# AQUIND Limited

# AQUIND INTERCONNECTOR

## Environmental Statement – Volume 3 – Appendix 16.8 Bat Survey Report

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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# EXECUTIVE SUMMARY

This report has been prepared on behalf of AQUIND Limited (the 'Applicant') to support an application (the 'Application') for a Development Consent Order ('DCO'). AQUIND Interconnector is a proposed electricity Interconnector between France and the UK. The Application for the DCO is made in respect of the UK elements of AQUIND Interconnector (referred to as the 'Proposed Development').

WSP was commissioned by AQUIND Ltd. to undertake bat surveys.

A phase 1 habitat survey conducted in 2017 highlighted the requirement for bat surveys around the Converter Station Area, due to the diversity of habitats with the potential to support roosting, foraging and commuting bats. A range of surveys comprising tree roosting assessments, activity transects and automated static detector monitoring were undertaken to establish a baseline and inform impact assessment.

Surveys were undertaken by competent WSP surveyors between 2017 and 2019, ensuring all methodology and data collection were in line with good practice guidelines (Collins, 2016).

No tree roosts were found although evidence of soprano pipistrelle *Pipistrellus pygmaeus* (droppings) was identified in a tree mounted box at approximately 90m to the north-west of the existing National Grid substation at Lovedean. The transitional occupancy of bat roosts in trees was acknowledged and a precautionary approach regarding mitigation has been taken to ensure a maximum effort to avoid disturbance.

Bat activity was dominated by common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle using the areas of mature woodland and hedgerows surrounding the existing substation and within the hedgerows to the west, running southwards from Hillcrest, Old Mill Lane.

Direct impacts on the roosting, commuting and foraging behaviour of bats are expected as a result of the boundary habitat, required to facilitate the construction of the converter station.

Indirect impacts are expected to arise from changes to lighting, noise and vibration. To ensure minimal impacts on foraging / commuting behaviour, alongside a bat-sensitive lighting scheme a wildlife buffer should be created around the boundary of Order Limits through hedgerow planting.

A wildlife buffer, in conjunction with the installation of bat boxes on suitably mature trees would create further roosting, foraging and commuting opportunities for bats locally.

# APPENDIX 16.8 BAT SURVEY REPORT

## 1.1. INTRODUCTION

### 1.1.1. PROPOSED DEVELOPMENT BACKGROUND

1.1.1.1. This report has been prepared on behalf of AQUIND Limited (the 'Applicant') to support an application (the 'Application') for a Development Consent Order ('DCO'). AQUIND Interconnector is a proposed electricity Interconnector between France and the UK. The Application for the DCO is made in respect of the UK elements of AQUIND Interconnector (referred to as the 'Proposed Development').

1.1.1.2. The Proposed Development is described in detail in Chapter 3 (Description of the Proposed Development) of the Environmental Statement Volume 1 (document reference 6.1.3).

### 1.1.2. ECOLOGICAL BACKGROUND

1.1.2.1. A Phase 1 habitat survey and subsequent Preliminary Ecological Appraisal ('PEA') of the Proposed Development was commissioned by the Applicant in August 2017 and updated in June 2019, Appendix 16.2 (PEA/ Phase 1 Habitat Survey Report) of the ES Volume 3 (document reference 6.3.16.2). The PEA identified ecological constraints associated with the Proposed Development, including possible effects on bats, and further surveys were recommended.

### 1.1.3. BRIEF AND OBJECTIVES

1.1.3.1. AQUIND commissioned WSP to undertake bat surveys relating to the Proposed Development.

1.1.3.2. Surveys were designed to assess potential bat roosting sites, species composition, relative abundance and key areas of bat foraging and commuting activity within the Converter Station Area; the Survey Area.

1.1.3.3. The immediate Survey Area is defined by the Site Boundary provided in Figure 1, although the desk based assessment (Section 3.1) extended up to 10 km (Collins, 2016).This report presents the baseline survey results recorded during bat surveys between 2017 and 2019. The results of the surveys and subsequent recommendations are included within this report. The information will be used to assess the impacts of the Proposed Development and inform the Environmental Impact Assessment ('EIA').

# 2. LEGAL AND PLANNING POLICY CONTEXT

## 2.1. LEGISLATION

### 2.1.1. HABITAT REGULATIONS

2.1.1.1. Bats and their roosts are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitat Regulations'), the legislation means that it is an offence to:

- deliberately capture, injure or kill a wild bat;
- deliberately disturb wild bats; 'disturbance of animals includes in particular any disturbance which is likely:
  - to impair their ability —
    - to survive, to breed or reproduce, or to rear or nurture their young; or
    - in the case of animals of a hibernating or migratory species, to hibernate or migrate;
  - to affect significantly the local distribution or abundance of the species to which they belong'; and
  - damage or destroy a breeding site or resting place used by this species.

2.1.1.2. Due to the high level of protection afforded to bats and their habitat, mitigation for this species is governed by a strict licensing procedure administered by Natural England (normally, planning permission must be obtained before a licence can be sought). Licencing is subject to three tests, as defined under the Habitats Regulations 2017, these must also be applied by the planning authority before granting permission for activities affecting bats. For permission to be granted the following criteria must be satisfied:

- The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- 'There is no satisfactory alternative'; and
- The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

### 2.1.2. WILDLIFE AND COUNTRYSIDE ACT

2.1.2.1. Protection is also afforded under the Wildlife and Countryside Act ('WCA') 1981 (as amended) with respect to disturbance of animals when using places of shelter, and obstruction of access to places of shelter.

2.1.2.2. Due to the high level of protection afforded to bats and their habitat, mitigation for this species is governed by a strict licensing procedure administered by Natural England (normally, planning permission must be obtained before a licence can be sought). Licencing is subject to three tests, as defined under the Habitats Regulations 2017, these must also be applied by the planning authority before granting permission for activities affecting bats. For permission to be granted the following criteria must be satisfied:

- The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- 'There is no satisfactory alternative'; and
- The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

### 2.1.3. NATURAL ENVIRONMENT AND RURAL COMMUNITIES ACT

2.1.3.1. Certain species of bats including Bechstein's bat *Myotis bechstein*, barbastelle *Barbastella barbastellus*, common pipistrelle *Pipistrellus pipistrelles*, soprano pipistrelle *Pipistrellus pygmaeus,* noctule *Nyctalus noctula*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros* are also listed as Species of Principal Importance ('SPI') for the Conservation of Biodiversity in England under Section 41 of the Natural Environment and Rural Communities ('NERC') Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

### 2.1.4. PLANNING POLICY

#### National

#### National Planning Policy Framework

2.1.4.1. At a national context, planning policy is driven by the National Planning Policy Framework ('NPPF') (2019). The NPPF sets out, amongst other points, how at an overview level the

> *"planning system should contribute to and enhance the national and local environment by:*

- *…recognising the wider benefits of ecosystem services;*
- *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures…*"

2.1.4.2. The NPPF states that this should be achieved through local planning development frameworks and gives recommendations for criteria based policies which recognise the hierarchy of designated sites which range from internationally important habitat, to Survey Areas of importance at a local level and ensure that protection is

> *"commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks."*

2.1.4.3. A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF which includes the following:

- "*if significant harm resulting from a development cannot be avoided…adequately mitigated, or, as last resort, compensated for, then planning permission should be refused;*
- *…opportunities to incorporate biodiversity in and around developments should be encouraged; and*
- *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland…unless the need for, and benefits of, the development in that location clearly outweigh the loss…"*

### National Policy Statement for Overarching Energy (EN-1)

2.1.4.4. National Policy Statements ('NPS's') comprise the government's objectives for the development of nationally significant infrastructure in a particular sector. EN-1 representing energy infrastructure includes the following statements regarding protected species (paragraphs 5.3.16 and 5.3.17):

- "*Many individual wildlife species receive statutory protection under a range of legislative provisions'*
- *'Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and thereby requiring conservation action. The IPC[1] should ensure that these species and habitats are*

[1] The NPS were compiled in 2011. The Infrastructure Planning Commission was abolished the Governments Localism Act 2011 which transferred its decision-making powers in all cases to the relevant Secretary of State.

*protected from the adverse effects of development by using requirements or planning obligations. The IPC should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context the IPC should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development*."

2.1.4.5. With regards to mitigation EN-1 details in paragraph 5.3.18 that the applicant should include appropriate mitigation measures as an integral part of the Proposed Development. In particular, the applicant should demonstrate that:

- "*during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;*
- *during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements;*
- *habitats will, where practicable, be restored after construction works have finished; and*
- *opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals."*

**Local**

2.1.4.6. The Hampshire Biodiversity Action Plan[2] has identified 493 priority species that require conservation action through positive habitat management. Five bat species comprising; barbastelle, serotine *Eptesicus serotinus*, Bechstein's bat, common pipistrelle and greater horseshoe bat are included within this list.

[2] http://www.hampshirebiodiversity.org.uk/hampshire%20BAP.html

# 3. METHODS

## 3.1. DESK STUDY

3.1.1.1. A desk study was undertaken in 2018 to review existing ecological baseline information available in the public domain and to obtain information held by relevant third parties. The full ecological desk study carried out for the Proposed Development is presented in Appendix 16.2 (PEA/ Phase 1 Habitat Survey Report).

