Preliminary Environmental Information Report

Chapter 8E: Bat Survey Results

PEIR Appendices [PINS Ref: EN 010171]

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Future Energy Llanwern Limited

Contents

1.0 Bat Survey Results

1.1 Introduction

1.1.1 This Appendix presents the results of bat surveys at Future Energy Llanwern in relation to an application for a Development Consent Order (DCO) for the installation of solar photovoltaic panels. The surveys were commissioned by Future Energy Llanwern Ltd/.

1.1.2 The area within the PEIR assessment boundary is hereafter referred to as the 'Site'.

Aims

1.1.3 The aims of this report are to:

- Identify the presence of potentially important commuting and foraging features for bats; and

- Identify trees that have potential to support roosting bats.

1.2 Legislation

1.2.1 All species of bat and their breeding sites or resting places (roosts) are protected under Regulation 41 of The Conservation of Habitats and Species Regulations 2017 (as amended) and Section 5 of the Wildlife and Countryside Act 1981 (as amended). It is an offence for anyone to:

- Deliberately capture, kill or injure a bat;

- Intentionally or recklessly to disturb a bat or group of bats in a roost;

- Damage or destroy any place used by bats for shelter, (whether they are present or not);

- Intentionally or recklessly obstruct access to a bat roost;

- Possess, or offer a bat (dead or alive) or part of a bat for sale or exchange.

1.2.2 Licences to permit illegal activities relating to bats and their roost sites can be issued for specific purposes. These are sometimes called 'derogation licences' or mitigation licences. These are issued by the relevant Statutory Nature Conservation

Organisation (SNCO) under the Habitats Regulations e.g. Natural Resources Wales (NRW).

1.2.3   Additionally Annex II of The Conservation of Habitats and Species Regulations 2017 (as amended) lists species of community interest, the conservation of which requires the designation of Special Areas of Conservation (SAC). In the UK, the bat species listed under Annex II are greater horseshoe, lesser horseshoe, Bechstein's bat and barbastelle.

1.2.4   In addition, the Environment (Wales) Act 2019, specifically identifies the following bat species which are considered to be Species of Principal Importance (SPI) for the purpose of maintaining and enhancing biodiversity in Wales: barbastelle bat, Bechstein's bat, noctule, common pipistrelle, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat.

1.3   Methods

Desk Study

1.3.1   An updated desk-based study was undertaken in 2024 whereby:

- South East Wales Biodiversity Records Centre (SEWBReC) was contacted for records of bats within 10km of the Site boundary, received on 18.01.2024, with records filtered to include those from the 10 years prior to the first surveys (2009) and to 4km only for most species;

- MAGIC (www.magic.gov.uk) was searched for European designated Natura 2000 sites relating to bats within 10km;

- Aerial photography of the wider area was reviewed to identify possible important habitat features for bat activity.

1.3.2   Monmouthshire Bat Group were contacted on 19 November 2024 to establish whether they held any additional records for this area. However, they responded to say that all of their group records are submitted to SEWBReC.

Bat Activity Surveys

1.3.3   The Site was assessed in 2020, and again in 2023, as having Moderate suitability

for bats in accordance with best practice guidance at that time (Collins 2016) based on the presence of continuous habitat connected to the wider landscape providing shelter and/or invertebrate prey sources such as hedgerows, tree lines, scrub, water courses (reens) and grassland.

1.3.4   Due to the relatively uniform distribution of habitats present, the likely impacts of the development and the embedded mitigation in the design (e.g. provision of buffers adjacent to habitats of highest value such as hedges and reens), it was considered proportionate to undertake transect surveys once per season in spring, summer and autumn rather than one visit per month recommended in Collins (2016), but to undertake automated 'static' detector surveys monthly from April to October. Incidentally, this approach mirrors the requirements of the updated best practice guidance that are current at the time of writing (Collins, 2023).

1.3.5   The focus on the use of automated 'static' detectors which record bat passes throughout the night was considered appropriate as it gives a fuller data set of when bats use the Site both throughout the night and throughout the seasons. This enables a more detailed analysis of bat activity to be undertaken both spatially and temporally. Walked transects have value, however, in that surveyors are able to view bats and record their behaviour (whilst it is still light enough) rather than record presence/ absence alone. Walked transects also covered more of the Site.

