

## 10.0 ECOLOGY AND NATURE CONSERVATION

### INTRODUCTION

- 10.1 This chapter provides an Ecological Impact Assessment of the proposed development, undertaken in accordance with Guidelines for Ecological Impact Assessment in the United Kingdom (Institute of Ecological and Environmental Management (IEEM), 2006). The chapter comprises the following:
- identification and evaluation of existing ecological baseline;
  - identification and assessment of potential impacts of the proposed development;
  - mitigation measures to avoid and/or minimise potential impacts and enhancement measures; and
  - residual impacts of the proposed development.
- 10.2 This chapter has been prepared by Hannah Maben MCIEEM of Seasons Ecology in association with RMA Environmental Ltd on behalf of Murex Energy Ltd.

### POLICY CONTEXT

#### National Planning Policy

- 10.3 The National Planning Policy Framework (NPPF) was published in March 2012 and came into immediate effect superseding all existing Planning Policy Guidance (PPGs) and Planning Policy Statements (PPSs). It sets out the Government's requirements for the planning system and how these are expected to be addressed. The NPPF is a material consideration for the purposes of planning decision-making.
- 10.4 The NPPF places a presumption in favour of sustainable development.
- 10.5 The NPPF states that the presence of a legally protected species is a material consideration for a local authority dealing with planning applications for any development that would be likely to result in harm to the species or its habitat. Circular 06/2005: Biodiversity and geological conservation, prepared in support of the former PPS9, is still relevant and provides more guidance on the application of the law relating to planning and nature conservation.

#### Local Planning Policy

- 10.6 West Devon Borough Council's (WDBC) Local Development Framework Core Strategy Development Plan Document (2006-2026), adopted April 2011 sets out the core policies for development within the borough. Strategic Policy 19 relates to ecology, biodiversity and nature conservation:

*“Strategic Policy 19: Biodiversity*

- a. Sites of Special Scientific Interest will be subject to a high degree of protection. Development adversely affecting a Site of Special Scientific Interest will only be permitted in exceptional circumstances.*
- b. Habitats and features of regional and local importance for nature conservation will be protected and where possible enhanced through beneficial management.*
- c. Appropriate considerations will be given to nationally protected species, with special consideration to European protected species.*
- d. The biodiversity and geological interest of the Borough will be maintained and, where appropriate, conserved and/or enhanced through new development. Opportunities to enhance the connectivity of biodiversity will be sought where possible.”*

**West Devon Interim Planning Guidance**

- 10.7 WDBC’s On Shore Wind Turbines in West Devon Interim Planning Guidance for Prospective Developers (outside of the Dartmoor National Park), September 2013, provides the following Development Management Principle for biodiversity:

*“Development Management Principle: Biodiversity*

*Most relevant adopted Local Development Plan policies:*

*Core Strategy Strategic Policy 3: Renewable Energy; Strategic Policy 19: Biodiversity*

*Developers should:*

- Identify any impacts on wildlife and habitats arising from their proposals, initially through a PEA supplemented by further surveys as required;*
- Check information held at the Devon Biodiversity Records Centre;*
- Seek the agreement of Natural England regarding the nature, timing and design of any work to assess impacts; and*
- Identify the presence of protected species and habitats, the potential impacts from the proposal and potential mitigation measures prior to submitting a planning application.*

*The Development Management team will:*

- Seek opportunities to conserve, enhance and restore habitats where possible, regardless of the designation of sites.”*

## ASSESSMENT METHODOLOGY

### Ecological Baseline

- 10.8 The existing ecological baseline has been established by undertaking a desk-based study, an extended Phase 1 Habitat Survey and bat activity surveys (manual transects and static detector at ground level). No additional Phase 2 protected species surveys were considered necessary to inform the proposed development and assessment.
- 10.9 Surveys have been undertaken with reference to the relevant guidelines including:
- Handbook for Phase 1 Habitat Survey (JNCC, 2010),
  - Technical Information Note TIN051: Bats and onshore wind turbines (Natural England);
  - Technical Information Note TIN059: Bats and single large wind turbines (Natural England); and,
  - Bat Surveys – Good Practice Guidelines 2nd Edition (Bat Conservation Trust, 2012).

### Desk Study

- 10.10 The following sources were used to obtain existing information on designated sites of nature conservation interest and existing records of protected/notable species generally within 2 km of the site (10 km with respect to bats):
- Devon Biodiversity Records Centre (DBRC);
  - Devon Bat Group;
  - MAGIC website;
  - Ordnance Survey maps; and
  - Google Earth.
- 10.11 The List of Species of Principal Importance in England and the Devon Biodiversity Action Plan (BAP) were also reviewed in order to identify notable species of potential interest to the study area.
- 10.12 Consultation was undertaken with the ecologist at WDBC in July 2014 with respect to Phase 2 bat surveys.

### Extended Phase 1 Habitat Survey

- 10.13 An extended Phase 1 Habitat Survey was undertaken by Hannah Maben MCIEEM on 25<sup>th</sup> June 2014 in accordance with JNCC guidelines (2010), with habitats occurring within the survey area being recorded along with their suitability to support notable flora and fauna. Any incidental evidence of protected species was also noted and an indicative species list taken. Target Notes were used to highlight specific areas of interest or as a reference tool.

## Bat Activity Surveys

### *Manual Transect*

- 10.14 An evening activity survey was undertaken on 18<sup>th</sup> August 2014 and 6<sup>th</sup> October 2014. The survey commenced 15 minutes before sunset and continued for two hours after sunset. The survey was led by Hannah Maben, an experienced and licensed bat surveyor. A line transect was designed to incorporate all field boundaries surrounding the proposed turbine location (Figure 10.2). Seven regularly spaced listening points were identified along the transect route and each was visited twice during each survey. The line transect was walked at a constant speed with seven minutes spent recording at each listening point along the route. The route was walked in reverse in the October survey. Bat passes were recorded continually throughout the survey (between and at listening points); all bat passes were recorded using Bat Box Duet and SSF Bat 2 detectors.

### *Automated Survey at Ground-level*

- 10.15 Two Anabats were positioned within the woodland edge approximately 170 m to the west of the proposed turbine location on 19<sup>th</sup> August 2014 until the 24<sup>th</sup> August 2014 (six nights). Two Anabats were positioned in the survey area from 6<sup>th</sup> October until the 11<sup>th</sup> October (five nights); one Anabat was placed in the north-west of the survey area, alongside the woodland edge and the other in the location of the proposed development. Subsequent analysis of calls was undertaken by Adrian Dowding, an experienced bat ecologist using Analook software.

## **Evaluation**

- 10.16 An evaluation of the ecological features (habitats and species) was undertaken with reference to the Ratcliffe criteria (Ratcliffe, 1977) and IEEM (2006) with features being valued at between Negligible and International value (Appendix 10.1).

## **Assessment of Impacts**

- 10.17 An assessment of impacts on ecological features was undertaken. Impacts identified on features of less than Local value were not considered to be 'Significant' and as such have not been detailed. Impacts were characterised in accordance with the IEEM (2006) criteria:
- confidence in predictions;
  - positive or negative;
  - magnitude;
  - extent;
  - duration;
  - reversibility; and,
  - timing and frequency.

## Mitigation and Enhancement Measures

- 10.18 Mitigation measures are proposed to avoid, reduce or compensate for adverse impacts. Enhancement measures are proposed to provide biodiversity gain, where possible and appropriate, in accordance with NPPF (2012), Strategic Policy 19 (WDBC, 2011) and WDBC's Interim Planning Guidance (2013).

## Residual Impacts

- 10.19 Residual impacts of the proposed development are assessed based on the predicted level of impacts with the mitigation and enhancement measures in place.

## BASELINE CONDITIONS

### Desk Study

#### Designated Sites of Nature Conservation Value

- 10.20 There are no statutory nature conservation designations within 2 km of the proposed turbine. One Special Area of Conservation (SAC), eight Sites of Special Scientific Interest (SSSI) and one Local Nature Reserve (LNR) lie within 10 km of the proposed turbine (the closest being Coryton Quarry SSSI approximately 3.9 km south-east of the proposed turbine location). None of these sites within the wider search area (2 km – 10 km) are designated specifically with respect to bats. North Dartmoor SSSI, which is located approximately 9.3 km east of the proposed turbine location, is cited as supporting a diverse upland breeding bird community, including golden plover, dunlin, whinchat, wheatear and ring ouzel.
- 10.21 Within 2 km of the proposed turbine, there are two County Wildlife Sites (CWS), one Other Site of Wildlife Interest (OSWI), two Ancient Woodlands and two Unconfirmed Wildlife Sites (UWS). The nearest of these sites is Barton Patch OSWI, part of which lies immediately to the west of the field within which the proposed development will be sited. This OSWI comprises two disused limestone quarries with deep lakes collectively covering an area of 12.2 ha.
- 10.22 The site does not lie within a Greater Horseshoe Bat Consultation Zone.
- 10.23 There are no Important Bird Areas within 10 km of the proposed turbine and the site does not lie within a sensitive bird area in relation to on shore wind turbines in England (Bright et al., 2009).
- 10.24 The site is not within a Great Crested Newt Consultation Zone.

Habitats and Ecological Context

- 10.25 Based on a review of Ordnance Survey maps and Google Earth, the site appears typical of the farmed landscape within which it lies being surrounded by pasture and arable land bisected by hedgerows with some large water bodies, a watercourse and small woodlands to the west and south. There are no buildings within 500 m of the proposed turbine. Wrey's Barton and other buildings associated with the village of Stowford are present approximately 750 m south of the proposed turbine.
- 10.26 The River Thrushel lies within a wooded valley around 850 m to the west of the site and the A30 is approximately 1.3 km to the north of the site. Other farmsteads, small villages, watercourses and minor roads are present to the east and south of the site.
- 10.27 The survey area comprises one agricultural field bounded by hedgerows to the north and south, a fence line to the east and woodland to the west. The woodland adjoins the north-eastern boundary of a large water body (both the woodland and water body form part of the Barton Patch OSWI). These boundaries separate the survey area from adjacent fields to the north, east and south which are all under mixed agricultural use. The boundary hedgerow and woodland appear, from aerial photographs and OS maps, to be connected to a wider network of hedgerows and woodland surrounding the site on all aspects.
- 10.28 There is no apparent standing water on site. The large water body (approximately 230 m by 40 m) at Barton Patch OSWI lies approximately 185 m to the west of the proposed turbine. No other water bodies are apparent within 500 m of the proposed turbine.

Protected/Notable Species

- 10.29 Table 10.1 below summarises existing records of protected and notable species within 2 km of the site (10 km with respect to bats) provided by DBRC and Devon Bat Group (four-figure OS grid references [OS grid squares] were provided by the bat group and by the Barn Owl Trust [c/o DBRC] so it is not possible to identify the precise location of a record). Legislation relevant to these species is provided within Appendix 10.2. There are no records provided for the field within which the proposed development is sited, but bat and barn owl records exist for the 10 km grid square within which the site lies.