3.1.1.2. For the purpose of the desk study, records were collated for the Survey Area to distances appropriate to the zone of influence associated with the proposed converter station works. The desk study included:

- Information on international nature conservation designations within 10 km of the Order Limits and statutory designated sites relevant to bats within 10 km of the Site available on online databases including MAGIC and the JNCC;
- Records of bat species within 2 km of the Proposed Development provided by Hampshire Biodiversity Information Centre ('HBIC'); and
- Active European Protected Species Bat Mitigation Licences within 2 km of the Survey Area.

## 3.2. GUIDANCE

3.2.1.1. Bat survey methodology for all survey techniques was in line with Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).

## 3.3. TREE ROOSTING BATS

### 3.3.1. GROUND LEVEL TREE ASSESSMENT

3.3.1.1. A visual inspection of the trees from ground level using binoculars and a high-powered torch was undertaken to search for features which provide potential roosting opportunities for bats such as: woodpecker holes, rot holes, splits and cracks, dead limbs and / or flaking bark. Where suitable features were identified, their location and a brief description were recorded. Additionally, each feature was visually inspected for evidence indicating use by roosting bats such as droppings, urine staining, and scratch marks / characteristic staining (from fur oils).

3.3.1.2. Due to changes in the Order Limits since 2017, the assessment included six trees beyond the boundary provided in Figure 1 (Tree reference 7-10, 25 and 26).

3.3.1.3. Locations of the trees were recorded and photographs were taken. The location and reference of each tree is shown in Figure 1.

3.3.1.4. Surveys were undertaken on 21 September 2017, 19 October 2017 and 31 May 2018. Additionally, all trees identified as of moderate or high potential were re-surveyed on the 11 June 2019 prior to aerial inspection.

3.3.1.5. Trees were categorised in line with the descriptions in Table 1. Trees categorised as having negligible potential to support roosting bats were not recorded during the survey due to time constraints.

3.3.1.6. Based on the features present and the location of the trees, the potential for different types of bat roost to be present was also considered. For the purposes of this Preliminary Roost Assessment ('PRA'), potential roost types were grouped as follows:

- Maternity (breeding roost);
- Summer / transitional (to include transitional, satellite, night and day roosts); and
- Hibernation.

3.3.1.7. Additional information with respect to the trees was collected, including: species, approximate height (m) and age.

**Table 1 - Roost Potential Categorisation**

| Bat Roosting Suitability | Description of Roosting Behaviour |
|---|---|
| **High** | A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. |
| **Moderate** | A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed). |
| **Low** | A tree of sufficient size and age to contain potential roosting features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential. |
| **Negligible** | Negligible habitat features on site likely to be used by roosting bats. |

### 3.3.2. EMERGENCE/RE-ENTRY SURVEYS

3.3.2.1. Due to the visibility of Potential Roost Features (PRF) within specific trees it was considered that further emergence and re-entry surveys would be the most efficient survey technique to ascertain the presence or likely absence or roosting bats in trees 19, 20 and 21. Subsequently surveys were undertaken and are detailed in Table 2.

**Table 2 - Trees Surveyed**

| Tree Code | Roost Potential Category | Survey Dates | Survey Times |
|---|---|---|---|
| **Tree 19** | Moderate | 21/06/18 – dusk | 21:06 – 22:51 |
| **Tree 20** | High | 07/06/18 - dusk<br>21/06/18 - dawn<br>09/08/18 - dusk | 20:59 – 22:44<br>03:07 – 05:05<br>20:20 – 22:05 |
| **Tree 21** | High | 08/06/18 - dawn<br>26/07/18 – dusk<br>08/08/18 – dusk | 03:21 – 05:06<br>20:44 – 22:29<br>20:21 – 22:06 |

3.3.2.2. Ecologists were stationed at two locations around each tree. The emergence (dusk) surveys began 15 minutes before sunset and ended 90 minutes after sunset. The return to roost (dawn) surveys began 90 minutes before sunrise and ended 15 minutes after sunrise. Weather conditions including cloud cover, wind, precipitation and air temperature at were recorded by the lead surveyor at the start and end of the survey. The suitability of weather conditions for the bat survey were then categorised in Table 3 (adapted from met office data on the Beaufort scale). Any limitations that could affect bat behaviour were recorded. The location of each surveyor was recorded and a photograph was taken or a sketch drawn of their survey view.

**Table 3 - Guidance of Weather Conditions**

| Conditions | Temperature (°C) | Precipitation | Beaufort Windforce Scale |
|---|---|---|---|
| **Optimal** | >10 | Dry | 0 to 3 (calm to slight wind) |
| **Suitable** | 10 | Dry | 3-4 (slight to moderate winds) |
| **Suitable** | 10 | Dry to light showers/drizzle | 3-4 (slight to moderate winds) |
| **Sub-optimal** | <10 | Moderate rainfall | 5 to 7 (fresh to strong winds) |
| **Unsuitable** | <10 | Heavy rainfall | >7 (near gale) |

3.3.2.3. During the emergence surveys, access points/PRFs were watched continuously by the ecologists, whilst during the re-entry surveys any bats were tracked to see if they returned back to any points/PRFs within the view of ecologists.

3.3.2.4. Bat activity, including species, number of passes, and presence of any emergences or returns to roost, direction of flight paths, habitat and number of bats was recorded by each ecologist using an Elekon Batlogger M, EM3 or Batbox Duet. An MP3 player with line in cable attached to the Duet or the internal recording function on the Batlogger was used to record all bat passes.

3.3.2.5. A pass is defined as an unbroken stream of echolocation calls up to ten seconds long, heard as a series of 'clicks, slaps, ticks or warbles' on a bat detector as the bat passes in and out of the detectors range.

**Table 4 - Summary of Weather, Dates and Times for Tree Emergence / Re-entry Surveys**

| Survey location | Visit number | Weather | Overall weather conditions | Start/End Temperature (°C) | Dusk or Dawn | Start/ Finish Time | Date |
|---|---|---|---|---|---|---|---|
| **Tree 20** | 1 | Cloudy, dry with no wind | Optimal | 19/18 | Dusk | 20:59 – 22:44 | 07/06/18 |
| **Tree 21** | 1 | Cloudy, dry with no wind | Optimal | 18/19 | Dawn | 03:21 – 05:06 | 08/06/18 |
| **Tree 20** | 2 | Patchy cloud, dry with light wind | Optimal | 15/10 | Dawn | 03:07 – 05:05 | 21/06/18 |
| **Tree 19** | 1 | Patchy cloud, dry with light wind | Optimal | 14/14 | Dusk | 21:05 – 22:50 | 21/06/18 |
| **Tree 21** | 2 | Patchy cloud, dry, with light wind | Optimal | 24/23 | Dusk | 20:40 – 22:29 | 26/07/18 |

| Survey location | Visit number | Weather | Overall weather conditions | Start/End Temperature (°C) | Dusk or Dawn | Start/ Finish Time | Date |
|---|---|---|---|---|---|---|---|
| **Tree 21** | 3 | High cloud cover, dry with light wind | Optimal | 20/18 | Dusk | 20:21 – 22:06 | 08/08/18 |
| **Tree 20** | 3 | Moderate cloud cover, dry with no wind | Optimal | 18/16 | Dusk | 20:20 – 22:05 | 09/08/18 |

### 3.3.3. DATA ANALYSIS

3.3.3.1. The surveyors watched for bats emerging from or re-entering the tree and used either an EM3 or Batlogger M bat detector to listen for the presence of bats. All bats seen or heard were recorded, noting the species, behaviour and time. Subsequent sound analysis of the recordings was undertaken using Kaleidoscope version 4.3.2 and Analook W to confirm the identification of species, and identify species which were not determined during the field survey.

### 3.3.4. TREE MOUNTED BAT BOXES

Bat boxes identified on Trees 1, 2 and 3 were inspected on the 24 May 2018 and again on the 12 June 2019.

### 3.3.5. AERIAL TREE INSPECTION

3.3.5.1. All trees identified as holding moderate or high potential to support tree roosting bats were subject to an aerial inspection, undertaken on 11 June 2019. The survey involved two minimum level 2 bat licensed ecologists, qualified in tree climbing and aerial rescue to inspect preliminary roosting features. Features were reached using rope and harness and inspected using an endoscope or handheld torch.

## 3.4. BAT ACTIVITY SURVEYS

### 3.4.1. TRANSECT SURVEYS

3.4.1.1. A dusk bat transect survey was undertaken monthly within the Survey Area from April to October 2017. No dawn surveys could be conducted, for details please refer to the limitations set out in Section 3.4. The transect incorporated 14, five-minute Point Count locations (Figure 1).

3.4.1.2. Each month a pre-defined transect was walked by two surveyors to record levels of bat activity across the Survey Area. The transect began within 15 minutes prior to sunset and continued up to three hours afterwards. Surveys were undertaken in suitable weather conditions with temperatures at the start of the survey of 10° or warmer.