1.3.6   It should be noted that the surveys undertaken in 2020 were based on different proposals and red-line boundary compared to the current situation and therefore the transect routes/ automated detector locations varied between the two survey periods. All of the data is included despite some now lying outside of the Site as it still provides an overview of bat activity across the similar habitats in this area.

Transect Surveys

1.3.7   Transect surveys involved experienced surveyors walking pre-defined routes covering all habitats of the Site and passing features with potential for use by foraging and commuting bats. The transects were chosen to cover a representative sample of habitats on Site.

1.3.8   In 2020, there were eight transect routes and in 2023 there were six transect routes due to the changes in boundaries. Although some of the transects covered similar

areas of the Site in both years, the results are not directly comparable as the routes differed. The numbering of the transects does not correlate between the two years and therefore to avoid confusion, should be considered separately. Due to the long-running nature of this project, the Site boundary has changed over time and it should be noted that two of the 2020 transect routes (3 and 8) are not within the current Site boundary. However, they still have value in representing bat activity in the local area.

1.3.9 Each of the transect routes was walked once per season in spring, summer and autumn in the relevant year.

1.3.10 The transects were walked continuously for at least two hours after sunset (see limitations below). The surveyors were equipped with a manual hand-held full-spectrum detectors and recorders comprising Wildlife Acoustics Echo Meter Touch 2 Pro, Elekon Batlogger:M, Echo Meter or Anabat Scout Detectors.

1.3.11 When a bat was encountered the time, species and flight direction/ behaviour was noted. Starting locations were altered between surveys to prevent biased results

1.3.12 All surveys were completed during optimal weather conditions for the time of year, as detailed in **Tables 8E-1** and **Table 8E-2** . Transect routes are shown on **Figures 8.5.1 and 8.5.2**.

Table 1E-1 Bat activity transect survey dates and personnel - 2020

Season	Date	Transect	Sunset/ start time	Transect duration	Weather	Personnel
Spring	13/04/20	1	20:06	2 hours	9-5°C, 5-0% cloud cover (cc), wind 3 (Beaufort scale)	SRS/SS
	13/04/20	2	20:06	2.25 hours	9-6°C, 0% cc, wind 2-3	LJ/EW
	14/04/20	3	20:08	2.25 hours	10-7°C, 5-0% cc, wind 1	SRS/SS
	14/04/20	4	20:08	2.25 hours	10-7°C, 15-0% cc, wind 0	LJ/EW
	16/04/20	5	20:11	2 hours	15-12°C, 10% cc, wind 1	SRS/SS
	20/04/20	6	20:18	1.5 hours	15-7°C, 15-20% cc, wind 2-3	LJ/EW
	20/04/20	7	20:18	2.5 hours	13-10°C, 25-5% cc, wind 3	SRS/SS
	16/04/20	8	20:11	1.25 hours	17-14°C, 30-80% cc, wind 0-1	LJ/EW

Season	Date	Transect	Sunset/start time	Transect duration	Weather	Personnel
Summer	01/07/20	1	21:32	2 hours	16-13°C, 70-100% cc, wind 3-2	LJ/EW
	02/07/20	2	21:31	2 hours	16-13°C, 40-30% cc, wind 3-2	LJ/EW
	05/07/20	3	21:30	2 hours	13°C, 20-80% cc, wind 3	LJ/EW
	11/07/20	4	21:26	2 hours	14-12°C, 40-80% cc, wind 1	LJ/EW
	09/07/20	5	21:27	2 hours	14-13°C, 100-95% cc, wind 2-1	LJ/EW
	12/07/20	6	21:25	2 hours	18-14°C, 30-70% cc, wind 1	LJ/EW
	06/07/20	7	21:29	2 hours	14-13°C, 15-30% cc, wind 1	LJ/EW
	10/07/20	8	21:26	2 hours	13-11°C, 10% cc, wind 1-2	LJ/EW
Autumn	10/09/20	1	19:37	2 hours	15-14°C, 60-70% cc, wind 1	LJ/EW
	10/09/20	2	19:37	0.5 hours	15-14°C, 60-70% cc, wind 1	LJ/EW
	03/08/20	3	19:52	2 hours	16-15°C, 80% cc, wind 2-1	LJ/EW
	04/08/20	4	19:50	2 hours	14°C, 70% cc, wind 2	LJ/EW
	11/09/20	5	19:34	2 hours	15-14°C, 20-100% cc, wind 2-3	LJ/EW
	02/09/20	6	19:56	2 hours	16-14°C, 20-10% cc, wind 1	LJ/EW
	08/08/20	7	19:41	2 hours	17°C, 100% cc, wind 1	LJ/EW
	09/09/20	8	19:38	2 hours	16-13°C, 60-100% cc, wind 1	LJ/EW