**Table 10.1: Existing Records of Protected/Notable Species (DBRC/Devon Bat Group, 2013)**

| SPECIES / GROUP | SUMMARY  |
|-----------------|--|
| Flora           | Two records provided; bottle-sedge (Devon Notable species) and primrose (Devon BAP species)  |
| Bats            | Brown long-eared, lesser horseshoe bat, common pipistrelle bat and an unidentified species of bat have been recorded roosting within 2 km of the site. The nearest soprano pipistrelle record is also somewhere between around 1.5 and 2.5 km from the site. The nearest records are those of unidentified species at least 750 m to the south of the site in the village of Stowford. |

| SPECIES / GROUP | SUMMARY   |
|-----------------|---|
|                 | <p>Further records for these species exist between 2 km and 10 km of the site, and for other species, including greater horseshoe bat (15 records, the nearest is at least 7 km from the site), Natterer's bat (16 records, the nearest record being at least 5 km from the site), Daubenton's bat (12 records, the nearest record is at least 5 km from the site), whiskered/Brandt's bat (25 records, the nearest being over 5 km from the site), barbastelle bat (eight records, the nearest being at least 3 km from the site), Leisler's bat (one record at least 2 km from the site) and noctule bat (seven records, the nearest being at least 2 km from the site).</p> <p>Table 10.2 below considers local bat records further.</p> |
| Badger          | No records.   |
| Other mammals   | No records.   |
| Birds           | Four bird species records have been provided. One record of song thrush and swallow around 650 m north-east of the site and two records of barn owl to the east of the site (one within 1 km).  |
| Reptiles        | No records.   |
| Amphibians      | One record of common frog within 1.5 km to the south-east of the site.  |
| Invertebrates   | One record of brown hairstreak butterfly within 1.5 km to the south-west of the site.   |

- 10.30 Table 10.2 below considers the records of medium and high risk bat species from wind turbines (Natural England, 2009) within 10 km of the proposed turbine.

**Table 10.2: Existing Records of Medium/High Risk Bat Species from Wind Turbines within 10 km (DBRC/Devon Bat Group, 2013)**

| SPECIES / GROUP     | SUMMARY  |
|---------------------|--|
| Medium risk species | <p>Four medium risk species, three of which have been recorded within 10 km of the site:</p> <p>Common pipistrelle – One of the most numerous returns of records with around 92 records out of over 550. These records include breeding roosts, temporary roosts and feeding/flying bats; the nearest record is of a building roost from within the 1 km<sup>2</sup> within which the site lies.</p> <p>Soprano pipistrelle – 15 records out of over 550 records returned; the nearest one being of a bat box at least 1.5 km north-east of the site.</p> <p>Barbastelle – Only eight records out of over 550 records returned; the nearest one being of a feeding/flying bat and a barn roost at least 3 km south-west of the site.</p> |

| SPECIES / GROUP   | SUMMARY  |
|-------------------|--|
|                   | There are no records for the other medium risk species, serotine.  |
| High risk species | <p>Three high risk species, two of which have been recorded within 10 km of the site:</p> <p>Noctule – In total there are seven records for noctule bat within 10 km of the site out of more than 550 bat records provided. Of these seven records a single record of a roost occurs at least 2 km north-east of the site. Other records are of foraging/flying noctule bats with the nearest being at least 2 km to the north-west and others to the south and south-east of the site.</p> <p>Leisler's bat – Only one record of Leisler's bat within 10 km of the site out of more than 550 bat records provided. The record is of a temporary roost at least 2 km to the north-west of the site.</p> <p>There are no records for the other high risk species, nathusius' pipistrelle.</p> |

## Extended Phase 1 Habitat Survey and Bat Activity Surveys

### Habitats

#### *General*

- 10.31 The proposed development is to be located in the north-east of a field comprising an area of approximately 3.5 ha. The field (survey area) comprises improved grassland that slopes down to the south and west becoming increasingly steep towards the western site boundary. Hedgerows bound the survey area to the north and south, a fence line to the east and a fence line to the west. The boundaries separate the survey area from arable land and further improved grassland to the north and east, woodland to the west and unimproved/marshy grassland to the south. The proposed turbine location is in the north-east of the field, which is the most prominent and exposed area of land. The distribution of habitats within the survey area are shown on Figure 10.1 and described below. Common names of species are given in the main text with Latin names (Stace, 2010) provided within Appendix 10.3 (indicative species list).

#### *Improved Grassland*

- 10.32 The survey area comprises an area of improved grassland that comprises perennial ryegrass, fescue species, Yorkshire-fog and some cock's-foot and dock species. The grass had been cut shortly before the survey was undertaken and is also used for grazing cattle (although no cattle were grazing at the time of the survey).



### *Hedgerow*

- 10.33 Two hedgerows border the survey area. The hedgerow to the south of the survey area has an access gate at its eastern end and adjoins with woodland approximately 156 m to the west and hedgerow to the east. The hedgerow was approximately 2 m – 2.5 m in height in the summer, but flailed to approximately 1 m in height in the autumn; it appears well managed and has an associated overgrown post and barbed wire fence. The species composition varies along the length of the hedgerow with willow species, hazel, blackthorn, bramble, hawthorn, elder and ash forming the woody species at the eastern end with hogweed, cleavers, wild carrot, common nettle, ground ivy and red campion also present. The far western end of this southern boundary hedgerow is dominated by bracken and immediately either side of the existing access gate comprises tall ruderals as opposed to woody species.
- 10.34 The hedgerow along the survey area's northern boundary is unbroken and adjoins with woodland approximately 240 m to the west, a hedgerow to the north and hedgerow to the east. The hedgerow is approximately 3 m in height in the summer, but was flailed to approximately 2 m in the autumn; the hedgerow appears well managed and has an overgrown post and barbed wire fence. Species include elder, bramble, hawthorn, hazel, holly, blackthorn, sycamore, some oak and ash, dog-rose, field-rose, honeysuckle, cleavers, common nettle, red campion, hedge woundwort, bloody crane's-bill, vetch species and *Juncus* species.

### *Fence lines*

- 10.35 A post and wire netting fence line depicts the survey area's eastern boundary. The fence is in good condition and lacks any associated vegetation. Post and wire fencing is also associated with the woodland edge and hedgerows to the north, east and west of the site.

### *Adjacent Habitats*

- 10.36 The woodland approximately 156 m to the west of the survey area comprises numerous mature beech and some mature pedunculate oak. Some trees support heavy and thick-stemmed ivy. Immature and semi-mature holly, elder, sycamore, ash and blackthorn are also present within the woodland. Ground flora comprises common nettle, curled dock, hedge woundwort, colts-foot, herb-Robert field-rose and grass species. The woodland grows on a bank that falls steeply to the west where there is a large water body.
- 10.37 Two fields lie to the north of the survey area beyond the hedgerow. These fields comprise arable land and improved grassland and are separated by a tall hedgerow that adjoins the hedgerow on the survey area's northern boundary. A field of improved grassland is present to the west of the survey area and appears to be under similar management to that on site. The grassland field to the south of the survey area has a stream flowing northwards along its western boundary towards the large water body to the west of the site. The grassland to the south includes areas of improved grassland on a north-facing slope and an area of unimproved marshy grassland is present to the north-west of the field at its lowest point.

### Protected and Notable Species

- 10.38 The suitability of habitats within the survey area has been considered alongside existing records of species when assessing the likely presence and value of the site to such species.

#### *Flora*

- 10.39 The survey area comprises land which is subject to rotational farm management. No Schedule 8 or 9 species as (Wildlife and Countryside Act 1981 [as amended]) were observed during the survey. The boundary hedgerows are species-rich and have potential along with adjacent woodland to support bluebell (a Schedule 8 species) and primrose (a Devon BAP species recorded locally [DBRC]). Similar habitat and opportunities for such species are abundant in the local area. The fence line is of no botanical interest and the improved grassland is of very little botanical interest due to its improved nature and management.

#### *Bats*

- 10.40 The improved grassland provides very limited foraging opportunities for bats due to its low species and structural diversity and its exposed nature. The boundary hedgerows and woodland edge offer good foraging and commuting habitat and are well connected to areas of woodland and further hedgerows and higher quality foraging habitat within the local landscape.
- 10.41 There are no built structures within 200 m of the site; however, the proposed turbine is located approximately 156 m east of the woodland that supports several mature trees, some with dense ivy cover and providing opportunities for roosting bats. There is no other suitable roosting habitat within 200 m of the site.
- 10.42 Manual Transect: The detailed results of the manual bat activity surveys are provided within Appendix 10.4. A low level of bat activity was recorded during the initial transect survey in August 2014. Five species of bat were recorded during the survey including soprano pipistrelle (11 records), serotine (four records), common pipistrelle (two records), noctule bat (two records) and long-eared species (one record). Most bat activity was recorded along the woodland edge at a distance in excess of 156 m from the proposed turbine and, in particular, in the north-western corner of the survey area and along the western end of the northern hedgerow (points 3 - 6, Figure 10.2). Bat activity was less in the eastern end of the survey area, where the turbine is proposed.
- 10.43 Low levels of bat activity were recorded during the October survey despite optimal conditions. The same five species of bat were recorded during the survey including soprano pipistrelle (six records), serotine (two records), common pipistrelle (one record), noctule bat (one record) and long-eared species (one record); a further two brief passes by a pipistrelle species were recorded. Bat activity was recorded primarily in the south-west of the survey area, with the majority of passes alongside the woodland edge between (points 3 – 6, Figure 10.2).

- 10.44 Static Detectors: In August 2014, a total of 2,934 bat passes were recorded from the two static detectors; 2,244 bat passes recorded from the south-west corner of the survey area (Woodland 2) and 690 from the north-west corner of the survey area (Woodland 1). In October 2014, a total of 2,515 bat passes were recorded, which were all from the north-west corner of the survey area. No bat passes were recorded from the static detector placed in the proposed turbine location suggesting that it is unlikely to lie on a key flight path for any species.
- 10.45 Tables 10.3 and Table 10.4 below summaries the results of the two static detectors from August and October 2014. Full analysis of the recordings is provided in Appendix 10.4.

**Table 10.3: Summary of Static Bat Detector Results, August 2014**

| SPECIES               | WOODLAND 1  | WOODLAND 2   |
|-----------------------|---|--|
| Common pipistrelle    | August: Recorded on all six evenings. Peak count of 70. Total count of 143 (average <24 per evening)  | August: Recorded on three evenings. Peak count of 261. Total count of 361 (average >60 per evening)      |
| Brandt's bat          | August: Recorded on four evenings. Peak count of 12. Total count of 18 (average three per evening)    | August: A single pass recorded on one evening  |
| Leisler's bat         | August: Recorded on five evenings. Peak count of 8. Total count of 17 (average <three per evening)    | August: None recorded  |
| Long-eared bats       | August: Recorded on all six evenings. Peak count of 68. Total count of 136 (average >22 per evening)  | August: Recorded on all but one evening. Peak count of 64. Total count of 129 (average >21 per evening)  |
| <i>Myotis</i> species | August: A single pass recorded on one evening   | August: None recorded  |
| Natterer's bat        | August: None recorded   | August: Recorded on a single evening. Peak count of four. Total count of four (average <one per evening) |
| Noctule               | August: Recorded on all six evenings. Peak count of 21. Total count of 42 (average seven per evening) | August: None recorded  |
| Serotine              | August: Recorded on two evenings. Peak count of two. Total count of three (average <one per evening)  | August: None recorded  |
| Soprano pipistrelle   | August: Recorded on all six evenings. Peak count of 180. Total count of 318 (average 53 per evening)  | August: Recorded on all but one evening. Peak count of 889. Total of 1744 (average >290 per evening)     |

| SPECIES              | WOODLAND 1            | WOODLAND 2            |
|----------------------|-----------------------|-----------------------|
| Lesser horseshoe bat | August: None recorded | August: None recorded |

**Table 10.3: Summary of Static Bat Detector Results, August 2014**

| SPECIES               | WOODLAND 1   | PROPOSED TURBINE |
|-----------------------|--|------------------|
| Common pipistrelle    | October: Recorded on all five evenings. Peak count of 166. Total count of 286 (average >57 per evening)  | October: N/A*    |
| Brandt's bat          | October: None recorded   | October: N/A*    |
| Leisler's bat         | October: None recorded   | October: N/A*    |
| Long-eared bats       | October: Recorded on all five evenings. Peak count of 256. Total count of 501 (average >100 per evening) | October: N/A*    |
| <i>Myotis</i> species | October: Recorded on three evenings. Peak count of one. Total count of three (average <one per evening)  | October: N/A*    |
| Natterer's bat        | October: Recorded on three evenings. Peak count of two. Total count of four (average <one per evening)   | October: N/A*    |
| Noctule               | October: A single pass recorded on one evening   | October: N/A*    |
| Serotine              | October: None recorded   | October: N/A*    |
| Soprano pipistrelle   | October: Recorded on all five nights. Peak count of 649. Total count of 1720 (average >32 per evening)   | October: N/A*    |
| Lesser horseshoe bat  | October: A single pass recorded on one evening   | October: N/A*    |

\* Second detector was placed in the location of proposed turbine in October; no bat passes were recorded.