3.4.1.3. During each transect, the surveyors noted the bat species recorded by sound or sight, including the time, location, and, where possible, behaviour type and direction of flight. At each Point Count the number of bat passes (and where possible the species and number of bats) were recorded, a summary of between Point Count activity was detailed on a map, including species. Data was analysed from the Point Count locations only to ensure the provision of comparable quantitative data. Surveyors were equipped with bat detectors; Elekon batlogger bat recorders with Wildlife Acoustics EM3 bat recorders as a back up to listen and record bat activity. Calls registered by the bat detectors were recorded for later analysis using specialist computer software (detailed in Section 3.3.8).

3.4.1.4. A plan showing the transect routes walked during the survey is provided in Figure 1 Dates, times and weather conditions of each of the transect survey visits are provided in Table 5 below.

3.4.1.5. In the field, a 'bat pass' was defined as a single Batlogger file where only one species was recorded. Where more than one bat / species was identified within a Batlogger file, then the number of bat passes would equal the number of bats / species recorded within the file.

**Table 5 - Dates and Weather Conditions of the 2017 Bat Activity Surveys**

| Date | Sunset | Survey start time | Survey end time | Weather |
|---|---|---|---|---|
| **26.04.2017** | 20:17 | n/a | n/a | Survey aborted due to heavy rainfall |
| **22.05.2017** | 20:56 | 20:40 | 23:41 | Temperature: 17$^0$C, Cloud cover: 2 oktas, Wind: 0 beaufort Rainfall: none |
| **22.06.2017** | 21:21 | 21:10 | 23:30 | Temperature: 17.5$^0$C, Cloud cover: 7 oktas, Wind: 2 beaufort Rainfall: none |
| **25.07.2017** | 20:59 | 20:45 | 23:40 | Temperature: 20$^0$C, Cloud cover: 1 oktas, Wind: 0 beaufort Rainfall: none |

| Date | Sunset | Survey start time | Survey end time | Weather |
|---|---|---|---|---|
| **08.08.2017** | 20:37 | 20:23 | 22:48 | Temperature: 15$^0$C, Cloud cover: 8 oktas, Wind: 2 beaufort Rainfall: none |
| **26.09.2017** | 18:53 | 18:40 | 21:03 | Temperature: 18$^0$C, Cloud cover: 8 oktas, Wind: 1 beaufort Rainfall: none |
| **19.10.2017** | 18:03 | 18:06 | 19:32 | Survey aborted due to heavy rainfall |

### 3.4.2. AUTOMATED DETECTOR SURVEYS

3.4.2.1. Automated static bat detectors were used to supplement the bat activity transect data. A total of three Song Metre 4s (SM4s) were deployed each month in locations where the original converter locations were sited and set to record for a minimum of five nights in each month (Figure 1). Two additional detectors were deployed in August and September (see Section 3.5 – Limitations). The automated detectors were set to commence recording at least 30 minutes before sunset and cease recording 30 minutes after sunrise. Calls registered by the static bat detectors were recorded for later analysis using specialist computer software Analook, details are provided within Section 3.3.8.

3.4.2.2. To allow standardisation and comparison of static detector survey results the number of bat passes recorded per night (ppn) was used, as detailed below:

$$Batt\ ppn = \frac{Total\ bat\ passes\ recorded\ at\ a\ SM4\ location}{Number\ of\ nights\ SM4\ Surveyed}$$

### 3.4.3. DATA ANALYSIS

3.4.3.1. The recordings of bat echolocation calls collected during the surveys were analysed using specialist computer software Bat Explorer, or where EM3s were used the data was converted using Kaleidoscope (version 4.3.2) before undergoing analysis in Analook (version 4.1). The analysis enables confirmation of species or species group based on call parameters, and the relative activity of different species of bats by counting the minimum number of bats recorded within discrete sound files. It should be recognised that a series of separate sound files may represent a series of different bats commuting within the range of a detector, or a smaller number of bats repeatedly triggering the detector (e.g. bats making repeated foraging passes within the range of a detector).

3.4.3.2. Where possible, bat calls were identified to species level. However, species of the genus *Myotis* are grouped together in most cases as their calls are similar in structure and have overlapping call parameters, making species identification problematic (Russ, 2012). For *Pipistrellus* species the following criteria based on measurements of peak frequency are used to interpret calls:

- Common pipistrelle ≥ 42 and <49 KHz;
- Soprano pipistrelle ≥ 51 KHz;
- Nathusius' pipistrelle *Pipistrellus nathusii* <39 KHz;
- Common/soprano pipistrelle ≥49 and <51 KHz; and
- Common/Nathusius' pipistrelle ≥39 and <42 KHz.

3.4.3.3. In addition, the following categories are used for calls which cannot be identified with confidence due to the overlap in call characteristics between species or species groups:

- *Myotis/Plecotus* sp.; and,
- *Nyctalus* sp. (either Leisler's bat *Nyctalus leisleri* or noctule).

## 3.5. LIMITATIONS

### 3.5.1. GENERAL

3.5.1.1. Bat survey data regarding roosting bats is typically valid for one year. As the site comprises features with the potential to support roosting bats, further survey may be required if construction does not commence within one year of the most recent survey.

3.5.1.2. Records held by local biological record centres and local recording groups are generally collected on a voluntary basis; therefore, the absence of records does not demonstrate the absence of species, it may simply indicate a gap in recording coverage.

### 3.5.2. ROOSTING BATS

3.5.2.1. Ground level based tree surveys were undertaken outside of the optimum period for assessing trees of November to April. This is not considered to be limiting to the survey findings and further survey work of trees with potential to support roosting bats are recommended before any works commence.

3.5.2.2. Weather conditions in September were overcast, with mild rain. This reduced visibility of the trees and may have affected the surveyor's ability to see all potential features for roosting bats. The use of binoculars and a high-powered torch mean that this limitation is not considered to have significant implications on the survey results.

3.5.2.3. Trees in the ancient woodland surrounding the existing substation were not surveyed as it is understood that the woodland will not be affected by the proposed converter station or associated connection. Should the footprint of the works affect the ancient woodland further surveys will be required.

3.5.2.4. Trees 21 and 20 were not subject to aerial inspection due to an access restriction on the second day of survey. These surveys were only scheduled as an additional precaution and were not considered to be limiting. Full emergence/re-entry surveys were undertaken in 2018 that identified no bats roosting within the trees.

### 3.5.3. BAT ACTIVITY

3.5.3.1. The April and October transect surveys were aborted due to unsuitable weather conditions. These surveys were not possible to re-arrange for another date that month, however as other transects were conducted successfully over the rest of the season, the lack of survey data is not considered to limit the results, as the core period has been fully surveyed (May-September).

3.5.3.2. A pre-dawn survey could not be completed during these surveys, in line with current guidance, as access was not permitted at these times. This is not considered to limit the validity of the surveys, as the combination of automated static detectors and walked transects provides a comprehensive baseline.

3.5.3.3. Bat activity surveys for the mature boundary (western extent of the Site), and the central hedgerow are on-going and results will be updated accordingly with impacts discussed in Chapter 16 (Onshore Ecology) of the ES Volume 1 (document reference 6.1.16).

3.5.3.4. Following the first survey it was decided that an extra automated detector was required to sample the likely converter locations (SM4 location 3). As such, a third automated detector was deployed for the subsequent surveys.

3.5.3.5. Following design changes in 2019, two additional automated detectors (SM4 location 4 and 5) were deployed within linear vegetation proposed for impact.

3.5.3.6. During the August 2017 monitoring survey, SM4 location 2 did not turn on, as such, no data was obtained during the month of August.

3.5.3.7. On 12 occasions the recommended minimum of five nights of data was not obtained. This was likely due to poor weather conditions that typically reduce bat activity. An average of bat passes per night was therefore calculated to ensure that this limitation did not skew the data and allow for fair assessment of bat activity.

# 4. RESULTS

## 4.1. DESK STUDY

4.1.1.1. No statutory sites designated for bats were identified within 10 km of the Proposed Development.

4.1.1.2. The desk study returned records of eleven bat species within the study area, which comprised 588 individual bat records since 2000. This included records of serotine *Eptesicus serotinus*, brown long-eared bat *Plecotus auritus,* noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis natteri* and whiskered bat *Myotis mystacinus*. There were two records of Bechstein's bat *Myotis bechsteinii* and single records for Alcathoe bat *Myotis alcathoe* and parti-coloured bat *Vespertillio murinus*. The closest record to Lovedean substation was a brown long-eared bat approximately 250 m to the north-east of the Order Limits.

4.1.1.3. Bechstein's bat is known to occur within the Forest of Bere, a large area of ancient woodland and a Forestry Commission site 3 km southeast of Lovedean. The two records of Bechstein's bat from the desk study are from approximately 1.8 km east of the Order Limits to the east of the A3M to the east of Waterlooville and from Hayling Island.