EW = Elen Williams; LJ = Lee Jenkins ACIEEM (Natural England Class 1 bat licence); SRS = Stephen Shutt BSc, StMIEnvSc (NRW bat licence: s087708/1); SS = Sylvia Sanyaolu

Table 1E-2 Bat activity transect survey dates and personnel - 2023

Season	Date	Transect	Sunset/start time	Transect duration	Weather	Personnel
Spring	02/05/23	1	20:33	2	14-12°C, 60-100% cc, wind 2	GV
	02/05/23	2	20:33	2	14-12°C, 60-100% cc, wind 2	KN
	02/05/23	3	20:33	2.25	14-12°C, 60-100% cc, wind 2	SRS
	10/05/23	4	20:50	2.5	10-9°C, 15-100% cc, wind 2	MP
	02/05/23	5	20:33	0.5	14-12°C, 60-100% cc, wind 2	HG
	05/05/23	6	20:38	2	14-12°C, 85-100% cc, wind 2	GV

Summer	24/07/23	1	21:12	2	16-14°C, 60-80% cc, wind 1	GV
	24/07/23	2	21:12	2.5	16-14°C, 60-80% cc, wind 1	SRS
	25/07/23	3	21:11	2.25	15-11°C, 20-10% cc, wind 2	SRS
	25/07/23	4	21:11	2	15-11°C, 20-10% cc, wind 2	GV
	02/08/23	5	20:59	2	17-16°C, 60-90% cc, wind 3-4	SRS
	26/07/24	6	21:11	2	17-16°C, 60-90% cc, wind 2	GV
Autumn	13/09/23	1	19:31	2	16°C-14°C, 40-80% cc, wind 2-1	GV
	13/09/23	2	19:31	2	16°C -14°C, 40-80% cc, wind 2-1	SRS
	14/09/23	3	19:29	2	18°C -16°C, 100% cc, wind 3-2 Light drizzle at end.	SRS
	14/09/23	4	19:29	2	18°C -16°C, 100% cc, wind 3-2 Light drizzle at end.	GV
	15/09/23	5	19:27	2	19°C -17°C, 15-40% cc, wind 2-1	SRS
	15/09/23	6	19:27	2	19°C -17°C, 15-40% cc, wind 2-1	GV

GV = Gavin Vella; HG = Hazel Greenland; KN = Ken Neal BSc; MP = Marie Pugh BSc; SRS = Stephen Shutt BSc, StMIEnvSc (NRW bat licence: s087708/1).

Automated Detector Surveys

1.3.13   This involved the deployment of six full spectrum bat detectors (Titley Scientific Anabat Swifts in 2020 and Wildlife Acoustics Song Meter Mini in 2023) in twelve different locations within hedgerows. Detectors were left in situ to record for a minimum of ten nights per month per location between April and October in both years. The six detectors were left to record at locations 1-6 for the first part of the month and then were moved to locations 7-12 for the second part of the month as detailed in **Tables 8E-3** and **8E-4** below.

1.3.14   Locations of detectors are shown on **Figures 8.5.3** and **8.5.4.** It should be noted that although some of the automated detectors were in similar locations in both years, the results are not directly comparable as the precise locations differed. In addition, the numbering of the automated detectors does not correlate between the two years and to avoid confusion, should be considered separately.

Table 1E-3 Automated detector survey dates - 2020

Survey month (2020)	Detector ID	Deployed nights	Date deployed
April	L1-L6	14	01/04/2020
	L7-L12	14	15/04/2020
May	L1-L6	10	08/05/2020
	L7-L12	10	19/05/2020
June	L1-L6	14	01/06/2020
	L7-L12	15	15/06/2020
July	L1-L6	15	01/07/2020
	L7-L12	15	16/07/2020
August	L1-L6	10	03/08/2020
	L7-L12	15	14/08/2020
September	L1-L6	18	01/09/2020
	L7-L12	11	19/09/2020
October	L1-L6	14	30/09/2020
	L7-L12	15	14/10/2020

Table 1E-4 Automated detector survey dates - 2023

Survey month (2023)	Detector ID	Deployed nights	Date deployed
April	L1-L6	15	04/04/2023
	L7-L12	16	19/04/2023
May	L1-L6	11	04/05/2023
	L7-L12	16	15/05/2023
June	L1-L6	16	31/05/2023
	L7-L12	18	16/06/2023
July	L1-L6	13	04/07/2023
	L7-L12	14	17/07/2023
August	L1-L6	10	31/07/2023
	L7-L12	21	10/08/2023
September	L1-L6	18	31/08/2023
	L7-L12	11	18/09/2023
October	L1-L6	18	29/09/2023 19/10/2023*
	L7-L12	14	17/10/2023

Static 3 flailed in October and redeployed on this date.