- 10.46 The two static detectors recorded high levels of bat activity throughout the six nights of recording in August. Soprano pipistrelle records were by far the most frequently recorded, particularly in the south-west of the survey area (with up to 889 recordings from the south-west corner on any one night), followed by common pipistrelle and long-eared bats (peak counts of 261 and 68 respectively). Whilst the level of bat activity was greater in the south-west of the survey area, the number of species recorded was greater in the north-west of the survey area. Species recorded at both locations included soprano pipistrelle, common pipistrelle, long-eared species and Brandt's bat. Natterer's bat was recorded on a single evening from just the south-west of the survey area (four

- recordings). Leisler's bat, noctule and serotine were recorded only in the north-west of the survey area.
- 10.47 The static detector positioned along the woodland edge in October again recorded high levels of bat activity, but no bats were recorded by the static detector positioned at the proposed turbine location. Soprano pipistrelle records were again by far the most frequent, with up to 649 passes recorded on any one night, followed again by long-eared bats and common pipistrelle bats (peak counts of 166 and 256 respectively). Whilst the number of bat passes recorded in the Woodland 1 location was greater in October than it was in August 2014, the species diversity was less with only seven species recorded including soprano pipistrelle, long-eared species, common pipistrelle, Natterer's bat, *Myotis* species, noctule bat and a lesser horseshoe bat.
- 10.48 On four of the six nights in August the overall bat activity was greatest between 20:40 and 22:00. On two nights in August (21<sup>st</sup> and 24<sup>th</sup> August 2014) pipistrelle and long-eared activity continued throughout the night in the Woodland 1 and 2 locations. Activity was recorded throughout the night in October.
- 10.49 Noctule activity was only recorded in the Woodland 1 location. In August, activity was generally recorded between 20:50 and 22:00, but a low number of passes were also recorded on two mornings (23<sup>rd</sup> and 25<sup>th</sup> August 2014) between around 04:40 and 05:45. Only two noctule passes were recorded between 23:00 and 04:40 throughout the six nights in August (one at 00:48 on 23<sup>rd</sup> August 2014 and one at 00:20 on 25<sup>th</sup> August 2014). In October, very few noctule passes were recorded (total of four passes). These passes were early morning or early evening (03:17 on 6<sup>th</sup> October; 19:25 on 8<sup>th</sup> October; 19:03 and 19:48 on 9<sup>th</sup> October). Sunset was between 20:21 and 20:29 during the August survey period and between 18:35 and 18:45 during the October survey. Sunrise was between 06:13 and 06:21 during the August survey period and 07:27 and 07:34 during the October survey period. Noctule bats were recorded as early as 26 minutes after sunset and as late as 36 minutes before dawn. These results suggest that a noctule roost may be present within proximity to the detector at Woodland 1 (noctules typically emerge 0 – 40 minutes after sunset) and foraging around this location before commuting off site. 13 of the total 42 passes were recorded within nine minutes on one evening (21<sup>st</sup> August; 35 – 45 minutes after sunset) so were likely attributable to one or two bats perhaps foraging soon after emerging from a nearby roost.
- 10.50 Leisler bat activity was only recorded at the Woodland 1 location in August. Activity was less frequent in the evenings and the earliest record was 41 minutes after sunset and the latest was one hour and 11 minutes. This species generally emerges at sunset and on average 18 minutes after sunset. The low number of Leisler bat passes was sporadic throughout most nights in August indicating that the Woodland 1 location is on an occasional flight path for a low number of Leisler bats.
- 10.51 High levels of soprano pipistrelle and common pipistrelle activity was recorded within both the Woodland 1 and 2 locations. Pipistrelle activity was generally greatest between 22:30 and 22:00 in August, but continued throughout the night and subsequent morning on 21<sup>st</sup> and 24<sup>th</sup> August 2014 and throughout October 2014. The earliest soprano pipistrelle bat was recorded eight/six minutes after sunset (Woodland 1/Woodland 2 respectively) and the last one was recorded 34/19 minutes before sunrise (Woodland

- 1/Woodland 2 respectively). The earliest common pipistrelle bat was recorded 20/12 minutes after sunset (Woodland 1/Woodland 2 respectively) and the last one was recorded one hour and 10 minutes/one hour and four minutes before sunrise (Woodland 1/Woodland 2 respectively). Both soprano pipistrelle and common pipistrelle bats typically emerge around 20 minutes after sunset so the results of the survey suggest that these species are roosting within proximity to both the Woodland 1 and 2 locations and are using the woodland edge for foraging and commuting.
- 10.52 Serotine was only recorded in the Woodland 1 location and only three serotine passes were recorded over the survey period (one on the 19<sup>th</sup> August 2014 and two on the 24<sup>th</sup> August 2014 (none in October)). These passes were recorded at 21:47, 22:23 and 22:25. The number of records is insufficient to base any assessment on the possible use of the site by this species, but does suggest that any use is low level and occasional.
- 10.53 Low risk bat species including long-eared bats, *Myotis* species (including Natterer's and Brandt's bats) and lesser horseshoe bats were also recorded. *Myotis* records were low and just a single lesser horseshoe bat was recorded on one evening in October. Moderate/high levels of long-eared bat passes were recorded in both the Woodland 1 and 2 location in August/October 2014 respectively. The earliest long-eared bat was recorded 42/56 minutes after sunset (Woodland 1/Woodland 2 respectively) and the last one was recorded 59 minutes/one hour and seven minutes before sunrise (Woodland 1/Woodland 2 respectively). Long-eared bats typically emerge around an hour after sunset so the results of the survey suggest that these species may be roosting within proximity to both the Woodland 1 and 2 locations and are using the woodland edge for foraging and commuting.
- 10.54 The surveys suggest that other species recorded locally (DBRC and Devon Bat Group) including barbastelle, whiskered, Daubenton's bat and greater horseshoe bats are unlikely to use the survey area extensively (if at all), but may also use the survey area occasionally or in low numbers despite not being recorded during the surveys.

#### *Badger*

- 10.55 The survey recorded no evidence of badger in the survey area and there are no records of this species within 2 km of the site. The improved grassland provides optimal foraging opportunities for badger. The boundary hedgerows and adjacent woodland provide seasonal foraging resources and sett building opportunities. Surrounding habitats provide an abundance of similarly suitable opportunities and the survey area is unlikely to be of significance to this species (if present).

#### *Dormouse*

- 10.56 The improved grassland and fence lines provide no opportunities for dormouse. The boundary hedgerows and adjacent woodland are well connected to similar habitats in the local landscape and provide suitable opportunities for dormouse. No records of dormouse have been identified (DBRC) within 2 km of the site, but given the suitability of the habitats in the survey area and good connectivity between these features and other suitable habitat in the local area (woodland and hedgerow network) the presence of dormouse utilising the boundary hedgerow and adjacent woodland cannot be discounted.

### *Other Mammals*

- 10.57 The improved grassland provide some seasonal foraging opportunities and shelter for small mammals and are likely to support some of the species recorded locally in combination with the wider landscape including brown hare and roe deer. A small woven nest (around 20 cm in diameter), likely that of a harvest mouse, was noted beyond the south-western corner of the survey area; given the management of the improved grassland on site it is unlikely that it would be used by nesting harvest mouse, but the field boundaries and adjacent woodland edge may be used. An abundance of similar opportunities are likely to be present within the adjoining and local landscape and if the survey area is used (no evidence noted), it is at most only likely to form a small part of these species territory. There is no suitable habitat on or immediately adjacent to the proposed turbine to support otter.

### *Birds*

- 10.58 A carrion crow, woodpigeon and pheasant were noted during the Phase 1 Habitat Survey and a buzzard was observed briefly on the woodland edge shortly after dusk during the bat transect survey in August 2014 and a tawny owl was heard in the distance off-site to the west. The improved grassland provides some seasonal foraging habitat for a range of bird species. Opportunities for foraging raptors may be present at times, but the current habitat is sub-optimal and likely to be less suitable when being grazed. This foraging resource is likely to be used in combination with the wider landscape and its value is likely to be less at other stages of the rotational farming, i.e. when arable. The northern aspect of the field has moderate vantage over the surrounding area to the south and east, but it is limited to the north and west and this is likely to deter large flocks of overwintering birds and waders from the site. Adjacent fields, particularly to the south, may support such species.
- 10.59 The hedgerows and adjacent woodland provide some suitable nesting and foraging habitat for bird species and are likely to be used throughout the year by a range of passerine species (including song thrush recorded locally) in combination with the abundance of similarly suitable habitats surrounding the survey area.

### *Reptiles*

- 10.60 The improved grassland provides suboptimal habitat for reptiles around the perimeter of the survey area; the hedgerows and adjacent woodland provide suitable refuge opportunities. There are no records of reptiles provided by the desk study. If the hedgerows and woodland are used (no evidence noted), it is likely to be in combination with similar adjoining habitats in the local landscape.

### *Amphibians*

- 10.61 There is no standing water in the survey area and the site is suboptimal for amphibians; the hedgerows and woodland edge provide refuge opportunities. The desk study identified one record of common frog 1.5 km south-east of the site and confirmed that the site is not within a Great Crested Newt Consultation Zone. One large water body associated with Barton Patch OSWI lies within 500 m of the site, this water body is

located around 10 m to the west of the survey area and 185 m from the proposed turbine location. This water body is large and deep and associated with a former limestone quarry. It is possible that this water body supports common and widespread species of amphibians, but great crested newts are unlikely to be present due to this species being rare in Devon and the site is not within a Great Crested Newt Consultation Zone.

### *Invertebrates*

- 10.62 A small tortoiseshell and red admiral butterfly were noted on the hedgerows during the extended Phase 1 Habitat Survey. The improved grassland provides poor habitat for invertebrates due to its low species and structural diversity. The hedgerows are likely to support a range of invertebrates given their high species diversity as is the adjacent woodland. Blackthorn is present within the hedgerows and could be used by low numbers of brown hairstreak (a species that has been recorded locally).

## **Ecological Evaluation**

- 10.63 An evaluation of the ecological features within and adjacent to the site is provided in Table 10.5.