4.1.1.4. Linear features, such as the hedgerows and scattered tree lines which border the A2030 north of the Havant bypass, London Road, Hambledon Road and Milton Road, offer commuting habitat for bats. The woodland and improved grassland fields adjacent to the Survey Area offer foraging habitat for these species. Ancient woodlands surrounding the National Grid Sub-station and associated hedgerows are suitable to support roosting foraging and commuting bat species, including Bechstein's bat.

4.1.1.5. No active European Protected Species Mitigation Licences were identified within 2 km of the site.

## 4.2. TREE ROOSTING BATS

### 4.2.1. GROUND LEVEL TREE ASSESSMENT

4.2.1.1. The surveys identified 34 trees that were found to have potential for roosting bats:

- 11 trees with high potential for roosting bats;
- 8 trees with moderate potential for roosting bats; and
- 15 trees with low potential for roosting bats.

4.2.1.2. All trees were located in areas of good habitat suitability, surrounded by open pastures, hedgerows and woodland. Trees were aged as mature (M), semi-mature (SM) and immature (I). Potential roost types were also classified as maternity (M), summer/transitional (S/T) and hibernation (H). Detailed survey results are shown in table 6. The locations of the trees are shown in Figure 1 with photographs in ES Technical Appendix 1. It should be noted tree number 17 is a group of five trees, tree number 19 is a pair of trees and tree number 21 is a group of 18 trees.

**Table 6 - Tree Inspection Results**

| Tree Ref | Species | Grid Ref | Approx. Height (M) | Age | Description | Type of Roost | Tree Category |
|---|---|---|---|---|---|---|---|
| **1** | Oak *Quercus robur* | SU 67412 13719 | 10 | M | Bat box on eastern side of tree approximately 3m above ground level. | M and S/T | HIGH |
| **2** | Oak | SU 67409 13726 | 7 | SM | Bat box on eastern side of tree approximately 3.5m above ground. Rot hole approximately 1.5m above ground and 10cm deep. Numerous cracks and crevices in branches. Partially detached bark. | M and S/T | HIGH |
| **3** | Oak | SU 67378 13752 | 12 | M | Two bat boxes on western side of tree approximately 3m and 3.5m above ground. Mature dense ivy stems (no leaves). | M and S/T | HIGH |

| Tree Ref | Species | Grid Ref | Approx. Height (M) | Age | Description | Type of Roost | Tree Category |
|---|---|---|---|---|---|---|---|
| **4** | Oak | SU 67367 13750 | 9 | M | One bird box on north side of tree approximately 3m above ground. Partially detached bark on north side approx. 4m above ground. Numerous crevices at varying heights and locations on tree. | S/T | HIGH |
| **5** | Oak | SU 67326 13754 | 15 | M | Partially detached bark at several locations and heights. | S/T | LOW |
| **6** | Oak | SU 67301 13752 | 12 | M | Owl box on eastern side of tree approximately 5m above ground. | S/T | LOW |
| **7** | Oak | SU 67232 14066 | 12 | M | Partially detached bark at several locations and heights. | S/T | LOW |
| **8** | Oak | SU 67183 14012 | 10 | M | Partially detached bark on south side of tree. | S/T | LOW |

| Tree Ref | Species | Grid Ref | Approx. Height (M) | Age | Description | Type of Roost | Tree Category |
|---|---|---|---|---|---|---|---|
| **9** | Oak | SU 67129 13970 | 12 | M | Partially detached bark on eastern side of tree. Broken branch on western side approx. 6m above ground. | S/T | LOW |
| **10** | Ash *Fraxinus excelsior* | SU 67109 13952 | 12 | M | Partially detached bark at several locations and heights. Rot hole on western side (large) approximately 7m high. Multiple cracks and crevices. | M and S/T | HIGH |
| **11** | Ash | SU 67047 13819 | 10 | M | Broken branch on eastern side of tree approximately 4m above ground. Small hole on northern branch approximately 3m above ground. Tree is dying. | S/T | LOW |
| **12** | Ash | SU 67024 13832 | 12 | SM | Hazard beam and broken limbs. | M, S/T and H | HIGH |
| **13** | Oak | SU 67025 13814 | 15 | M | Partially detached bark on top branched. Crack in broken/dead branch. | S/T | LOW |

| Tree Ref | Species | Grid Ref | Approx. Height (M) | Age | Description | Type of Roost | Tree Category |
|---|---|---|---|---|---|---|---|
| **14** | Oak | SU 67025 13790 | 13 | M | Several broken branched with cracks (min 10cm deep). Small about of partially detached bark. | S/T | MODERATE |
| **15** | Oak | SU 67029 13757 | 12 | M | Split in branch facing east. Woodpecker hole in branch (west field) | S/T | MODERATE |
| **16** | Oak | SU 67029 13725 | 12 | M | Two woodpecker holes on east side. Split in branch to west and woodpecker hole | S/T | MODERATE |
| **17** | Ash | SU 67038 13669 | 12 | M | Woodpecker hole on eastern side | S/T | MODERATE |
| **18 (2 trees)** | Oak | SU 67038 13669 | 12 | M | Split in branches to south. Dead oak fallen onto tree with peeling bark. | S/T | MODERATE |
| **19** | Oak | SU 67038 13669 | 12 | M | Split in branch to west. | S/T | MODERATE |
| **20** | Oak | SU 67055 13628 | 11 | M | Dead oak with three woodpecker holes. Peeling and lifted bark. | M and S/T | HIGH |

| Tree Ref | Species | Grid Ref | Approx. Height (M) | Age | Description | Type of Roost | Tree Category |
|---|---|---|---|---|---|---|---|
| **21** | Ash | SU 67036 13627 | 12 | M | Three stem coppice. Northern stem, two woodpecker holes. Broken branch to north. Eastern stem, one woodpecker hole. | M and S/T | HIGH |
| **22** | Field maple *Acer campestre* | SU 67023 13621 | 8 | SM | Two cavities on northern side. Fungus present. Endoscope survey recorded no evidence of bats. | S/T | MODERATE |
| **23** | Oak | SU 67006 13618 | 12 | M | Split in branch to west | S/T | LOW |
| **24** | Oak | SU 66990 13618 | 18 | M | Split in centre of trunk. Endoscope survey recorded no evidence of bats. | S/T | LOW |
| **25** | Oak | SU 66962 13609 | 16 | M | Splits in branches to west and east | S/T | LOW |
| **26** | Oak | SU 66891 13598 | 12 | M | Split in middle, no sign of suitable cavities | S/T | LOW |
| **27** | Ash | SU 66994 13511 | 20 | M | Small areas of partially detached bark. | S/T | LOW |

| Tree Ref | Species | Grid Ref | Approx. Height (M) | Age | Description | Type of Roost | Tree Category |
|---|---|---|---|---|---|---|---|
| **28 (2 trees)** | Ash | SU 67008 13421 | 18 | M | Two ash trees adjacent to each other. One - split branch approximately 4m high, partially detached bark, Two - several areas of partially detached bark. | S/T | LOW |
| **29** | Oak | SU 67285 12893 | 15 | M | Split broken limb at approximately 4m above ground. Two holes in branch. | S/T | LOW |

### 4.2.2. EMERGENCE AND RE-ENTRY SURVEYS

4.2.2.1. Survey dates, times and weather data are provided in Table 4. All surveys were undertaken in optimal or suitable weather conditions. Survey results are summarised in Table 7.

4.2.2.2. No bats were recorded emerging from, or returning to, any of the trees during any survey visit.

**Table 7 - Dusk Emergence and Dawn Re-entry Survey Results**

| Tree | Date and Survey Time | Species and Description and Behaviour | Evidence of Roost |
|---|---|---|---|
| **Tree 20** | 07/06/18 Dusk | L1- Regular passes of common pipistrelle, foraging along hedgerows and heard not seen from 21:41 until 22:38. Single pass of Myotis sp. and two passes of serotine.<br>L2 – Regular passes of common pipistrelle, foraging mostly heard not seen. | None |
| **Tree 21** | 08/06/18 Dawn | L1 – Regular passes of common pipistrelle, foraging until 04:21, two individuals seen.<br>L2 – Regular passes of common pipistrelle, foraging until 04:12 | None |
| **Tree 20** | 21/06/18 Dawn | L1 – Regular passes of common pipistrelle, foraging until 04:12, Two individuals seen.<br>L2 – Regular passes of common pipistrelle, foraging until 04:11. | None |
| **Tree 19** | 21/06/18 Dusk | L1 – Regular passes of common pipistrelle, mostly heard not seen, from 21:56.<br>L2 – Regular passes of common pipistrelle, foraging from 21:55, Two individuals seen. | None |

| Tree | Date and Survey Time | Species and Description and Behaviour | Evidence of Roost |
|---|---|---|---|
| **Tree 21** | 26/07/18 Dusk | L1 – Regular passes of common pipistrelle, mostly heard not seen from 21:26, Two individuals seen. Single passes of Myotis species and Leisler's.<br>L2 – Regular passes of common pipistrelle, mostly heard not seen from 21:27. Single passes of Myotis sp. and two passes of serotine. | None |
| **Tree 21** | 08/08/18 Dusk | L1 – Regular passes of common pipistrelle, foraging from 21:00 or heard not seen. Single pass of soprano pipistrelle.<br>L2 – Regular passes of common pipistrelle from 21:07. Single passes of Myotis species and noctule. | None |
| **Tree 20** | 09/08/18 Dusk | L1 – Regular passes of common pipistrelle, mostly heard not seen. Two passes of soprano pipistrelle.<br>L2 – Regular passes of common pipistrelle and soprano pipistrelle, mostly foraging. | None |

### 4.2.3. TREE MOUNTED BAT BOXES

4.2.3.1. On the 11 June 2019 evidence of soprano pipistrelle (droppings) were recorded in the top bat box installed on T3. Previous surveys in 2017 and 2018 recorded no evidence of bats within these boxes. All other boxes surveyed during 2019 returned no evidence of bats.