1.3.15   In order to provide comparable data across the survey period in both years, the first ten nights of recordings were selected for each detector during each recording period.

Bat Data Analysis

1.3.16   Recordings from the transect surveys were analysed through Wildlife Acoustics

Kaleidoscope Pro software and processed through Microsoft Excel, R Statistical Software (R Core Team 2021) and QGIS to produce a heat map of bat passes, indicative of bat activity on Site. Annotations and locations of Annex II bat passes provide further detail on how bats are using the Site.

1.3.17   The latest version of Wildlife Acoustics Kaleidoscope Pro software was used for processing and analysing static bat data. The confidence settings used are "liberal (this will produce more identifications but have more false positives)" with an audit of all recordings, including "noise" files. Batches of noise files and pipistrelle calls are checked depending upon their characteristics which are grouped by a range of variables including background noise and strength of calls. *Myotis*, long-eared and *Nyctalus* species were identified to genus level. All bat calls other than common pipistrelle, soprano pipistrelle and *Nyctalus* species are verified manually in full, with at least 10% of calls checked again to confirm verification. A three-stage quality assurance process is undertaken, focusing on cryptic species. Where necessary further identification of more cryptic species such as *Myotis* and long-eared bats is undertaken using Titley Scientific Analook software.

1.3.18   Data from the automated surveys was then analysed and presented, using R Statistical Software (R Core Team 2021). A bat pass is defined as a sequence of echolocation calls separated from another call by a minimum of two seconds. Bat passes per hour for each species was calculated (bat pass/night length), allowing comparison between different seasons and locations on Site. The time of calls relative to sunset/sunrise was also calculated, using the 'bioRad' R package, and considered in relation to accepted emergence times for each species (Andrews and Peason 2022).

Weather Data

1.3.19   A Wireless Vantage Pro2 (Rainfall, Temp/Hum, Wind Speed and Direction) weather station was installed at ST 43173 84923, (Lat: 51.560310 Long: -2.8211415) on 1st April 2020 and was installed again on 25 October 2022 until October 2023. The weather station records weather conditions every five minutes and is accessed online via www.weatherlink.com. Spreadsheets of the records can be downloaded for selected date ranges.

Bats in Trees

Ground Level Tree Roost Assessment

1.3.20   The trees on Site were assessed by Dominic Sheldon BSc PgCert ACIEEM on 21st and 22nd May 2019 and 12th September 2019 by Kerri Watson BSc (Hons) ACIEEM during the Extended Phase 1 Habitat Survey for their bat roost potential in accordance with best practice methodology at that time, published by the Bat Conservation Trust (Collins 2016). This assessment was subsequently updated by Adam Earl MArborA MCIEEM (NE bat licence Level 1 2015-10845-CLS-CLS) in conjunction with the aerial assessments that were undertaken on 15th and 16th February 2021.

1.3.21   Trees were inspected from ground-level with the aid of binoculars for Potential Roost Features (PRFs) such as rot holes, hazard beams, cracks or splits, woodpecker holes, knot holes, man-made holes, cankers, gaps between overlapping stems/ branches, loose bark, dense ivy, epicormic growth and bat, bird or dormouse boxes. Signs indicating possible use by bats were also recorded such as bat droppings, odour, scratches, staining and audible sounds. Information collected about PRF's included a description, the height of the feature above ground level and the orientation of the feature in relation to the trunk. Trees were then prescribed a category based on their potential to support roosting bats as detailed in **Table 8E-5**, based on best practise survey guidelines at that time (Collins 2016).