**Table 10.5: Ecological Evaluation of Ecological Features**

| <b>FEATURE</b>     | <b>ECOLOGICAL VALUATION</b> | <b>REASON FOR VALUATION</b>   |
|--------------------|-----------------------------|---|
| Improved grassland | Site                        | Common and widespread in local area. Lacks diversity, rarity, permanence and fragility.   |
| Hedgerows          | Local                       | The hedgerows form part of a wider network of hedgerows and feature several ecological attributes, including elements of diversity, naturalness, fragility, typicalness and permanence.<br>Species-rich, which enhances its value.  |
| Set-aside          | Site                        | Common and widespread in local area. Lacks diversity, rarity, permanence and fragility.   |
| Fence line         | Negligible                  | Common and widespread in local area. Lacks diversity, rarity, naturalness, permanence and fragility.  |
| Adjacent habitats  | County                      | The surrounding landscape comprises pasture and arable field units bordered and occasional watercourses, hedgerows and woodlands. An OSWI lies immediately adjacent to the site. These provide a diversity of habitats for a range of local wildlife. Hedgerow network, woodlands, watercourses and woodland corridors in particular provide diversity, naturalness, fragility, typicalness and permanence. |
| Flora              | Site                        | Limited species diversity provided by the habitats on site, but the hedgerows and adjacent woodland may support bluebell and primrose (Devon BAP species). The majority of the site is unlikely to support species of note. Extensive similar habitat in surrounding local area.  |



| FEATURE       | ECOLOGICAL VALUATION | REASON FOR VALUATION   |
|---------------|----------------------|--|
| Bats          | Local                | Roosting opportunities adjacent to the site (156 m west of proposed turbine). The hedgerows and adjacent woodland, particularly to the south-west of the site provide foraging and commuting habitat for a moderate number of bats. Extensive similar habitat is present in the surrounding local area with more sheltered areas likely to be of greater interest to bats. |
| Badger        | Site                 | The site provides limited seasonal foraging habitat and the boundary (hedgerows and adjacent woodland) offer suitable sett-building habitat. The site is unlikely to form a significant part of any groups' territory (if any), but at most could contribute a small part to wider foraging habitat. Extensive similar habitat in surrounding local area.                  |
| Dormouse      | Site                 | The hedgerows and adjacent woodland provide suitable habitat for dormouse and given their connectivity to the wider local hedgerow network and woodland use by dormice cannot be discounted.   |
| Other mammals | Site                 | The hedgerow and adjacent woodland provide suitable opportunities for mammals, including brown hare, in combination with surrounding habitats. Extensive similar habitat in surrounding local area.  |
| Birds         | Site                 | The boundary hedgerows and adjacent woodland are likely to support a range of nesting and foraging birds. The improved grassland provides some foraging opportunities, but is limited by its size and management. Extensive similar habitat in surrounding local area.   |
| Reptiles      | Site                 | The hedgerows and adjacent woodland provide foraging and refuge opportunities for widespread species of reptiles. Extensive similar habitat in surrounding local area.   |
| Amphibians    | Site                 | The hedgerows and adjacent woodland provide foraging and refuge opportunities for widespread amphibians. Extensive similar habitat in surrounding local area.  |
| Invertebrates | Site                 | The hedgerows and adjacent woodland provide limited foraging and refuge opportunities for invertebrates, including brown hairstreak. Extensive similar habitat in surrounding local area.  |

## CONSTRUCTION EFFECTS, MITIGATION & RESIDUAL EFFECTS

### Effects

#### Designated Sites of Nature Conservation Value

- 10.64 The adjacent Barton Patch OSWI will not be directly affected during construction. There is a risk of indirect impacts through construction activities such as dust and run-off;

however, such risks would be managed through good working practices as outlined in Chapter 5 and, therefore, are unlikely to be significant.

- 10.65 No impacts on other designated sites of nature conservation interest are anticipated due to the distance between the proposed turbine location and the designations.

#### Habitats within the Site

- 10.66 The proposed development will result in the permanent loss of improved grassland habitat amounting to approximately 1,500 m<sup>2</sup> comprising the concrete turbine base and access route from the field entrance to the base. The cable trench will require approximately 500 m<sup>2</sup> of improved grassland to be excavated. Once the cable has been laid, it will be covered and reseeded so loss will be small scale and temporary. This land will return to rotational agricultural use along with the rest of the field within which the turbine will be sited after the operational phase. This loss would be adverse, certain and long-term/short-term but significant at a Site level, i.e. not significant overall.

- 10.67 The boundary hedgerows and fence lines will not be directly affected during construction. The cable route and access routes will use existing points of access and will not require any hedgerow removal. There is a risk of indirect impacts through construction activities such as dust and run-off; however, such risks would be managed through good working practices as outlined in Chapter 5 and, therefore, are unlikely to be significant.

#### Habitats adjacent to the Site

- 10.68 The adjacent woodland will not be affected directly during construction. There is a risk of indirect impacts through construction activities such as dust and run-off; however, such risks would be managed through good working practices as outlined in Chapter 5 and, therefore, are unlikely to be significant. No impacts on adjacent habitats are anticipated.

#### Protected/Notable Species

##### *Flora*

- 10.69 The proposal will retain and protect habitats of any botanical interest, namely the hedgerows and adjacent woodland edge. No impacts on flora are therefore anticipated.

##### *Bats*

- 10.70 The proposal will retain and protect habitats of value to bats, namely the hedgerows and woodland edge 156 m to the west. Construction activities will be restricted to daylight hours and no lighting is proposed. No impacts on bats are anticipated.

##### *Badger*

- 10.71 The loss of a small area of improved grassland habitat will have a negligible impact on any local badger population. During construction any badgers using the site may be at risk from becoming trapped within any deep trenches left open overnight. No significant impacts on badgers are anticipated.

*Dormouse*

- 10.72 The proposals will retain and protect habitats of interest to dormouse, namely the hedgerows and woodland edge to the west. Temporary noise disturbance may impact on dormouse; however, given the abundance of alternative suitable habitat in the local area such impacts are unlikely to be significant. Such disturbance would be adverse, probable and short-term but significant at a Site level, i.e. not significant overall.

*Other Mammals*

- 10.73 The proposal will retain and protect habitats of most value to other mammals, namely the hedgerows and woodland edge to the west. During construction any other mammals using the site may be at risk from becoming trapped within any deep trenches left open overnight. No significant impacts on other mammals are anticipated.

*Birds*

- 10.74 The proposal will retain and protect the habitats of greatest interest to birds, namely the bounding hedgerows and woodland edge to the west. Construction of the turbine is anticipated to take between three and four months. Depending on when construction commences temporary noise disturbance may impact on nesting birds. Given the abundance of alternative suitable nesting and foraging habitat in the local area, which could easily accommodate any displaced species and unlikely presence of any notable species or important bird populations, such impacts are unlikely to be significant. Such disturbance would be adverse, probable and short-term but significant at a Site level, i.e. not significant overall.

*Reptiles*

- 10.75 The proposal will retain and protect the hedgerows and woodland edge to the west; the only habitats on site to offer some limited suitability to reptiles. No significant impacts on reptiles are anticipated.

*Amphibians*

- 10.76 The proposal will retain and protect the hedgerows and woodland to the west; the only habitats on site to offer some suitability to amphibians. No significant impacts on amphibians are anticipated.

*Invertebrates*

- 10.77 The proposal will retain and protect the bounding hedgerows and woodland edge to the west; the only habitats within proximity to the turbine to offer suitability to invertebrates. No significant impacts on invertebrates are anticipated.

## Mitigation and Enhancement

- 10.78 Much of the proposed mitigation for this scheme is inherent with careful consideration having been given to choosing a low risk site with respect to bats and birds, positioning the proposed turbine away from features (treeline and hedgerow) and using existing access points through hedgerows.

### Habitats

- 10.79 The construction site will be fenced off and all contractors will be made aware of the importance of restricting all works (including storage of machinery and materials) to within the construction site fencing.
- 10.80 The Principal Contractors will be required to work in accordance with best practice and ensure that an appropriate Construction Environmental Management Plan (or similar) is prepared and implemented on site. This will outline measures to avoid pollution incidents and emergency action procedures to be taken if necessary.
- 10.81 All contractors will be required to attend a site induction that will include an overview of the environmental protection measures in place and to be implemented prior to and during works.
- 10.82 Improved grassland habitat within the construction footprint (but outside the concrete base) and along the access route will be reinstated upon completion of the construction works and will continue to form part of a rotational farm management regime.
- 10.83 The scale of the scheme limits opportunities for ecological enhancement. The hedgerows and adjacent woodland edge management could be improved to encourage greater species and structural diversity by providing field margins and the replacement of the metal access gate with a wooden gate to improve connectivity across the site.

### Species

- 10.84 Any construction works between April and September will be restricted to daylight hours and avoid the use of construction lighting.
- 10.85 Any trenches to be left overnight will be either covered (if more than 1 m deep) or provide an appropriate means of escape (only appropriate if less than 1 m deep) to prevent any mammals, reptiles or amphibians from becoming trapped. If despite these measures being taken any fauna does become trapped, then an appropriately qualified ecologist would be contacted immediately for further advice and action.
- 10.86 Food will only be consumed within designated areas on site and litter shall be disposed of appropriately so as not to encourage fauna onto the construction site.

## Residual Impacts

### Designated Sites

- 10.87 No impacts on designated sites are anticipated.

### Habitats

- 10.88 The permanent loss of approximately 1,500 m<sup>2</sup> of improved grassland is considered to be of negligible significance.

### Species

- 10.89 All residual impacts for the construction stage are adverse at the negligible or Site level and are therefore not significant.

## **OPERATIONAL EFFECTS, MITIGATION & RESIDUAL EFFECTS**

### **Effects**

#### Designated Sites

- 10.90 No impacts on designated sites of nature conservation interest are anticipated due to the distance between the site and the designations.

#### Habitats within the Site

- 10.91 No impacts on habitats on site are anticipated.

#### Habitats adjacent to the Site

- 10.92 No impacts on adjacent habitats are anticipated.

#### Protected/Notable Species

##### *Flora*

- 10.93 No impacts on flora are anticipated.

##### *Bats*

- 10.94 Foraging and commuting bats may be adversely affected by the movement of wind turbine blades during the operational phase. Adverse impacts such as killing or injury could be caused by direct collision with the blades or by barotrauma caused by the sudden change in air pressure close to the turbine blade. There are no suitable roosting opportunities on site, but some are likely to be present within the woodland at the survey area's western boundary (156 m west of the proposed turbine location). The exposed position of the eastern part of the survey area reduces the suitability of the hedgerows nearest to the proposed turbine as foraging habitat and commuting routes; no bats were recorded by the static detector placed in the location of the proposed turbine and very few bat passes were recorded during the manual transect surveys to the east of the survey area. Bat activity was most frequent along the more sheltered woodland edge and western end of the northern boundary hedgerow as would be expected.