### 4.2.4. AERIAL TREE INSPECTION

4.2.4.1. All features inspected through an aerial tree inspection returned no evidence of bats. T14 was downgraded from moderate to low potential due to the loss of cracked limbs from recent storm damage. The bat roosting potential for the remainder of moderate and high potential trees remained unchanged following survey.

## 4.3. BAT ACTIVITY SURVEYS

### 4.3.1. TRANSECT SURVEYS

4.3.1.1. A total of 141 bat calls were recorded from a minimum of five bat species during the walked transect surveys. The confirmed species were:

- noctule;
- Leisler's bat;
- common pipistrelle;
- soprano pipistrelle; and
- barbastelle.

4.3.1.2. The calls recorded during the transect surveys each month are summarised in Table 8 below. No Bechstein's bats or horseshoe bat species were recorded during the surveys.

**Table 8 - Summary of Bat Passes Recorded Per Species on Each Months Transect**

| Month | Common pipistrelle | Soprano pipistrelle | Pipistrelle species | Noctule | Leisler's bat | Barbastelle | Grand Total |
|---|---|---|---|---|---|---|---|
| **April** | - | - | - | - | - | - | - |
| **May** | 33 | 5 | 0 | 1 | 0 | 0 | 39 |
| **June** | 12 | 3 | 0 | 0 | 1 | 1 | 17 |
| **July** | 13 | 0 | 23 | 0 | 0 | 0 | 36 |
| **August** | 10 | 0 | 12 | 0 | 0 | 0 | 22 |
| **September** | 24 | 3 | 0 | 0 | 0 | 0 | 27 |
| **October** | - | - | - | - | - | - | - |
| **Grand Total** | 92 | 11 | 35 | 1 | 1 | 1 | 141 |

4.3.1.3. The transect surveys recorded regular pipistrelle activity throughout the year, accounting for 93% of the bat activity recorded. Three other species were also recorded within the survey area, although these were only noted at individual levels. The results summary of the transect surveys are displayed on Figure 2.

4.3.1.4. Bat activity was recorded across all of the Survey Area, bat activity was highest within the woodland habitats immediately surrounding the sub-station. Activity levels were fairly constant throughout the survey period, with a peak level of bat activity being recorded within May.

4.3.1.5. Barbastelle, soprano pipistrelle and Leisler's bat were recorded at Point Count locations associated with the woodland habitat that runs west to east across the centre of the survey area (Figure 2). Noctule was recorded within the east of the Survey Area. Common pipistrelles were recorded throughout the Survey Area.

### 4.3.2. AUTOMATED DETECTOR SURVEY

4.3.2.1. A total of 17,663 bat passes were recorded from a minimum of nine bat species and species groups during the automated static detector surveys. A summary of these results is provided in Table 9. The species recorded were:

- *Myotis* species;
- *Plecotus* species;
- barbastelle;
- noctule;
- serotine;
- Leisler's bat;
- common pipistrelle;
- soprano pipistrelle; and
- Nathusius' pipistrelle.

4.3.2.2. The SM4 sited at location 1, recorded the third highest level of bat activity throughout the monitoring period, with an average of approximately 200 bat passes per night. A minimum of eight species were recorded at location 1 including common pipistrelle, soprano pipistrelle, pipistrelle species, Leisler's bat, barbastelle, *Plecotus* species, serotine and *Myotis* species. A peak level of bat activity was recorded during June where an average of 454 bat passes per night was recorded (Plate 1). The earliest bats recorded during the automated static detector surveys were common pipistrelles recorded at location 1, these were recorded up to 10 mins before sunset. A single barbastelle pass was recorded at this location within the May monitoring period.

4.3.2.3. The SM4 sited at location 2 recorded an average bat activity level of 81 bat passes per night from a minimum of five bat species. Peak activity levels were recorded in April with 319 bat passes per night, however the months of May – October had much lower levels of activity, ranging from 31-77 bat passes per night (Plate 1). Species recorded here include common pipistrelle, soprano pipistrelle, noctule, Leisler's bat and *Myotis* species.

4.3.2.4. The SM4 at location 3 recorded an average bat activity level of 70 bat passes per night (lowest activity across the site), this is largely down to the lower levels of bat activity recorded within the June and July monitoring periods. Peak activity was recorded in August and September (Plate 1), much of which was associated with open habitat adapted species such as Leisler's and serotine bat species. The majority of activity of these species were recorded over one night in September 2017.

4.3.2.5. The SM4 at location 4 recorded the second amount of bat activity across the Site despite only being deployed during the months of August and September, returning an average of 365 calls per night. This location was dominated by common pipistrelle, accounting for 92% of all activity. Six other bat species were also identified in low numbers (<10 calls per night).

4.3.2.6. The SM4 location 5 returned the highest level of bat activity across the site with an average of 512 bat calls per night. This location was also dominated by common pipistrelle, accounting for 92% of all activity. Myotis species were the second most active with an average of 12 calls per night. September was the key month in terms of activity with an average of 880 common pipistrelle calls, 47 soprano pipistrelle calls and 18 Myotis calls per night. This automated detector was placed within the central hedgerow (SU 67169 13634) that ran west-east between mature habitat and was identified as a key linear habitat feature for connectivity. The activity identified is therefore likely to comprise bats commuting between different roosting and foraging areas.