Table 1E-5 Bat Roost Potential (as detailed in Collins, 2016)

Suitability	Description of bat roosting potential (trees)
Negligible	Negligible habitat feature/s likely to be used by roosting bats
Low	A tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective

	of species conservation status, which is established after presence is confirmed).
High	A tree with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Roost	Known or confirmed roost

Aerial Assessment

1.3.22 Any tree identified as being of Moderate or High suitability to support roosting bats was subject to a more detailed inspection on 15th and 16th February 2021 by an aerial team comprising Matt Underwood BSc MArborA (NPTC Level 2 (CS38) Tree Climbing & Aerial Rescue) and Adam Earl BSc (Hons) MArborA MCIEEM (Level 2 (CS38) Tree Climbing & Aerial Rescue, NE bat licence Level 1 2015-10845-CLS-CLS), both were working as accredited agents on Mark Witherall's NRW scientific bat licence (62538:OTH:CSAB:2015).

1.3.23 PRFs were inspected internally to determine the size and extent of the feature's suitability and to search for any bats or bat evidence present at the time of the survey. An endoscope, torch and measuring device were used where appropriate. Trees and/ or individual features were reassigned categories where appropriate, as described above.

1.3.24 Locations are shown in **Figure 8.5.5.**

Limitations

1.3.25 Care has been taken to ensure that balanced advice is provided on the information available and collected during the study periods, and within the resources available for the project. However, the possibility of important ecological features being missed due to survey timings, absence during surveys or the year of survey cannot be ruled out. In addition, the lack of evidence or records of protected species on Site does not preclude their presence from Site.

1.3.26 Transect routes were followed where possible. However, the presence of cattle in some of the fields led to minor deviations in routes being necessary and on a small number of occasions meant that the transect surveys had to be cut short due to lack of access for health and safety reasons. In particular, Transect 5 in May had to be

abandoned due to widespread presence of bullocks. Similarly tall crops (maize) meant that routes had to vary slightly as the standard transect routes were impassable.

1.3.27 Had the routes been changed significantly, or 'safer' areas been revisited, this would have skewed the survey effort and may have erroneously raised the perceived importance of a particular section of the site for bats. Although this is a constraint, it is not considered significant as surveyors were able to walk along field boundaries and reens close to the original routes.

1.3.28 Battery/equipment failure resulted in a reduced number of recorded nights on some detectors and in 2023, it was noted that the automated detector at Location 3 was removed by a farmer in the April survey and at the same location was flailed in October resulting in an absence of data. The October detector was re-deployed at a later date within the same month. However, given the large amount of data collected across similar habitat it is considered that a robust impact assessment can be made based on the data collected.

1.3.29 To illustrate the large amount of automated detector data that was collected, the tables below show the number of nights that bats were recorded at each location out of a possible 70 nights at each location:

Table 1E-6 Number of nights that bats were recorded at each detector location - 2020

Detector ID	Latitude	Longitude	No. of nights*
L1	51.57014	-2.801306	67
L2	51.57004	-2.807725	61
L3	51.56139	-2.811553	62
L4	51.55920	-2.821049	58
L5	51.56382	-2.831174	56
L6	51.55442	-2.823372	50
L7	51.55347	-2.829182	67
L8	51.55070	-2.838492	60
L9	51.54916	-2.846208	60
L10	51.54618	-2.853306	47
L11	51.54422	-2.858532	51
L12	51.54486	-2.879714	55
L1	51.57014	-2.801306	67

* A number of nights where bats were not recorded were due to detector failures as detailed in the Limitations Section

Table 1E-7 Number of nights that bats were recorded at each detector location- 2023

Detector ID	Latitude	Longitude	No. of nights*
L1	51.56235	-2.8699	70
L2	51.55321	-2.87265	70
L3	51.56503	-2.81244	70
L4	51.5592	-2.82105	70
L5	51.54822	-2.87345	70
L6	51.55442	-2.82337	44
L7	51.55347	-2.82918	61
L8	51.5507	-2.83849	65
L9	51.54909	-2.84987	68
L10	51.54589	-2.85989	70
L11	51.54474	-2.86669	55
L12	51.54486	-2.87971	70

* A number of nights where bats were not recorded were due to detector failures as detailed in the Limitations Section

1.4   Results

Desk Study

1.4.1   The data search with SEWBReC provided 1904 incidental bat detector and bat roost records within the 10km search area, with 1086 of these from within 10 years prior to the start of the surveys in 2019. Records show a broad assemblage of 15 species of bats in the area including common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus,* Nathusius' pipistrelle *Pipistrellus nathusii*, serotine *Eptesicus serotinus*, noctule *Nyctalus noctula,* Leisler's (or lesser noctule) *Nyctalus leisleri*, barbastelle *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii,* whiskered bat *M.mystacinus,* Brandt's bat *M.brandtii,* Natterer's bat *M.nattereri,* Daubenton's bat *M.daubentonii,* brown long-eared bat *Plecotus auritus*, lesser horseshoe bat *Rhinolophus hippisoderos* and greater horseshoe bat *R.ferrumequinum.* Additional records of *Myotis* sp., *Plecotus* sp. and *Pipistrellus* sp. were returned as part of the desk study; as well as records not identified to species/genus level.