- 10.95 Ten species of bat have been recorded using the survey area for foraging and commuting. The five low risk species recorded on site (long-eared bat, Brandt's bat, Natterer's bat, *Myotis* species and lesser horseshoe bats) accounted for almost 10% of the overall bat records in August and 20% in October. No significant impacts on low risk bat species are anticipated.
- 10.96 Three of the four medium risk bat species were recorded on site in August (common pipistrelle, soprano pipistrelle and serotine bat) and just two of the four species in October (common and soprano pipistrelle bats). Soprano pipistrelle bats accounted for around 70/68% of the overall bat records and common pipistrelle accounted for around 17/11% of the records in August/October respectively. Whilst soprano pipistrelle and common pipistrelle are at medium risk of collision with turbines, their populations are at low risk from turbines (Natural England, 2009). Pipistrelle are common and widespread throughout the UK, South West and Devon (collectively pipistrelle species form 131 of around 550 bat records provided from within 10 km of the site). Impacts are unlikely to occur; however, if they do occur impacts on low numbers are unlikely to significantly affect local populations and are even more unlikely to significantly affect populations at a regional or national level i.e. they are not significant overall.
- 10.97 The turbine base has been positioned approximately 64 m from the hedgerow along the northern field boundary and 66 m from the hedgerow along the southern field boundary, which ensures that a minimum 50 m buffer is maintained between these features and any part of the turbine (in accordance with TIN051). Furthermore the proposed turbine will be 156 m from the woodland edge at its nearest point where most bat activity has been recorded. The provision of this buffer will ensure that potential impacts on soprano pipistrelle and common pipistrelle bat species are minimised as these species typically fly low and close to features such as hedgerows and treelines.
- 10.98 Serotine bats are less common (these accounted for around 0.1% of the records) and are at medium risk of collision with turbines and their populations are also at medium risk from turbines (Natural England, 2009). The number of serotine passes recorded (three) equates to an average of approximately one pass every two nights in August, but this species was not recorded in October, which is considered to be indicative of an occasional and very low level of activity. No records of serotine have been provided from within 10 km of the site. Impacts on medium risk bats species are unlikely to occur; however, if they do occur, they are likely to be adverse, long-term and potentially significant at the Site level, i.e. not significant overall.
- 10.99 Two of the three high risk bat species were recorded in the survey area (noctule and Leisler's bat) in August, accounting for around 0.6% and 1.4% respectively of the overall bat records for the site. Noctule was the only high risk bat species recorded in October, accounting for less than 0.2% of the overall bat records. Noctule bats are uncommon and Leisler's bats are scarce with only seven existing records of noctule bat and one of Leisler's bat within 10 km of the proposed turbine location (out of around 550 records provided). Both noctule and Leisler's bat are at high risk of collision with turbine and their populations are also at high risk from turbines (Natural England, 2009).

10.100 The total number of noctule passes recorded (42 in August and four in October) equates to an average of approximately four passes per night, which is considered to be indicative of a low level of activity. The number of Leisler's passes recorded (17) equates to an average of approximately one pass per night, which is also considered to be indicative of a low level of activity. The siting of the turbine away from potential bat features (in accordance with TIN051) reduces, but is unlikely to entirely avoid, potential impacts on noctule and Leisler's bats, which fly at high level across open habitat. No bats were recorded flying across the survey area during either of the manual activity transects or on the static detector placed in the proposed location. All noctule and Leisler bats were recorded in the western part of the survey area, away from the proposed turbine location and as such it is considered unlikely that the proposed turbine location is sited on a key commuting corridor for high risk bat species. Impacts on high risk bat species are unlikely to occur; however, if they do occur, they are likely to be adverse, long-term and potentially significant at the Local level, i.e. not significant overall.

#### *Badger*

10.101 No impacts on badger are anticipated.

#### *Dormouse*

10.102 No impacts on dormouse are anticipated.

#### *Other mammals*

10.103 No impacts on other mammals are anticipated.

#### *Birds*

10.104 Wind turbines can impact upon both breeding and wintering birds through disturbance and/or collision. Literature review of the impacts of wind power on birds and bats (Rudell *et al.*, 2012) has identified that by far the most important measure that can be taken to minimise the risk of negative effects on birds is to identify the dangerous locations and avoid locating wind turbines there. Most accidents with birds occur in places where they concentrate.

10.105 There are no designated sites for birds within 10 km of the site and the survey area does not lie within a sensitive area as identified by RSPB (2009). The survey area is elevated, but is neither on a ridge nor near any wetlands or large water bodies. Barn owl has been recorded within 2 km of the site and a buzzard was noted on the woodland edge during the bat survey. The survey area alone could not support important populations of any species, but it could be used alongside its immediate surroundings to form a small part of a wider foraging area for these species. Pheasants use the survey area and are known to have a high collision rate with turbines; however, this is not a species of conservation concern.

10.106 Some disturbance and collision is probable; however, if disturbance and collision does occur, it is likely to be adverse, long-term and significant at the Site level alone for breeding and wintering birds, i.e. not significant overall.

- 10.107 Post-construction, the proposals are for the land to continue to be subject to rotational farm management. This land management together with maintenance of the turbine is unlikely to significantly affect bird populations on or adjacent to the site.

#### *Reptiles*

- 10.108 No impacts on reptiles are anticipated.

#### *Amphibians*

- 10.109 No impacts on amphibians are anticipated.

#### *Invertebrates*

- 10.110 No impacts on invertebrates are anticipated.

### **Mitigation and Enhancement**

- 10.111 Much of the proposed mitigation for this scheme is inherent with careful consideration having been given to choosing a low risk site with respect to bats and birds. The proposed turbine has been positioned as far away from features (treeline and hedgerow) as possible in order to maintain a minimum 50 m buffer between the treeline and any part of the proposed turbine. The proposals will also use existing access points through hedgerows.

- 10.112 The scale of the scheme limits opportunities for ecological enhancement. The treeline and hedgerow management could be improved to improve species diversity and by providing field margins and less heavy or less frequent flailing of the hedgerow, the replacement of the metal access gate with a wooden gate and hedgerow planting to improve connectivity across the site. Positioning the turbine base 64 m from the hedgerow along the field's northern boundary and 66 m from the hedgerow along the field's southern boundary will enable a minimum 50 m buffer to be maintained between any part of the turbine.

#### Habitats

- 10.113 No mitigation proposed.

#### Species

- 10.114 No mitigation proposed.

### **Residual Impacts**

#### Designated Sites

- 10.115 No impacts on designated sites are anticipated.

#### Habitats

- 10.116 No impacts on habitats are anticipated.



Species

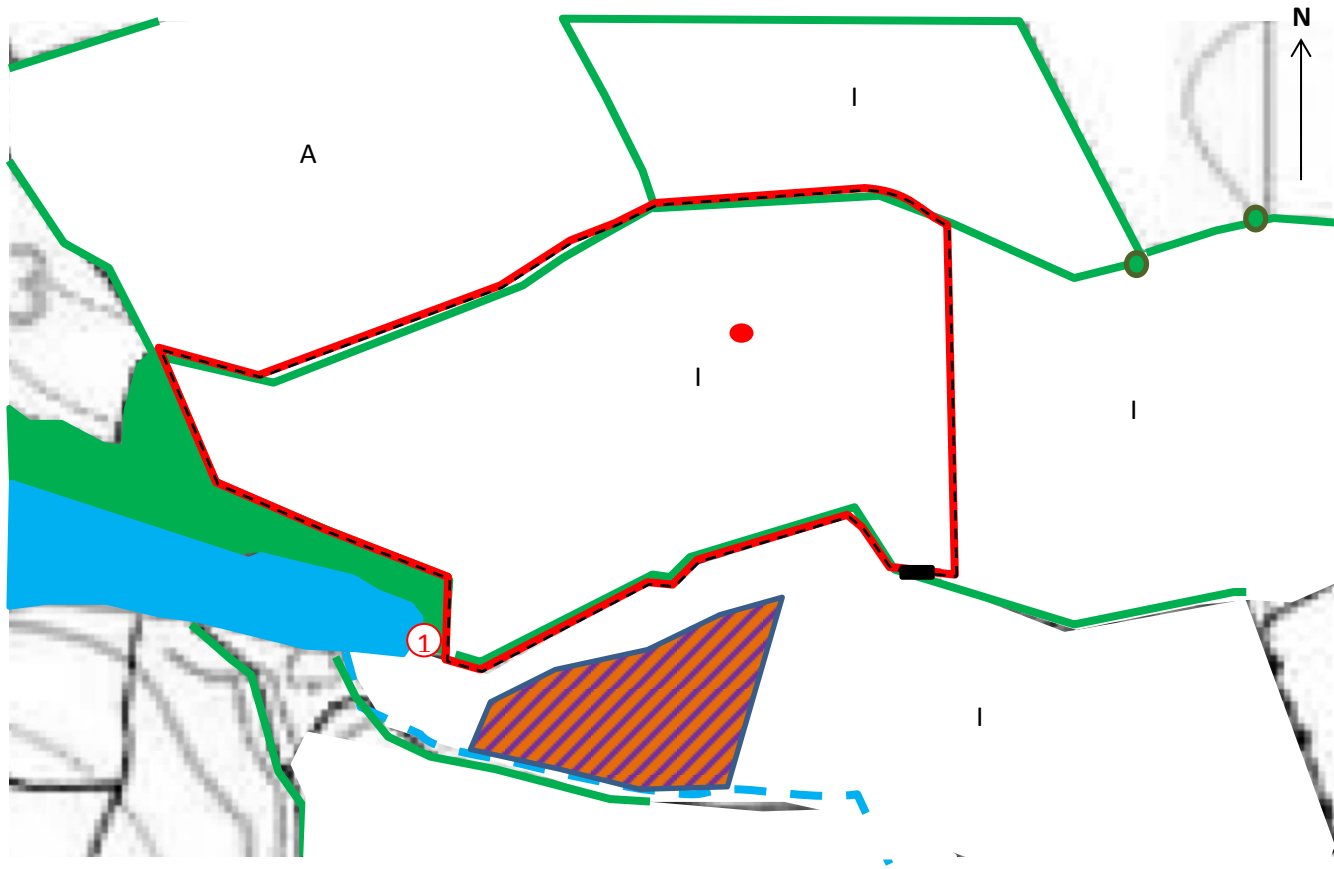
- 10.117 There is the potential for some residual effects on bat and bird populations as a result of the proposed turbine, but these are unlikely. The turbine is located away from any designated sites for bats and birds and the site does not lie within a sensitive area as identified by RSPB (Bright et al., 2009). The turbine base is situated to ensure that the tip of the blades is more than 50 m from the nearest hedgerows bounding the survey area and is therefore in accordance with Natural England design guidance (Natural England, 2009). The turbine is also located to the east of the survey area away from where most bat activity was recorded (most activity was recorded along the western site boundary). Based on the assessed value of the site for bat species, impacts are unlikely to occur, but where they do they would be adverse, long-term and potentially significant at the Local level i.e. not significant overall. With respect to bird species, impacts are probable and would be adverse, long-term and significant at the Site level alone i.e. not significant overall.

**SUMMARY**

- 10.118 The residual impacts of the proposed development are summarised in Table 10.6. Impacts identified at the Site level have been included (no greater impacts identified).

