fascia was 11.5 C

Open windows upstairs allow bat access
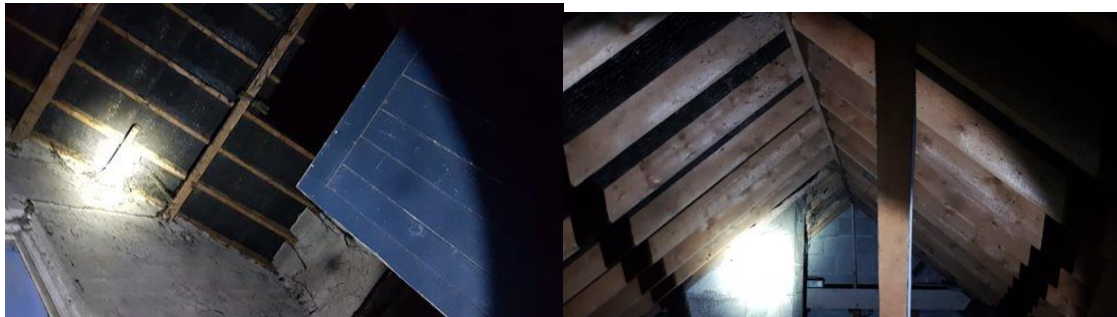


No droppings in attics of house. All attics had cobwebs, so nothing had been flying within them.



There were no signs of bats within the outbuildings

Weather conditions -11 degrees Celsius 90%cloud dry calm

Lux level - 0 lux at 23.04

Sunrise sunset – 4.58 21.52

A Leisler's bat was seen commuting on the track near the house at 22.05.A common pipistrelle fed around the outbuildings at 22.10. It fed here on occasion for the next 30 minutes. The Leisler's bat flew over the house at 21.54
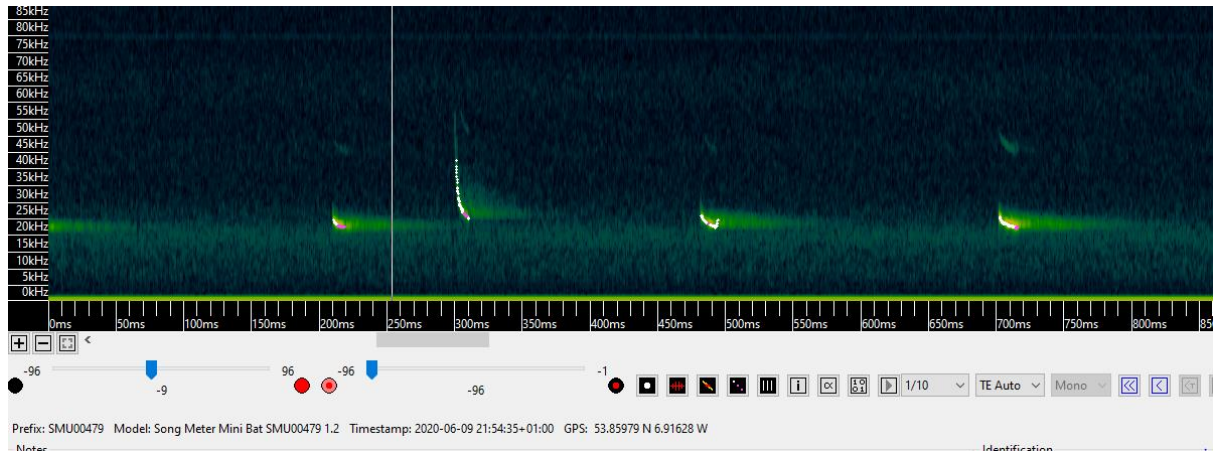


Leisler's bat at 21.54

There was light rain and a common pipistrelle fed under the shelter of the conifers at the entrance to the site at 22.39.