1.4.2   The data was filtered to include those records listed as 'roost records' within a 4km radius of the Site as this distance is equal to or exceeds the core sustenance zone

for most species except barbastelle (BCT, 2020)[1]. No roost records were returned within the Site boundary. There were 61 roost records within 4km, including roosts of unknown species and a summary of species specific data search results is provided in **Table 8E-8** and on **Figure 8.5.6**. Due to the larger sustenance zone for barbastelle bats, a specific check of the full 10km data set was undertaken and identified no roost records for this species.

Table 1E-8 Summary of bat roost records within 4km of Site (provided by SEWBReC)

Species	Status/ Distribution in South-west England & South Wales	Record Summary
Common pipistrelle	EPS. Widely distributed.	17 roost records since 2009. Roost types included 'male roost' and 'day roost' with records in buildings and trees. Closest record is a roost c.0.5km north of Site within Redwick with two adults within the roof of a dwelling.
Soprano pipistrelle	EPS, SPI. Widely distributed.	Four roost records between 2017 and 2019. The closest records relate to individual bats within tree roosts adjacent to the railway c.1.7km north.
Nathusius' pipistrelle	EPS. Rare but widespread.	A single roost record c.3.2km west of the Site. Abundance was not recorded.
Pipistrelle sp.	EPS. Widely distributed.	Eight roost records between 2011 and 2019. Records included a maternity roost 1.7km west of the Site. The closest record is a roost within a building c.1.65km north.
Brown long-eared bat and long eared species.	EPS, SPI. Widely distributed.	Six roost records within 4km, including a record of a roosts with a count of 17 individuals, which likely corresponds to a maternity roost, 3.9km north of the Site. The closest is a record of three brown long-

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[1] BCT (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London.

		eared bats within a dwelling's loft space c.1.9km north.
Noctule bat	EPS, SPI. Widespread in many geographies, but not abundant in all.	Two roost records from 2017-2019. Closest record is a tree roost (individual bat) c. 1.5km north of the Site adjacent to the railway.
Serotine	EPS. Rare but widespread.	Eight roost records from 2012 -2018. The closest seven of these relate to roosts within trees adjacent to the railway, north of the Site, the closest being c.1.8 km. It is however noted that serotines do not typically roost in trees or bat boxes.
Natterer's bat	EPS. Widespread in many geographies, but not abundant in all.	A single adult male in a roost recorded at Pye Corner c.2.4km west during a soft demolition.
Whiskered bat	EPS. Widespread in many geographies, but not abundant in all.	A single roost record c.300m north of the Site within Redwick. The roost was identified by dropping DNA, so abundance is unknown.
Lesser horseshoe bat	EPS, Annex II, SPI. Rare, with a restricted distribution.	Six roost records within 4km. Two of these pertain to the same roost c.3.8km north of the Site and are counts of 54 and 12 which indicate the presence of a maternity roost. The nearest record is c.1.2km north of the Site within Magor and is recorded as a night roost, with droppings found.

EPS = European Protected Species; **Annex II** = species listed in the Habitat Directives Annex II; **SPI**= Species of Principal Importance under S41 of NERC Act 2006.

1.4.3   The habitats within the Site comprise a series of crop and pasture fields that are rotationally managed. The fields are bound by a network of freshwater reens and hedgerows with occasional areas of self-sown woody scrub and reedbed. The grassland is comprised of improved grassland, semi-improved grassland, species poor semi-improved grassland and marshy grassland. Some of the fields are cattle or sheep grazed. Similar habitats surround the Site to the north, west and east.

1.4.4   Habitats on and adjacent to the Site are therefore suitable to support foraging for all of the species identified in the desk study, with the exception of Bechstein's bat

which rely heavily on parcels of woodland.

1.4.5   The Bristol Channel lies directly to the south and therefore most bat species are unlikely to commute to/ from the south on a regular/ frequent basis as the open expanse of water will act as a barrier to most species.