**Table 10.6: Summary Impact Table**

| ECOLOGICAL FEATURE                | DESCRIPTION OF IMPACT   | MITIGATION / ENHANCEMENT MEASURES  | RESIDUAL IMPACT  |
|-----------------------------------|---|--|--|
| Bats                              | Post-construction impacts only:<br>Impacts of turbine blades on bats - collision and barotrauma.<br>Impacts probability and significance cannot be determined precisely.  | Turbine would be located to ensure blade tips are more than 50 m from bounding hedgerows (base will be 64/66 m from hedgerows) in accordance with Natural England design guidance and 156 m from the sites western boundary. | Unlikely to occur, but would be adverse, and long-term impact significant at the Local level only, i.e. not significant overall. |
| Birds: Breeding and overwintering | Post-construction impacts only:<br>Potential disturbance of nesting habitat, foraging and flight pathways.<br>Collision with turbine blades during operation.<br>Impacts probability and significance cannot be determined precisely. | Turbine is located outside any sensitive bird areas and would be located to ensure blade tips are more than 50 m from bounding hedgerows (64/66 m from hedgerows).   | Probable impact, which would be adverse, and long-term impact significant at the Site level only, i.e. not significant overall.  |



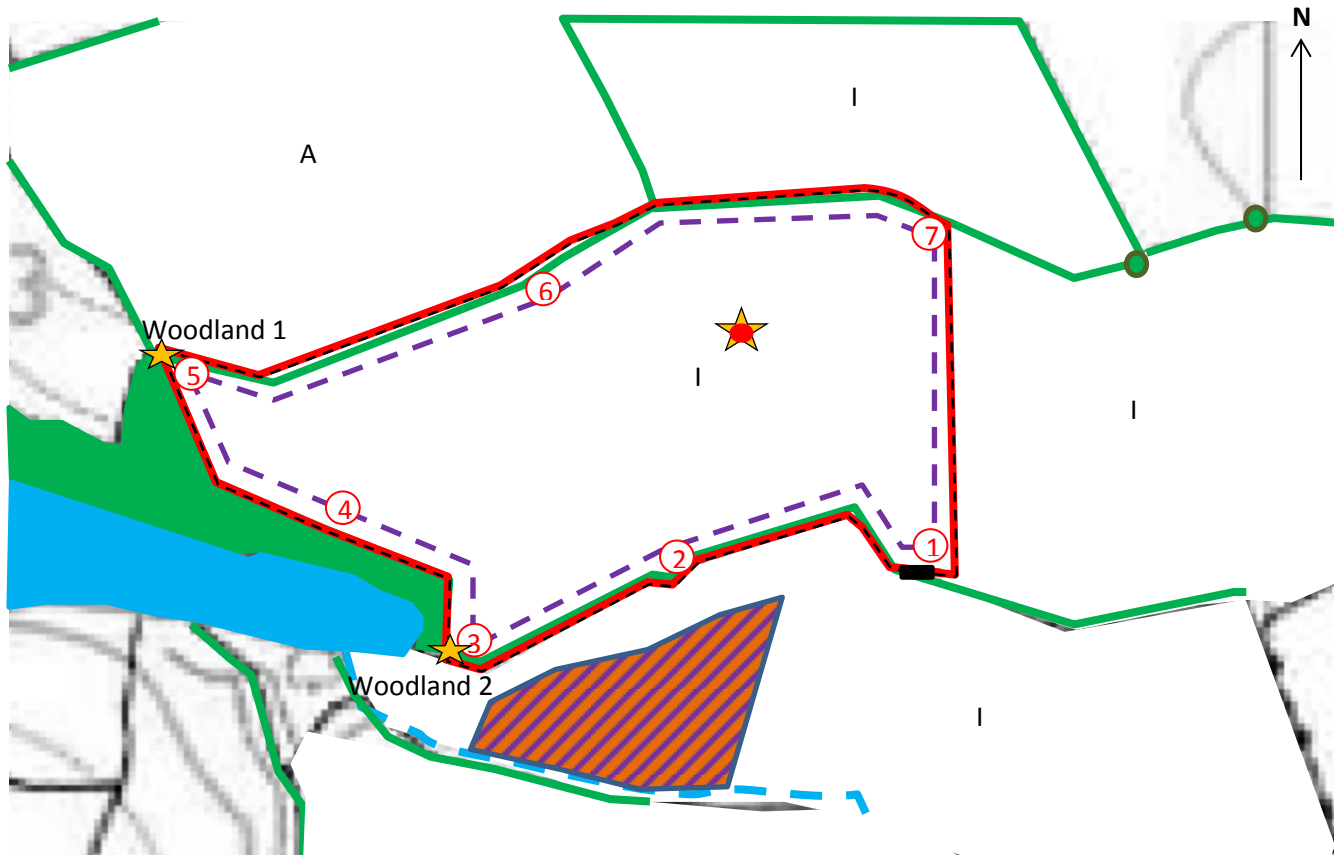
**Key**

- Survey area
- Proposed turbine location
- I Improved grassland
- Hedgerow
- Fence line
- A Arable
- Woodland
- Marshy grassland
- Water body
- Wet ditch
- Tree
- Gate
- 1 Target Note



|                   |                      |
|-------------------|----------------------|
| <b>Site</b>       | Wrey's Barton        |
| <b>Title</b>      | Phase 1 habitat plan |
| <b>Figure ref</b> | 10.1                 |
| <b>Report ref</b> | SET1160_01           |
| <b>Date</b>       | June 2014            |
| <b>Scale</b>      | Indicative only      |

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### Key

- Survey area
- Proposed turbine location
- - - Transect route
- ① Points
- ★ Anabat (Woodland 1, Woodland 2 & turbine)

### Notes:

- Noctule records – Woodland 1  
Anabat and points 2 & 3
- Leisler records – Woodland 1 Anabat
- Serotine records – Woodland 1  
Anabat, Point 2 & between Point 6 & 7

**Seasons**  
**ECOLOGY**

|                   |                     |
|-------------------|---------------------|
| <b>Site</b>       | Wrey's Barton       |
| <b>Title</b>      | Bat plan            |
| <b>Figure ref</b> | 10.2                |
| <b>Report ref</b> | SET1160_01          |
| <b>Date</b>       | August/October 2014 |
| <b>Scale</b>      | Indicative only     |

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## APPENDIX 10.1: ECOLOGICAL EVALUATION CRITERIA

### Ratcliffe Criteria 1977

Criteria are based on Ratcliffe, D.A. (1977) A Nature Conservation Review, Cambridge University Press.

| CRITERIA FOR ASSESSING NATURE CONSERVATION VALUE   |  |
|--|--|
| <b>Size</b>  | In lowland Britain, semi-natural habitats tend to be highly fragmented and the value of a site usually increases with its size.  |
| <b>Diversity</b>                                   | The variety in number of both communities and species depends largely on the diversity of habitat. Diversity is also related to area and the number of both plant and animal species shows a marked tendency to increase with the size of the area.  |
| <b>Naturalness</b>                                 | Truly natural habitats, unmodified by man, are rare in Britain, and nature conservation deals largely with semi-natural habitats. Semi natural habitats must nevertheless exhibit a level of quality marked by a lack of features which indicate gross or recent human modification. This criterion has to take into account the fact that some habitats, (e.g. grasslands, heathlands) are anthropogenic in origin. |
| <b>Rarity</b>                                      | One of the most important purposes of nature conservation is to protect rare or local species and communities. The general principle is that the rarer the species or community, the greater the value for nature conservation. Rarity is related to the frequency of occurrence at national or county level.  |
| <b>Fragility</b>                                   | Fragility reflects the degree of sensitivity of habitats, communities and species to environmental change and involves a consideration of intrinsic and extrinsic factors.   |
| <b>Typicalness</b>                                 | It is necessary to represent the typical and commonplace within a field of ecological variation as well as the best examples of particular ecosystems.   |
| <b>Recorded history</b>                            | The extent to which a site has been used for scientific study and research is a factor of some importance.   |
| <b>Position in ecological/geographical context</b> | The relationship of a site to adjacent areas of nature conservation value. It is important to recognise the important and characteristic formations, communities and species of a district.  |
| <b>Potential value</b>                             | Certain sites could, through appropriate management or natural change, develop a greater nature conservation interest.   |
| <b>Intrinsic appeal</b>                            | The knowledge of the distribution and numbers of popular groups of species, such as birds, is greater than for obscure groups. Similarly, colourful wild flowers and rare orchids arouse more enthusiasm than liverworts. It is pragmatic to give more weight to some groups than to others.   |

## **IEEM Guidelines for Ecological Assessment 2006**

The value or potential value of habitats on site has been defined by geographical context using the frame of reference used within the Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the United Kingdom (2006):

- International;
- UK;
- National (i.e. England/Northern Ireland/Scotland/Wales);
- Regional;
- County (or Metropolitan - e.g. in London);
- District (or Unitary Authority, City, or Borough);
- Local or Parish;
- Site (within zone of influence only [which might be the project site or a larger area]); and,
- Negligible.

## APPENDIX 10.2: LEGISLATION

The following table summarise the legal protection and policy that is most relevant to species and species groups in respect to planning. For full details of legal protection, reference should be made to the Acts themselves.

| Species / Group | Legal Protection and Policy  |
|-----------------|--|
| Flora           | <p>A number of plant species are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010. It is an offence to deliberately pick, collect, cut, uproot or destroy these wild plants. It is also an offence for any purpose to possess, sell or exchange such a plant.</p> <p>In addition, a number of plant species are of principal importance in England, Local BAP priority species and/or notable species that are a material consideration in planning.</p>   |
| Bats            | <p>Bat species in England and Wales are protected under The Conservation of Habitats and Species regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to:</p> <ul style="list-style-type: none"> <li>• Deliberately capture, injure or kill bats;</li> <li>• Intentionally or recklessly disturb bats;</li> <li>• Intentionally or recklessly obstruct access to any structure or place which bats use for shelter or protection; and</li> <li>• Deliberately damage or destruction of a breeding site or resting place.</li> </ul> <p>Seven of the 18 species of bats occurring in the UK are species of principal importance in England and many are also included in Local BAPs.</p> |
| Badgers         | <p>Badgers and their setts are protected under the Protection of Badgers Act 1979. Under this legislation it is illegal to kill, injure or take badgers or to interfere with a badger sett in any way.</p>   |
| Dormouse        | <p>Dormouse in England and Wales are protected under The Conservation of Habitats and Species regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to:</p> <ul style="list-style-type: none"> <li>• Deliberately capture, injure or kill a dormouse;</li> <li>• Intentionally or recklessly disturb dormice;</li> <li>• Intentionally or recklessly obstruct access to any structure or place which a dormouse use for shelter or protection; and</li> <li>• Deliberately damage or destruction of a breeding site or resting place.</li> </ul> <p>Dormouse is a species of principal importance in England.</p>  |
| Other mammals   | <p>Several other species of mammals, whilst not afforded specific legal protection, are of note and consideration to such species is necessary in respect to planning in accordance with national and often local policy. Such species are typically identified as priority species within UK BAP and/or Local BAPs.</p> <p>Species of principal importance in England include brown hare and hedgehog.</p>  |
| Birds           | <p>All wild birds in England and Wales are granted legal protection under the Wildlife &amp; Countryside Act 1981 (as amended). Under this legislation it is an offence to:</p>  |

| Species / Group | Legal Protection and Policy   |
|-----------------|---|
|                 | <ul style="list-style-type: none"> <li>• Kill, injure or take any wild bird;</li> <li>• Take, damage or destroy the nest of any wild bird while it is in use or being built; and,</li> <li>• Take or destroy the egg of any wild bird.</li> </ul> <p>Bird species listed on Schedule 1 of the Act are afforded further protection and it is illegal to disturb such species while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.</p> <p>A number of bird species are also species of principal importance in England and Local BAP species.</p>   |
| Reptiles        | <p>Smooth snakes and sand lizards in England and Wales are protected under The Conservation of Habitats and Species Regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to:</p> <ul style="list-style-type: none"> <li>• Deliberately capture, injure or kill a smooth snake or sand lizard;</li> <li>• Intentionally or recklessly disturb a smooth snake or sand lizard;</li> <li>• Intentionally or recklessly obstruct access to any structure or place which a smooth snake or sand lizard use for shelter or protection; and</li> <li>• Deliberately damage or destruction of a breeding site or resting place.</li> </ul> <p>Widespread species of reptile (slow worm, common lizard, grass snake and adder) are protected against killing, injury and sale.</p> <p>Reptile species are of principal importance in England and often Local BAP species.</p>      |
| Amphibians      | <p>Great crested newts and natterjack toads in England and Wales are protected under The Conservation of Habitats and Species regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to:</p> <ul style="list-style-type: none"> <li>• Deliberately capture, injure or kill a great crested newt or natterjack toad;</li> <li>• Intentionally or recklessly disturb a great crested newt or natterjack toad;</li> <li>• Intentionally or recklessly obstruct access to any structure or place which a great crested newt or natterjack toad use for shelter or protection; and</li> <li>• Deliberately damage or destruction of a breeding site or resting place.</li> </ul> <p>Great crested newt, pool frog, natterjack toad and common toad are species of principal importance in England. These and other amphibian species are also often included in Local BAPs.</p> |
| Invertebrates   | <p>Marsh fritillary and a further 44 species of invertebrate are fully protected under the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to:</p> <ul style="list-style-type: none"> <li>• Intentional kill, injure or take such species;</li> <li>• Deliberately damage or destruction of a breeding site or resting place used by such species; and,</li> <li>• Disturb such species when occupying such a structure or place.</li> </ul>  |

| Species / Group | Legal Protection and Policy  |
|-----------------|--|
|                 | <p>A further 24 species are only afforded partial protection (typically only against sale). Stag beetle for instance is only protected against sale.</p> <p>Eight species and their habitats are also afforded further protection under The Conservation of Habitats and Species Regulations 2010 (as amended).</p> <p>Several species of invertebrate are of principal importance in England and often also included within Local BAPs.</p> |