A common pipistrelle was recorded northeast of the house at 22.45. It fed along this hedgerow for 15 minutes. A Leisler's bat flew over the field at the back of the house. A soprano pipistrelle passed the house at 22.52
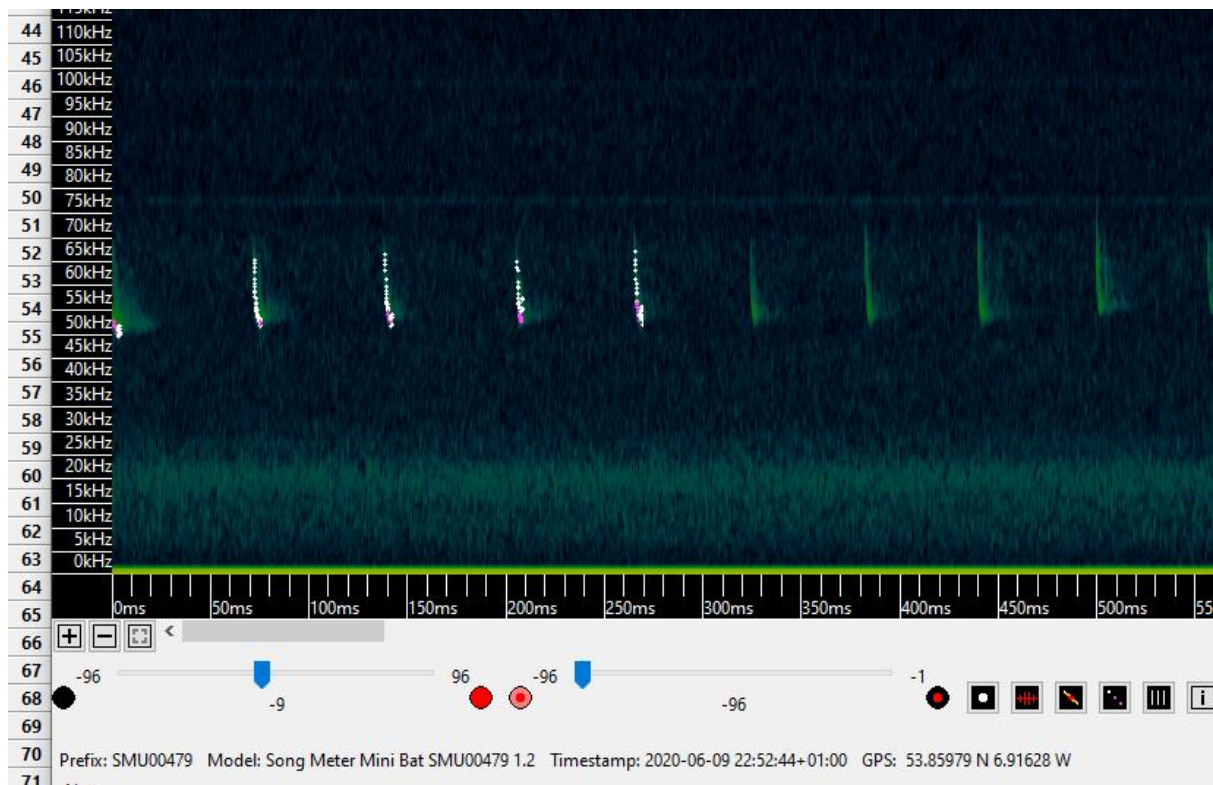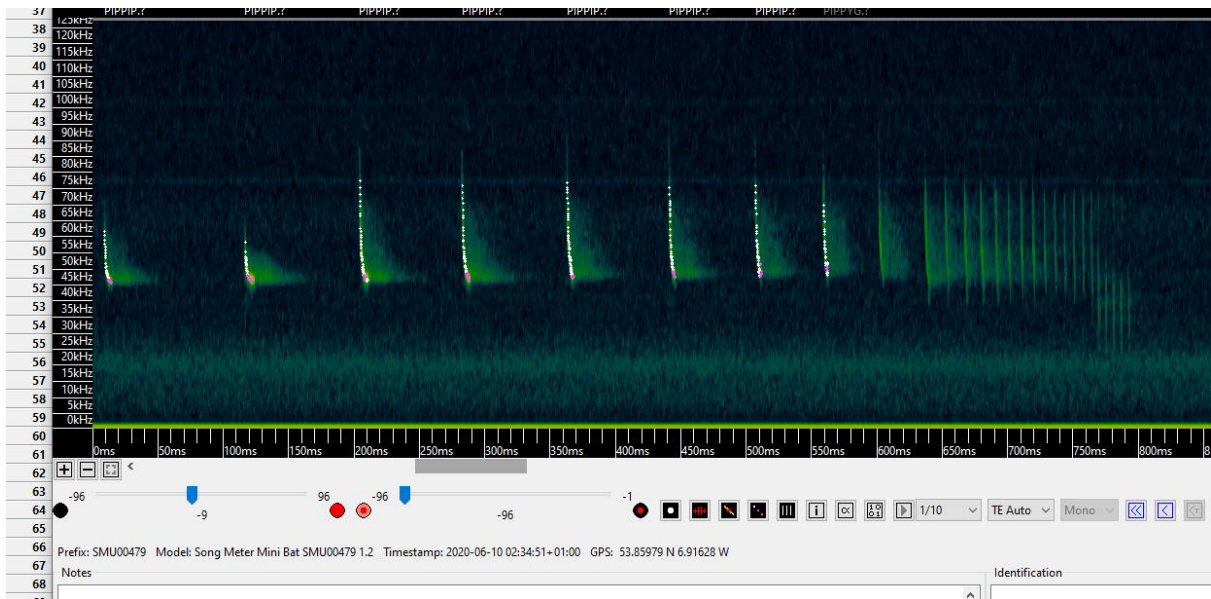
Soprano pipistrelle 22.52
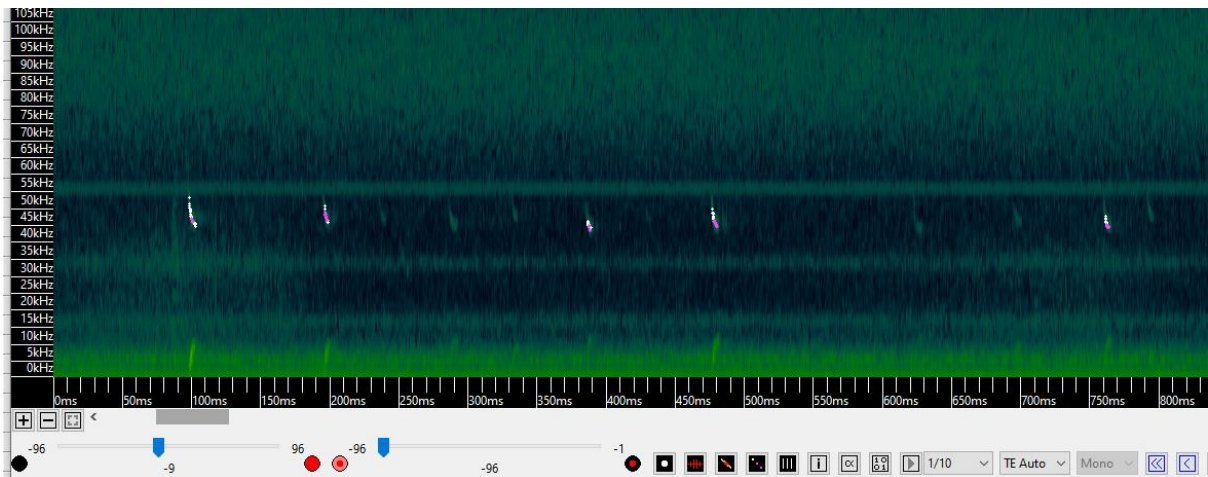


Common pipistrelle near house

The common pipistrelle continued to feed around the house and outbuildings, along the hedgerow until 23.09. A common pipistrelle was noted at the river at the site entrance at 23.11

A common pipistrelle fed over the house at 2.54.



Feeding buzz of common pipistrelle at 2.54

A soprano pipistrelle was seen at the site entrance at 3.56. A second soprano pipistrelle was seen commuting along the back hedgerow, off the site.

A common pipistrelle was seen feeding along the lane leading to the house at 4.19. It fed here for ten minutes before moving west, off site, high over the trees.