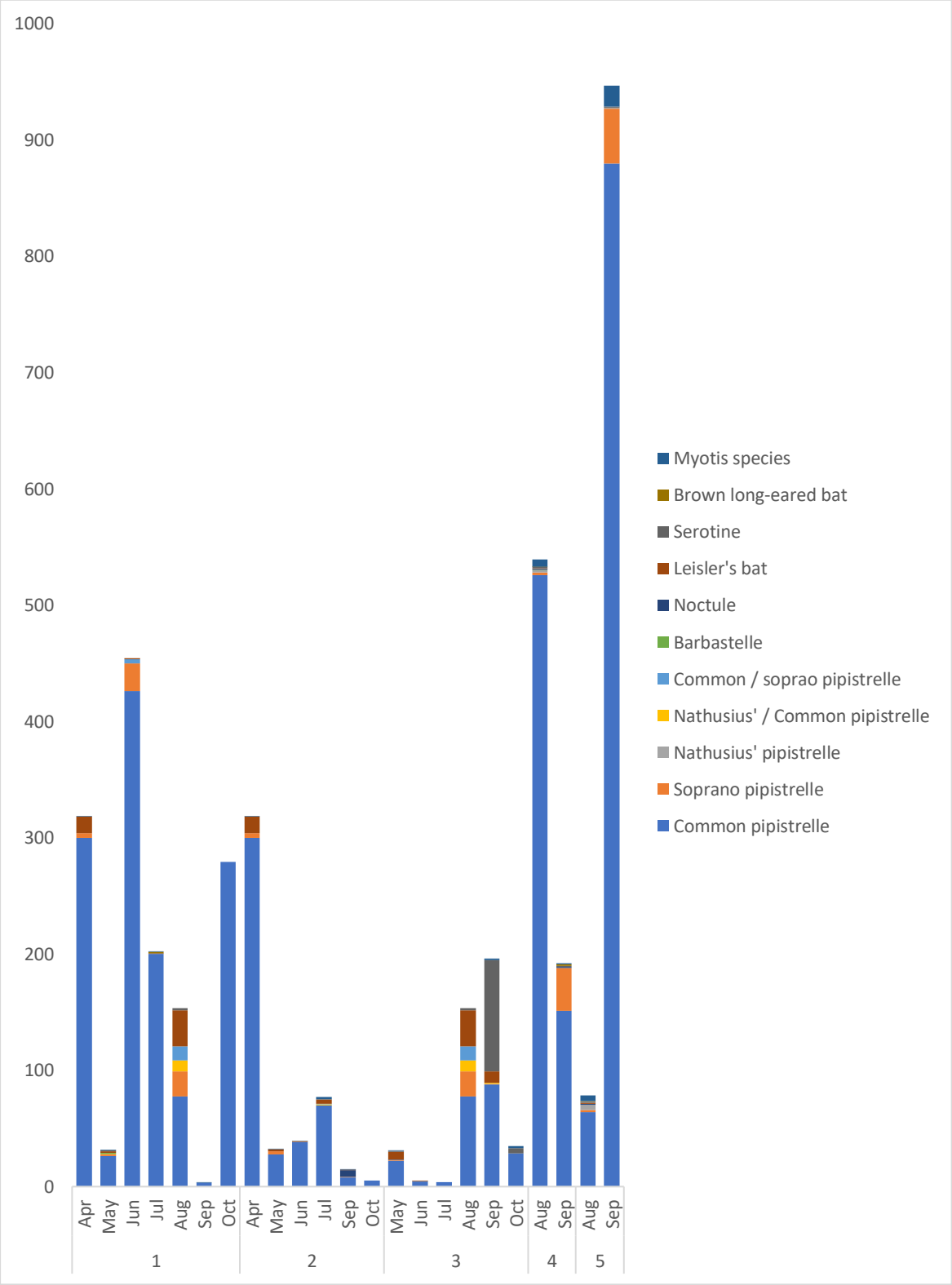



**Plate 1 - Chart showing total number of bat passes per species per month for each SM4**

**Table 9 - Summary of Automated Detector Results - Bat Passes Recorded Per Species Each Month**

| | | | Bat passes per night of species recorded | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SM4 Location | | Common pipistrelle | Soprano pipistrelle | Nathusius' pipistrelle | Nathusius' / common pipistrelle | Common / soprano pipistrelle | Barbastelle | Noctule | Leisler's bat | Serotine | Brown long-eared bat | *Myotis* species |
| 1 | Apr | 300 | 4 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 1 |
| | May | 26 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| | Jun | 426 | 24 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 |
| | Jul | 200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | Aug | 78 | 22 | 0 | 10 | 12 | 0 | 0 | 31 | 2 | 0 | 0 |
| | Sep | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Oct | 279 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Apr | 300 | 4 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 1 |
| | May | 28 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |

| SM4 Location | | | Bat passes per night of species recorded | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Common pipistrelle | Soprano pipistrelle | Nathusius' pipistrelle | Nathusius' / common pipistrelle | Common / soprano pipistrelle | Barbastelle | Noctule | Leisler's bat | Serotine | Brown long-eared bat | *Myotis* species |
| | Jun | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Jul | 70 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 2 |
| | Sep | 8 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| | Oct | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3** | May | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 0 |
| | Jun | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Jul | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Aug | 78 | 22 | 0 | 10 | 12 | 0 | 0 | 31 | 2 | 0 | 0 |
| | Sep | 88 | 0 | 0 | 1 | 0 | 0 | 0 | 10 | 96 | 0 | 1 |
| | Oct | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 2 |

| SM4 Location | | | Bat passes per night of species recorded | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Common pipistrelle | Soprano pipistrelle | Nathusius' pipistrelle | Nathusius' / common pipistrelle | Common / soprano pipistrelle | Barbastelle | Noctule | Leisler's bat | Serotine | Brown long-eared bat | *Myotis* species |
| **4** | Aug | 526 | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 6 |
| | Sep | 151 | 37 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| **5** | Aug | 64 | 2 | 4 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 5 |
| | Sep | 880 | 47 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 18 |

# 5. DISCUSSION, MITIGATION AND RECOMMENDATIONS

## 5.1. DISCUSSION

### 5.1.1. TREE ROOSTING BATS

5.1.1.1. Although no tree roosts were identified through survey work, this does not rule out the presence of tree roosting bats within proximity to the site. Evidence of soprano pipistrelle roost (droppings) within a bat box (T3, Figure 1) confirmed that bats are roosting within proximity to the existing substation.

5.1.1.2. There is the potential for the development to directly impact potential roost sites through the removal of trees at the western boundary of the Order Limits.

5.1.1.3. There is also the potential for direct impacts through factors such as vibration and lighting during both the construction and operational stages.

### 5.1.2. FORAGING AND COMMUTING BATS

5.1.2.1. The proposed converter station lies in the northwest area of the Survey Area where a mixture of pasture grassland and hedgerows were key habitat. The transect surveys recorded the highest levels of species activity in the northwest area, particularly along the woodland edge to the immediate south of the development area. The automated detector installed at Location 5 recorded the highest bat activity levels and species diversity within the Survey Area, indicating the localised importance of this hedgerow for foraging and commuting bats. Bats were also recorded passing the detector around dusk indicating that pipistrelle species are roosting within close proximity to the proposed converter station, likely within the adjacent woodland / mature trees.

5.1.2.2. The construction of the converter station and access track would result in the loss of hedgerows, a mature tree lined boundary and pasture grassland habitat. The potential impact on bat activity in relation to these features is discussed in the Ecology ES Chapter.

### 5.1.3. CONSERVATION STATUS

5.1.3.1. Common and soprano pipistrelle are regarded as common and widespread and as such any development is expected to have limited impact on the overall conservation of bats in this area. A roost of a common species is considered to be of local importance (soprano pipistrelle roost in bat box -T3). Barbastelle, Nathusius' pipistrelle, serotine, Myotis sp., and noctule are considered rarer, with individuals of

up to county importance (Wray, Wells, Long, & Mitchell-Jones, 2010).

## 5.2. MITIGATION

5.2.1.1. Based on the 'worst-case' design proposal the construction of the converter station will result in the loss of suitable roosting, foraging, and commuting habitat. To significantly reduce impacts it is recommended that the proposed converter station is micro-sited to retain optimal foraging and commuting habitat, such as hedgerows and trees where possible.

5.2.1.2. The mature boundary running south from Hillcrest, Old Mill Lane and the adjoining hedgerow running eastwards at a right angle towards the existing converter station are expected to be directly impacted. These areas supported a large amount of common pipistrelle activity (approximately 500 passes per night).

5.2.1.3. It is recommended that new habitat buffer be planted around the converter station to mitigate for the loss of habitat and ensure connectivity is retained between habitat east and west of the new converter station following construction. The buffer will also reduce disturbance from indirect factors such as lighting once established.

5.2.1.4. The buffer should be planted as a hedgerow (with trees) approximately 10m away and in parallel with the converter station boundaries. The hedgerow should be extended to connect with existing mature boundaries where possible. Gaps for access should not exceed more than 10 m.

5.2.1.5. Planting should comprise a good diversity of native, nectar rich species to encourage nigh-flying invertebrates. To provide some protection for the buffer whilst vegetation establishes, closed-board fencing (2 m x 2 m) should be installed in parallel. Once the vegetation reaches approximately 2 m, the fencing can be removed.

5.2.1.6. Lighting during the construction and operational stages of the Proposed Development could have a negative effect upon bat activity within proximity to the development. Therefore, a bat sensitive lighting strategy should be implemented in line with Guidance Note 08/18 (Bat Conservation Trust, 2018):

- Use the minimum light levels necessary for the relevant task / function, this may equate to reducing light intensity, and/or using the minimum number or light sources or minimum column height;
- Use hoods, louvres or other luminaire design features to avoid light spill onto retained and newly created areas of vegetation likely to be used by foraging and commuting bats;
- Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wave length blue light, using instead warm/neutral colour temperature <4,200 kelvin lighting; and
- Use light sources that emit minimal ultra-violet light to avoid attracting night-flying invertebrate species which in turn may attract bats to the light.

## 5.3. RECOMMENDATIONS

5.3.1.1. The NPP (EN-1) and NPPF promotes the inclusion of ecological enhancement and the following measures should be incorporated into the design where possible:

- Inclusion of nectar-rich plant species in soft landscaping areas that are attractive to night-flying insects to enhance foraging opportunities for bats;
- Provision of standing water-bodies to provide an additional foraging resource for bats using the site, which may benefit *Myotis* sp. and *Nyctalus* sp. bats in particular; and
- Installation of 20 2F Schwegler Bat Boxes on mature trees. Box should be located where they are out of reach of people from the ground (so as to limit interference) and high enough to deter cats and other predators (without being placed too high as this makes maintenance more difficult and can leave the boxes exposed to weather, particularly strong winds). In practice, placing them between 3 and 4.5 metres from the ground is optimal. Boxes should be placed in a range of locations at slightly different heights and facing in slightly different directions to give a choice of roost site options (Mitchell-Jones & McLeish, 2004). The direction of the boxes should be selected to avoid facing them into the prevailing weather and will preferably be positioned facing in a southerly direction (i.e. south-west through south to south-east) where they will receive a good degree of sunlight.

# 6. CONCLUSIONS

6.1.1.1. No roosting bats were identified within any of the trees surveyed. Evidence of soprano pipistrelle (droppings) was recorded within a tree mounted bat box approximately 90m north-west of the existing substation. The Proposed Development will directly impact trees with the potential to support roosting bats and therefore further survey work will be required prior to removal. There is also the potential for indirect impacts on trees with bat roosting potential through additional lighting.

6.1.1.2. Activity surveys were dominated by common and soprano pipistrelle activity in 2017 and 2019. Species also recorded but in lower numbers comprised Myotis species, noctule, Leisler's bat and barbastelle. The highest levels of bat activity were associated with the woodland and hedgerow habitats surrounding the existing substation to the north of the Survey Area and within the mature tree lined boundary running south from Hillcrest, Old Mills Lane.

6.1.1.3. Construction of the converter station will involve the removal mature boundary habitat. This activity will impact on the foraging and commuting behaviour of bats.