### APPENDIX 10.3: INDICATIVE SPECIES LIST

The table below lists species recorded during the extended Phase 1 habitat survey. The species list is indicative of the habitats on site and no effort was made to record every species on site. Flora nomenclature is based on Stace (2010).

#### Flora

| COMMON NAME         | SCIENTIFIC NAME              |
|---------------------|------------------------------|
| Ash                 | <i>Fraxinus excelsior</i>    |
| Beech               | <i>Fagus sylvatica</i>       |
| Blackthorn          | <i>Prunus spinosa</i>        |
| Bloody crane's-bill | <i>Geranium sanguineum</i>   |
| Bracken             | <i>Pteridium aquilinum</i>   |
| Bramble             | <i>Rubus fruticosus</i> agg. |
| Cleavers            | <i>Galium aparine</i>        |
| Cock's-foot         | <i>Dactylis glomerata</i>    |
| Colt's-foot         | <i>Tussilago farfara</i>     |
| Common nettle       | <i>Urtica dioica</i>         |
| Curled dock         | <i>Rumex crispus</i>         |
| Dock species        | <i>Rumex</i> species         |
| Dog-rose            | <i>Rosa canina</i>           |
| Elder               | <i>Sambucus nigra</i>        |
| Fescue species      | <i>Festuca</i> species       |
| Field-rose          | <i>Rosa arvensis</i>         |
| Ground-ivy          | <i>Glechoma hederacea</i>    |
| Hawthorn            | <i>Crataegus monogyna</i>    |
| Hazel               | <i>Corylus avellana</i>      |
| Hedge woundwort     | <i>Stachys sylvatica</i>     |
| Herb-Robert         | <i>Geranium robertianum</i>  |
| Hogweed             | <i>Heracleum sphondylium</i> |
| Holly               | <i>Ilex aquifolium</i>       |
| Honeysuckle         | <i>Lonicera periclymenum</i> |
| Oak                 | <i>Quercus</i> species       |
| Pedunculate oak     | <i>Quercus robur</i>         |
| Perennial rye-grass | <i>Lolium perenne</i>        |
| Red campion         | <i>Silene dioica</i>         |
| Rush species        | <i>Juncus</i> species        |
| Sycamore            | <i>Acer pseudoplatanus</i>   |
| Vetch species       | <i>Vicia</i> species         |
| Wild carrot         | <i>Daucus carota</i>         |

| COMMON NAME    | SCIENTIFIC NAME       |
|----------------|-----------------------|
| Willow species | <i>Salix</i> species  |
| Yorkshire-fog  | <i>Holcus lanatus</i> |

## Fauna

| Common Name                   | Scientific Name                  |
|-------------------------------|----------------------------------|
| Soprano pipistrelle           | <i>Pipistrellus pygmaeus</i>     |
| Serotine                      | <i>Eptesicus serotinus</i>       |
| Common pipistrelle            | <i>Pipistrellus pipistrellus</i> |
| Noctule                       | <i>Nyctalus noctula</i>          |
| Long-eared bat                | <i>Plecotus</i> species          |
| Brandt's bat                  | <i>Myotis brandtii</i>           |
| Leisler's bat                 | <i>Nyctalus leisleri</i>         |
| <i>Myotis</i> species         | <i>Myotis</i> species            |
| Natterer's bat                | <i>Myotis nattereri</i>          |
| Lesser horseshoe bat          | <i>Rhinolophus hipposideros</i>  |
| Carrion crow                  | <i>Corvus corone</i>             |
| Woodpigeon                    | <i>Calumba palumbus</i>          |
| Pheasant                      | <i>Phasianus colchicus</i>       |
| Buzzard                       | <i>Buteo buteo</i>               |
| Small tortoiseshell butterfly | <i>Aglais urticae</i>            |
| Red admiral butterfly         | <i>Vanessa atalanta</i>          |

## APPENDIX 10.4: BAT ACTIVITY SURVEY RESULTS

- 1.1 The following tables detail the results of the manual bat activity survey and the static bat detector surveys.

| Date:       | 18/08/14  | Timing:        | Start at 20:16; finish at 22:31 (sunset 20:31) |     |  |
|-------------|---|----------------|--|-----|--|
| Weather:    | Start: 11.4°C; no wind; 0% cloud.   |                |  |     |  |
|             | End: 9.8°C; no wind; 0% cloud.  |                |  |     |  |
|             | General; Dry day, partly cloudy and sunny interval some wind but dry and still for survey |                |  |     |  |
| Surveyors   | Hannah Maben (HM)   |                |  |     |  |
| Time        | Location  | Seen/<br>Heard | Species  | No. | Activity   |
| 20:48       | L3  | H              | Soprano pipistrelle                            | 1   | Very brief call  |
| 20:49-20:51 | L3  | S&H            | Soprano pipistrelle                            | 1   | Foraging along woodland edge and distant call  |
| 20:52       | L3  | S&H            | Soprano pipistrelle                            | 1   | At the very top of the canopy then headed east to L2 and back                                  |
| 20:55       | L3  | S&H            | Soprano pipistrelle                            | 2   | Foraging around surveyor   |
| 20:58       | L3  | H              | Soprano pipistrelle                            | 1   | Commuting and feeding buzz   |
| 21:01       | L3  | H              | Soprano pipistrelle                            | 1   | Commuting  |
| 21:07       | L4  | S&H            | Soprano pipistrelle                            | 2   | Strong to start, then faint for a few min, occasionally flew around surveyor                   |
| 21:12       |   | S&H            | Common pipistrelle                             | 1   | Foraging briefly under trees in corner   |
| 21:15       | L4-5  | H              | Soprano pipistrelle                            | 1   | Flew west along hedge  |
| 21:18       | L4-5  | S&H            | Soprano pipistrelle                            | 1   | Flew west along hedge  |
| 21:18       | L5  | S&H            | Pipistelle species                             | 1   | Flying low west along hedge 10 m in from hedge   |
| 21:27       | L5-6  | S&H            | Pipistelle species                             | 1   | Flying east along hedge  |
| 21:27       | L6  | S&H            | Pipistelle species                             | 1   | Back west along hedge, close to hedge, back east at 21:28                                      |
| 21:28       | L6  | S&H            | Serotine                                       | 1   | About a minute, close to hedge   |
| 21:29       | L6  | S&H            | Long-eared species                             | 1   | To east of adjacent hedge which is slightly taller ash and bush. All very faint close to hedge |
| 21:29       | L6  | S&H            | Serotine                                       | 1   | To east of adjacent hedge which is slightly taller ash and bush. All very faint close to hedge |
| 21:29       | L6  | S&H            | Soprano pipistrelle                            | 1   | To east of adjacent hedge which is slightly taller ash and bush. All very faint close to hedge |
| 21:33       | L6  | S&H            | Soprano pipistrelle                            | 1   | Flew east  |

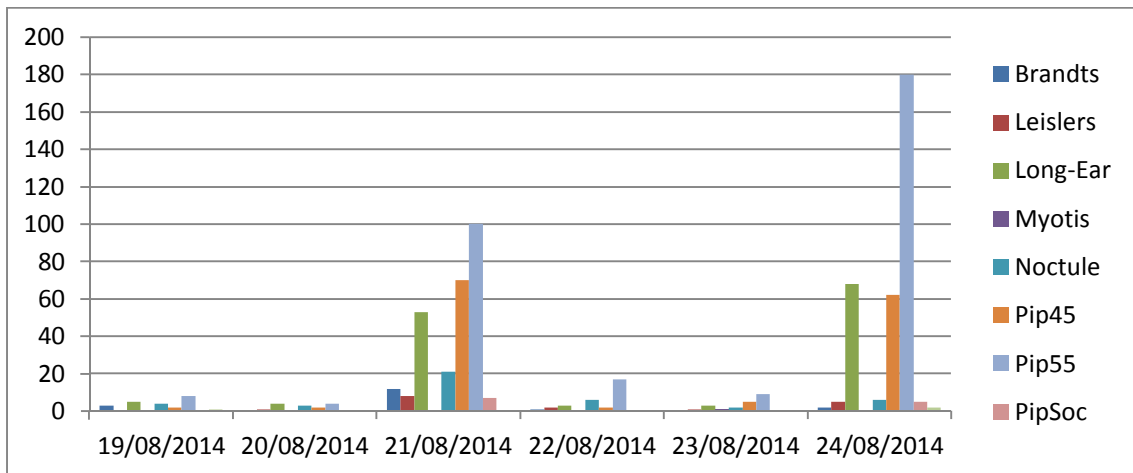
|                  |   |                    |  |            |                                       |
|------------------|---|--------------------|--|------------|---------------------------------------|
| <b>Date:</b>     | 06/10/2014  | <b>Timing:</b>     | Start at 18:30; finish at 20:45 (sunset 18:45) |            |                                       |
| <b>Weather:</b>  | Start: 9.7°C; light wind; 10% cloud.  |                    |  |            |                                       |
|                  | End: 8.3°C; no wind; 90% cloud.   |                    |  |            |                                       |
|                  | General; Light breeze at start and dry throughout. Some thunderstorms in the distance at the end of the survey. |                    |  |            |                                       |
| <b>Surveyors</b> | Hannah Maben (HM) and Emma Pilgrim (EP)   |                    |  |            |                                       |
| <b>Time</b>      | <b>Location</b>   | <b>Seen/ Heard</b> | <b>Species</b>                                 | <b>No.</b> | <b>Activity</b>                       |
| 19:10            | L5  | S&H                | Soprano pipistrelle                            | 1          | Circling trees, flew from NW corner   |
| 19:12            | L5  | S&H                | Pipistrelle species                            | 1          | Flew by briefly                       |
| 19:17-19:19      | L4  | S&H                | Soprano pipistrelle                            | 1          | Foraging back and forth between trees |
| 19:21            | L4  | S&H                | Common pipistrelle                             | 1          | Commuting low and tight to hedgerow   |
| 19:23            | L4  | S&H                | Soprano pipistrelle                            | 2          | Low and close to woodland edge        |
| 19:25            | L3  | H                  | Soprano pipistrelle                            | 1          |                                       |
| 19:28            | L3  | H                  | Pipistrelle species                            | 1          | Distant                               |
| 19:38            | L2  | H                  | Soprano pipistrelle                            | 1          | Commuting east – west along hedge     |
| 19:47            | L1  | H                  | Unidentified                                   | 1          | Commuting, very briefly picked up     |
| 20:11 - 20:17    | L5  | H                  | Soprano pipistrelle                            | 1          | Commuting by trees                    |
| 20:16            | L5  | H                  | Long-eared species                             | 1          | Commuting                             |
| 20:23            | L4  | H                  | Noctule  | 1          | Commuting                             |
| 20:37            | L2  | H                  | Serotine                                       | 1          | Commuting east - west                 |