Transect Survey

2020 Surveys

1.4.6   Transect 8 and parts of Transects 3 and 7 are now outside the current red-line (**Figure 8.5.1**).

1.4.7   At least eight different species were recorded during the 2020 transect surveys. Common pipistrelle was the most frequently recorded species across the Site, with lower frequencies of soprano pipistrelle. Noctule were also recorded broadly across the Site and *Myotis* species and serotine were recorded occasionally in low numbers. Single calls by lesser and greater horseshoe bats were recorded, and a very low number of long-eared bat calls were also recorded.

1.4.8   The majority of activity observed during the transect surveys was from bats foraging and commuting along hedgerows, lanes and reens. Particularly high levels of foraging and commuting activity were recorded along the sea wall running along the southern Site boundary. The relative activity of bats recorded during the transect surveys is represented on **Figures 8.5.1 and 8.5.2**.

1.4.9   Total numbers of bat passes per species on each transect are shown in **Table 8E-9**.

Table 1E-9 Summary of bat passes recorded during activity transects - 2020

Season	Transects	Es	Msp	Nn	Pp	Ppy	Pl	Rf	Rh	Total
Spring	1		1							1
	2				5					5
	3		1		91	16			1	109
	4			15	46					61
	5			2	165	2				169
	6				51					51
	7				13					13
	8			3	8					11
Total										**420**

Season	Transect	Es	Msp	Nl	Nn	Pp	Ppy	Pl	Rf	Rh	Total
Summer	1		3			55					58
	2		1		21	147	94				263
	3				7	77	6				90
	4		3		62	132	1				198
	5		4		72	154	2	6			238
	6		1		13	134			1		149
	7		1			94	8				103
	8		1		2	73	4				80
Total											**1179**
Autumn	1		6			41	3				50
	2	2			4	5		1			12
	3				1	94	8				103
	4	14	1		18	60	3	4			100
	5	7	1		16	129	2	1			156
	6	1			17	105	7	1			131
	7	7			8	67	2				84
	8		2		4	45	4	1			56
Total											**692**
Total		31	25		266	1791	162	14	1	1	2291

Es = serotine; **Msp** = *Myotis* species; Nl = Leisler's; **Nn** = noctule; **Pp** = common pipistrelle; **Ppy** = soprano pipistrelle; **Pl** = long-eared species; **Rf** = Greater horseshoe; **Rh** = lesser horseshoe

1.4.10 There appears to be an affinity for bats to forage and commute along the strongest linear features within the survey area; namely,

- Ynys Mead reen which runs north to south through the Site;

- Mead Lane running east to west at the western end of the Site;

- Sea St Lane running from Redwick to the sea wall; and,

- The sea wall itself.

1.4.11 The highest number of bat calls were recorded along the central and eastern part of the sea wall that runs along the Site boundary. This corresponds to an area of salt marsh (HPI) which runs eastwards along the foreshore. This is likely to support invertebrate communities upon which bats prey.

1.4.12 Additionally, the high number of pipistrelle calls recoded along Sea St Lane in spring and summer (including Transects 4, 5 and 6) may correspond to the presence of a maternity roost in a building (unidentified) in Redwick, with bats commuting along the lane to forage along the sea wall.

1.4.13 In any case, it appears that bat activity was concentrated towards habitats closer to the Bristol Channel (southern part of the Site) than further inland.

2023 Transect Surveys

1.4.14 At least six different species were recorded during the 2023 transect surveys. Common pipistrelle was the most frequently recorded species across the Site and was recorded on every transect route in every season (except transect 5 which was aborted in the Spring). The next highest number of calls were from noctule. This species was also recorded broadly across the Site on every transect route, however most of the activity was recorded in the summer and autumn surveys.

1.4.15 Relatively high numbers of soprano pipistrelle calls were also recorded. They were recorded on every transect route, but this was not consistent throughout the seasons, with most activity recorded in the summer. Serotine calls were also recorded across all transect routes, with most activity being recorded in the autumn surveys. Other bats recorded more sporadically included Leisler's bat and Myotis sp.

1.4.16 Transect 3 (west of Windmill Reen) consistently recorded the highest levels of bat activity across all seasons and levels of activity on Transect 6 (east of Site) were generally low when compared to the other transect routes.