6.1.1.4. Potential impacts on bats arising from the Proposed Development will be discussed in Chapter 16 (Onshore Ecology).

6.1.1.5. Opportunities have been highlighted where there is scope to enhance roosting, foraging and commuting habitat in line with national and local planning policy.

# REFERENCES


Bat Conservation Trust. (2018). *Guidance Note 08/18: Bats and artificial lighting in the UK.* London.

Collins, J. (2016). *Bat Surveys for Professional Ecologists:Good Practice Guidlines (3rd edn).* London: Bat Conservation Trust.

Mitchell-Jones, A. J., & McLeish, A. P. (2004). *3rd Edition Bat Workers' Manual.* Peterborough: JNCC.

Russ, J. (2012). *British Bat Calls: A Guide to Species Identification.* Exeter : Pelagic Publishing.

Wray, S., Wells, D., Long, E., & Mitchell-Jones, T. (2010). Valuing Bats In Ecological Impact Assessment. *In Practice*, 23-26.

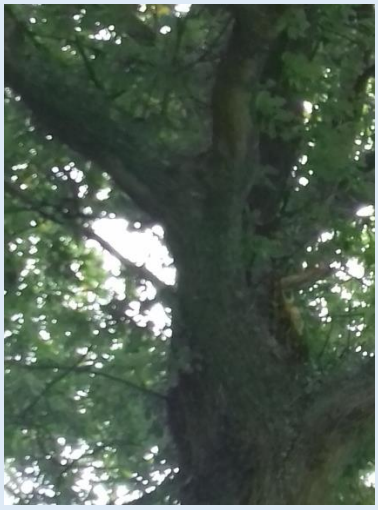
# Appendix 1 – Photographs

# PHOTOGRAPHS

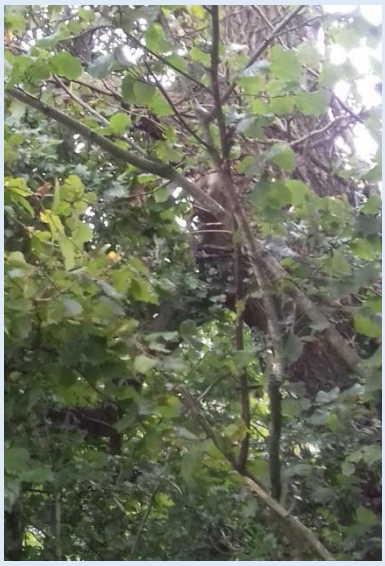
**Table 1 – Tree Photographs**

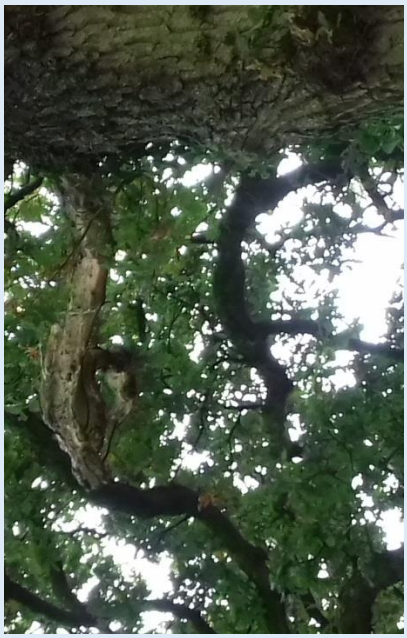
| Tree Reference | Photograph | Description |
|---|---|---|
| **1** |  | Bat box on eastern side of tree approximately 3m above ground level. |
| **2** |  | Bat box on eastern side of tree approx. 3.5m above ground. Rot hole approximately 1.5m above ground and 10cm deep. Numerous cracks and crevices in branches. Partially detached bark. |

| | | |
|---|---|---|
| **3** |  | Two bat boxes on western side of tree approx. 3m and 3.5m above ground. Mature dense ivy *Hedera helix* stems (no leaves). |
| **4** |  | One bird box on north side of tree approx. 3m above ground. Partially detached bark on north side approx. 4m above ground. Numerous crevices at varying heights and locations on tree. |
| **5** |  | Partially detached bark at several locations and heights. |

| | | |
|---|---|---|
| **6** |  | Active kestrel *Falco tinnunculus* box on eastern side of tree approx. 5m above ground. |
| **7** |  | Partially detached bark at several locations and heights. |
| **8** |  | Partially detached bark on south side of tree. |

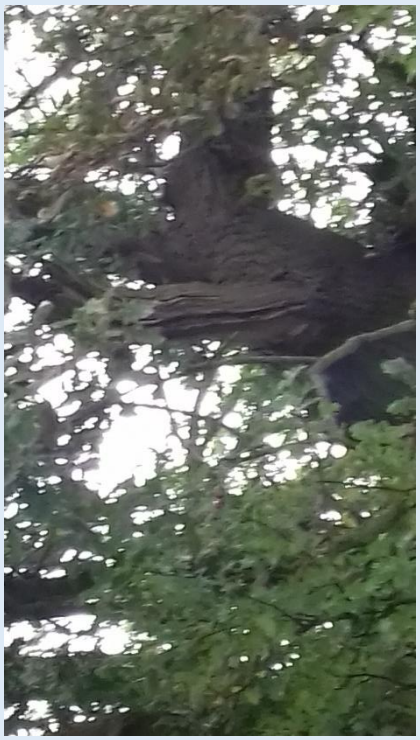
| | | |
|---|---|---|
| **9** |  | Partially detached bark on eastern side of tree. Broken branch on western side approx. 6m above ground. |
| **10** |  | Partially detached bark at several locations and heights. Rot hole on western side (large) approx. 7m high. Multiple cracks and crevices. |

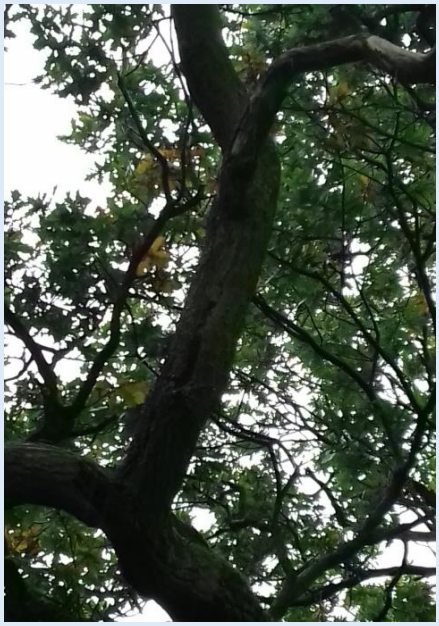
| | | |
|---|---|---|
| **11** |  | Broken branch on eastern side of tree approx. 4m above ground. Small hole on N branch approximately 3m above ground. Tree is dying. |
| **12** |  | Hazard beam and broken limbs. Note: not on accessible land. |

| | | |
|---|---|---|
| **13** |  | Partially detached bark on top branched. Crack in broken/dead branch. |
| **14** |  | Several broken branched with cracks (min 10cm deep). Small area of partially detached bark. |
| **15** |  | Split in branch facing east. Woodpecker hole in branch (west field) |