## Automated Survey at Ground-level – 19th August to 25th August 2014

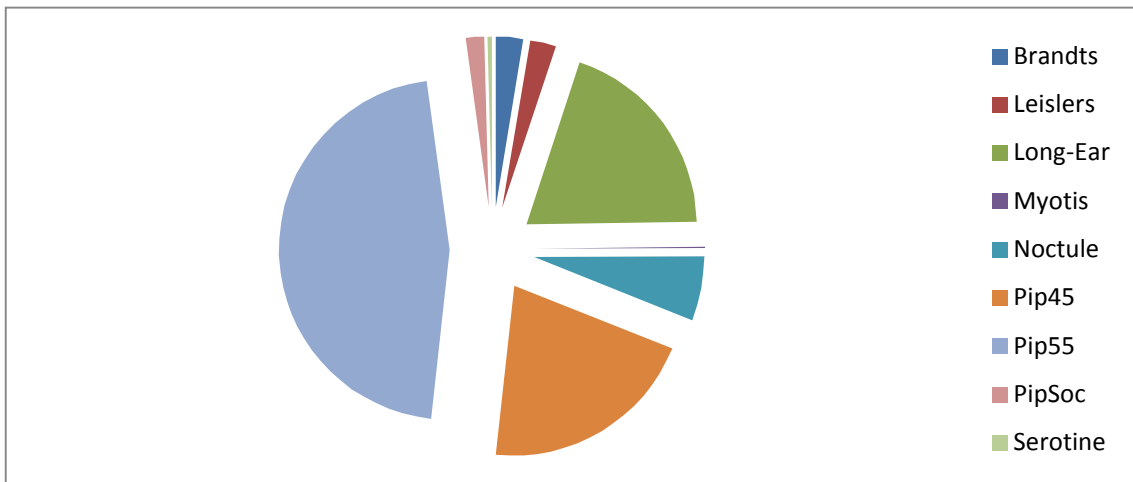
**Table 1: Total number of passes per species per night (North West)**

| Date (pm)          | Brandts   | Leislars  | Long-Ear   | Myotis   | Noctule   | Pip45      | Pip55      | PipSoc    | Serotine | Grand Total |
|--------------------|-----------|-----------|------------|----------|-----------|------------|------------|-----------|----------|-------------|
| 19/08/2014         | 3         |           | 5          |          | 4         | 2          | 8          |           | 1        | 23          |
| 20/08/2014         |           | 1         | 4          |          | 3         | 2          | 4          |           |          | 14          |
| 21/08/2014         | 12        | 8         | 53         |          | 21        | 70         | 100        | 7         |          | 271         |
| 22/08/2014         | 1         | 2         | 3          |          | 6         | 2          | 17         |           |          | 31          |
| 23/08/2014         |           | 1         | 3          | 1        | 2         | 5          | 9          |           |          | 21          |
| 24/08/2014         | 2         | 5         | 68         |          | 6         | 62         | 180        | 5         | 2        | 330         |
| <b>Grand Total</b> | <b>18</b> | <b>17</b> | <b>136</b> | <b>1</b> | <b>42</b> | <b>143</b> | <b>318</b> | <b>12</b> | <b>3</b> | <b>690</b>  |

**Graph 1: Total number of passes per species per night (North West)**



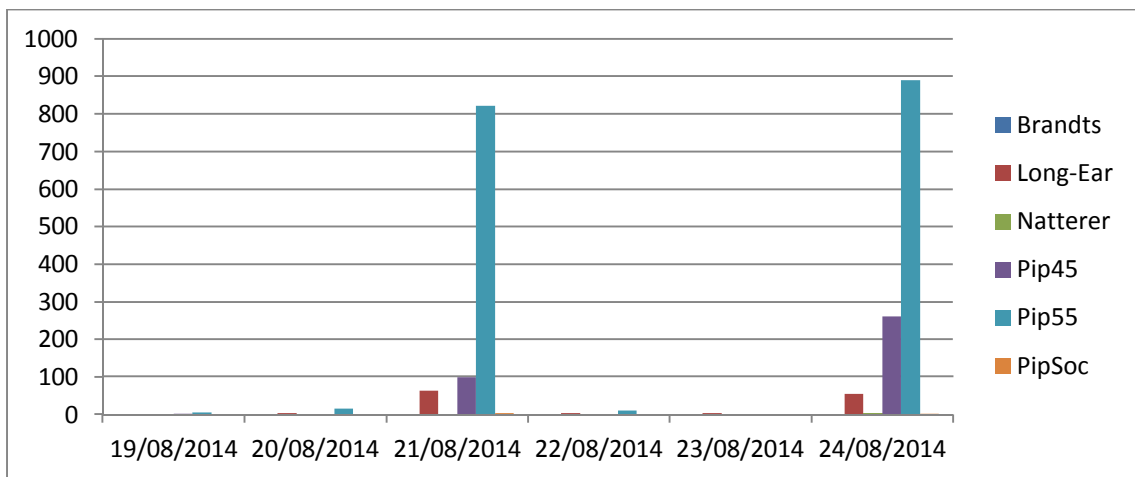
**Graph 2: Proportion of passes per species throughout survey period (North West)**



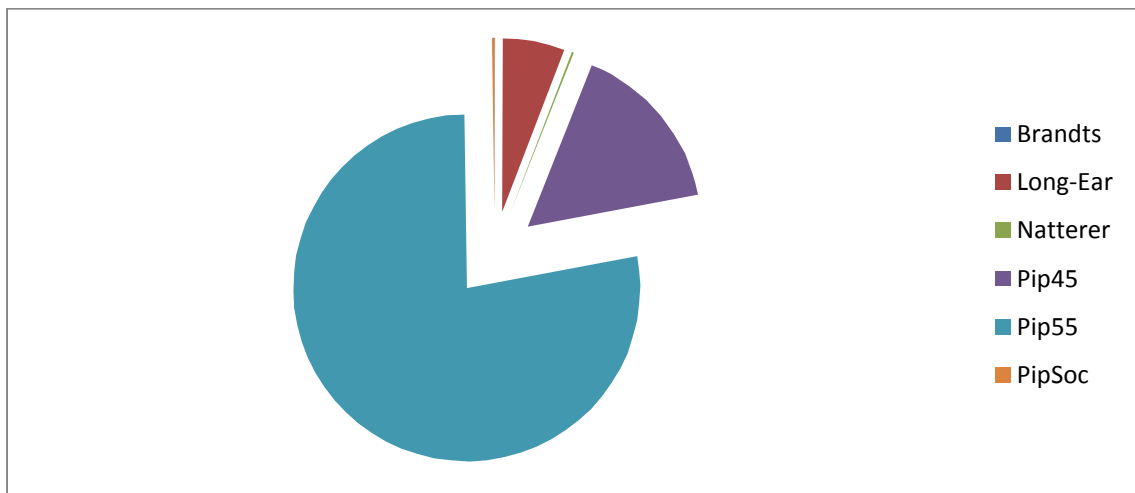
**Table 2: Total number of passes per species per night (South West)**

| Row Labels         | Brandts  | Long-Ear   | Natterer | Pip45      | Pip55       | PipSoc   | Grand Total |
|--------------------|----------|------------|----------|------------|-------------|----------|-------------|
| 19/08/2014         |          |            |          | 1          | 6           |          | 7           |
| 20/08/2014         |          | 3          |          |            | 16          |          | 19          |
| 21/08/2014         |          | 64         |          | 99         | 822         | 4        | 989         |
| 22/08/2014         |          | 4          |          |            | 11          |          | 15          |
| 23/08/2014         | 1        | 3          |          |            |             |          | 4           |
| 24/08/2014         |          | 55         | 4        | 261        | 889         | 1        | 1210        |
| <b>Grand Total</b> | <b>1</b> | <b>129</b> | <b>4</b> | <b>361</b> | <b>1744</b> | <b>5</b> | <b>2244</b> |

**Graph 3: Total number of passes per species per night (South West)**



**Graph 4: Proportion of passes per species throughout survey period (South West)**

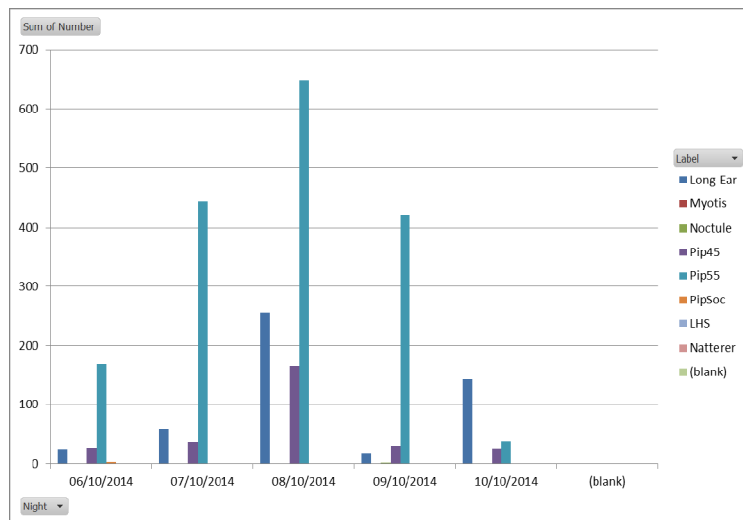


## Automated Survey at Ground-level – 6th October to 11th October 2014

**Table 3: Total number of passes per species per night (North West)**

| Row Labels         | Long-Ear   | Myotis   | Noctule  | Pip45      | Pip55       | PipSoc   | LHS      | Natterer | (blank) | Grand Total |
|--------------------|------------|----------|----------|------------|-------------|----------|----------|----------|---------|-------------|
| 06/10/2014         | 25         | 1        | 1        | 27         | 169         | 3        |          |          |         | 226         |
| 07/10/2014         | 59         | 1        |          | 37         | 444         |          | 1        |          |         | 542         |
| 08/10/2014         | 256        |          | 1        | 166        | 649         | 1        |          |          |         | 1073        |
| 09/10/2014         | 18         | 1        | 2        | 30         | 420         |          |          | 1        |         | 472         |
| 10/10/2014         | 143        |          |          | 26         | 38          |          |          |          |         | 207         |
| <b>Grand Total</b> | <b>501</b> | <b>3</b> | <b>4</b> | <b>286</b> | <b>1720</b> | <b>4</b> | <b>1</b> | <b>1</b> |         | <b>2520</b> |

**Graph 1: Total number of passes per species per night (North West)**



**Graph 6: Proportion of passes per species throughout survey period (North West)**