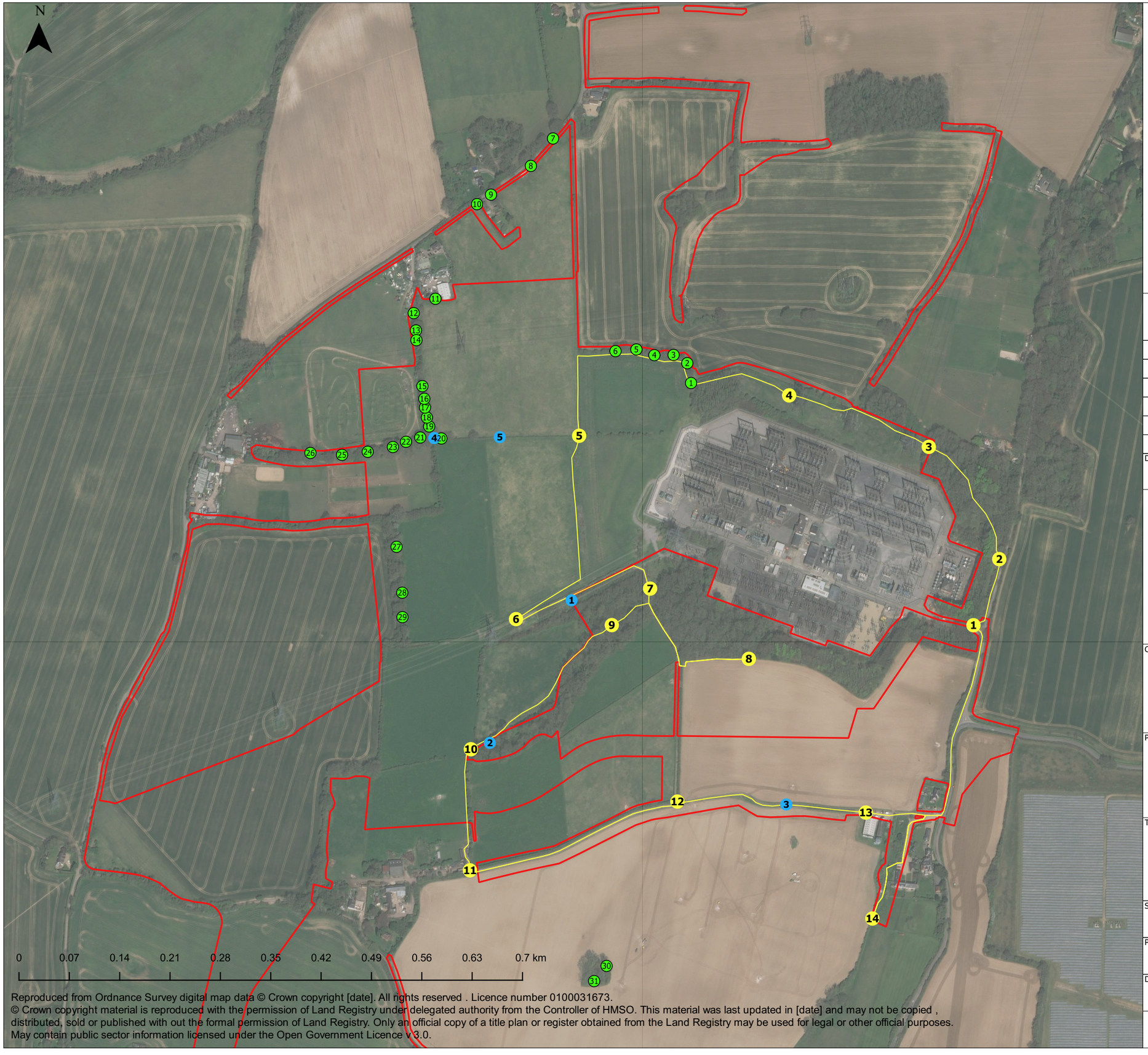
| | | |
|---|---|---|
| **16** |  | Two woodpecker holes on east side. Split in branch to west and woodpecker hole |
| **17** |  | Woodpecker hole on east side |
| **18** |  | Split in branches to south. Dead oak fallen onto tree with peeling bark. |
| **19** | No photo | Split in branch to west. |
| **20** |  | Dead oak with three woodpecker holes. Peeling and lifted bark. |

| | | |
|---|---|---|
| **21** |  | Three stem coppice. Northern stem, Two woodpecker holes. Broken branch to north. Eastern stem, 1 woodpecker hole |
| **22** |  | Two cavities on north side. Fungus present. |
| **23** |  | Split in branch to west |
| **24** |  | Split in centre of trunk. |

| | | |
|---|---|---|
| **25** |  | Splits in branches to west and east |
| **26** |  | Split in middle, no sign of suitable cavities |
| **27** |  | Small areas of partially detached bark. |

| | | |
|---|---|---|
| **28** |  | Two ash trees adjacent to each other. One - split branch at from of tree approx. 4m high, partially detached bark, Two - several areas of partially detached bark.<br><br>Photographs not available of each tree. |
| **29** |  | Split broken limb at approximately 4m above ground. Two holes in branch. |

# Appendix 2 – Figures






**Legend**

- Order Limits
- Bat tree assessment locations
- Bat transect stopping points
- Bat transect route
- SM4 static locations

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

| REV | DATE | BY | DESCRIPTION | CHK | APP |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| 02 | 30/10/19 | AP | Bat Survey - Transect, statics and tree assessment | LW | IE |
| 01 | 09/08/19 | MG | Bat Survey - Transect, statics and tree assessment | LW | IE |

DRAWING STATUS:

FINAL

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wsp.com

CLIENT

AQUIND

PROJECT:

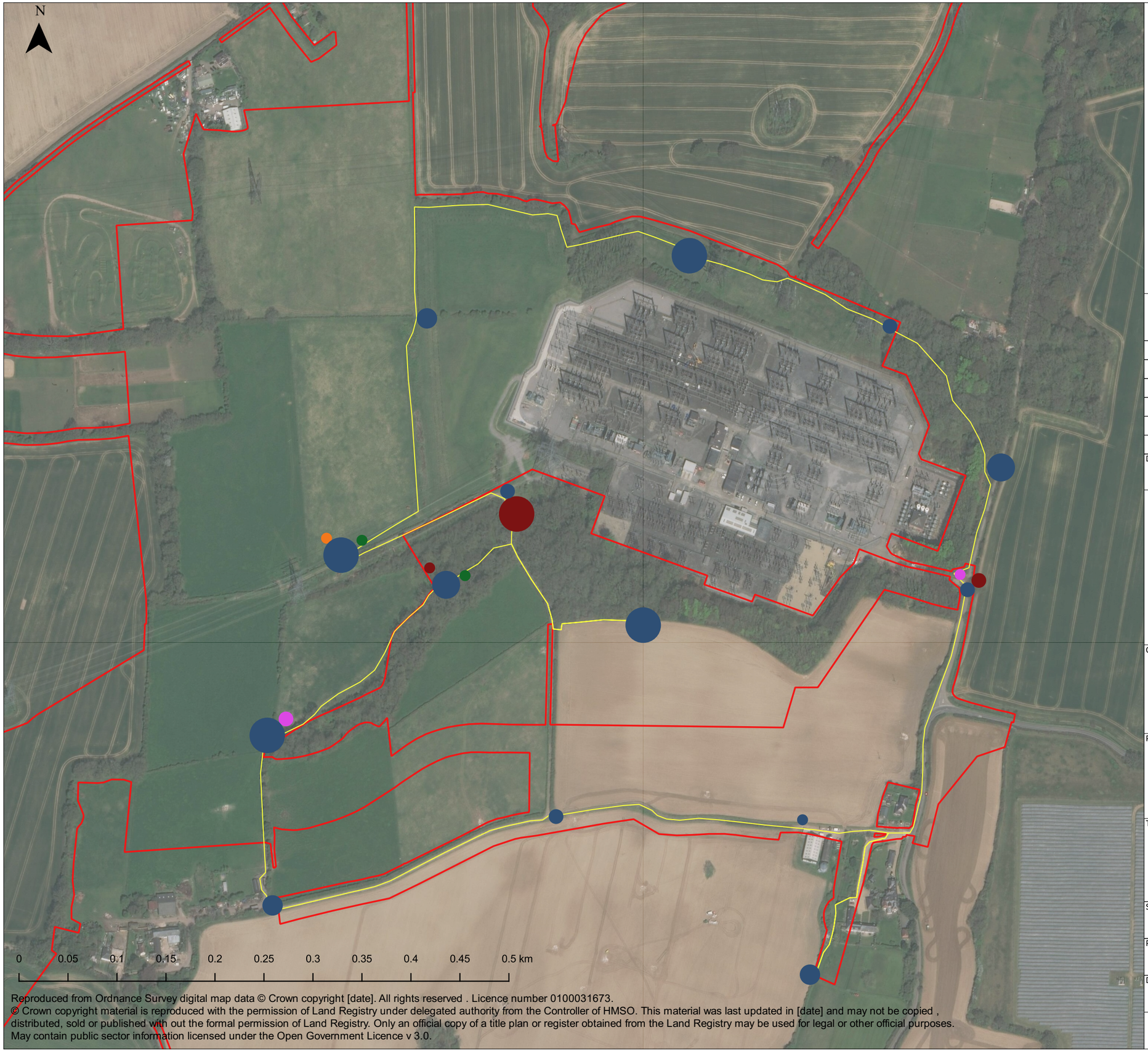
AQUIND Interconnector

TITLE:

Figure 1:
Bat Surveys - Transect Statics and Tree Inspections

| SCALE AT A3: | CHECKED: | | APPROVED: |
|---|---|---|---|
| 1:8300 | LW | | IE |
| PROJECT NO: | DESIGNED: | DRAWN: | DATE: |
| 62100616 | MG | AP | 30/10/19 |

| DRAWING NO: | REV NO. |
|---|---|
| EN020022-ES-APP-16.8-1 | 02 |




## Legend

- Order Limits
- Bat transect route
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- Leisler's
- Barbastelle

Number of bat passes:

- 1 - 2
- 3 - 8
- 9 - 16
- 17 - 20
- 21 - 28

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

| REV | DATE | BY | DESCRIPTION | CHK | APP |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| 02 | 30/10/19 | AP | Bat Transect Result Summary | LW | IE |
| 01 | 18/07/19 | MG | Bat Transect Result Summary | LW | IE |

DRAWING STATUS: FINAL

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CLIENT: AQUIND

PROJECT: AQUIND Interconnector

TITLE: Figure 2: Bat Transect Results Summary

| SCALE AT A3: | CHECKED: | | APPROVED: |
|---|---|---|---|
| 1:6100 | LW | | IE |
| PROJECT NO: | DESIGNED: | DRAWN: | DATE: |
| 62100616 | MG | AP | 30/10/19 |

DRAWING NO: EN020022-ES-APP-16.8-2 REV NO. 02