1.4.17 The majority of activity observed during the transect surveys was from bats foraging and commuting along hedgerows, lanes and reens. Higher levels of foraging and commuting activity were recorded along Mead Lane in Transect 3, compared to elsewhere. The relative activity of bats recorded during the 2023 transect surveys is represented on **Figure 8.5.2**.

1.4.18 Total numbers of bat passes per species on each transect are shown in **Table 8E-10.**

Table 1E-10 Summary of bat passes recorded during activity transects - 2023

Season	Transect	Es	Msp	Nl	Nn	Pp	Ppy	Total
Spring	1				6	97	6	109
	2			2		83	4	89
	3		43		13	1477	20	1553

		Es	Msp	Nl	Nn	Pp	Ppy	Total
	4[2]					2[2]		2
	5[3]							
	6					26	9	35
Total								**1788**
Summer	1		7	11	15	281	7	317
	2	62	4	49	310	514	97	1036
	3		36	28	119	1074	139	1396
	4	97		58	38	148	11	352
	5	20	61	12	21	989	52	1155
	6				5	21		26
Total								**4282**
Autumn	1	5				198		203
	2	83		49	231	273	84	720
	3	20	6		21	547	96	690
	4	73		12	198	87		370
	5	119	7	7	294	90	28	545
	6	15			73	13		101
Total								**2926**
Total		**494**	**164**	**228**	**1344**	**5920**	**549**	**8697**

Es = serotine; **Msp** = *Myotis* species; **Nl** = Leisler's**; Nn** = noctule; **Pp** = common pipistrelle; **Ppy** = soprano pipistrelle; **Pl** = long-eared species; **Rf** = Greater horseshoe; **Rh** = lesser horseshoe

Automated Detector Survey

2020 Automated Detector Surveys

1.4.19 During the 2020 automated detector surveys, statics were placed at the following locations (illustrated in **Plate 8A-1**). Field and boundary reference numbers relate to those listed in **Figures 8.2.2** and **8.2.3** of **Appendix 8B**.

Plate 8A-1: Automated detector locations 2020 (with current red-line shown)

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[2] No bats recorded on detector, although surveyor noted two faint common pipistrelle calls.

[3] Survey aborted due to cattle. No data recorded.
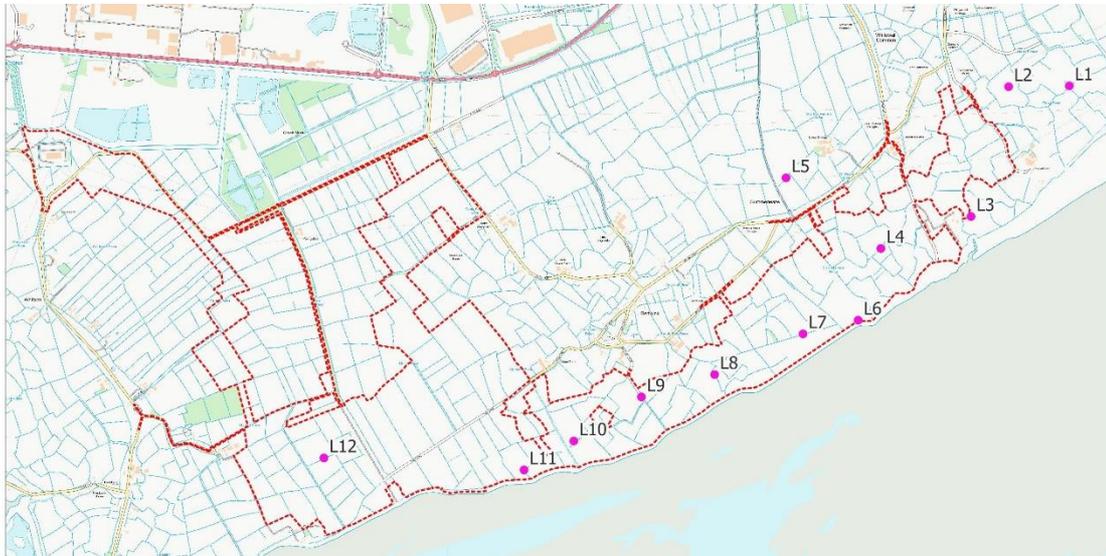
- Location 1 – Adjacent to Petty Reen to east of Site in Field 203 (outside current red-line)

- Location 2 – In centre of Field 196 adjacent to a strip of hedge/ scrub to east of Site (outside current red-line)

- Location 3 – Adjacent to Pratt Reen which is bordered by trees/ scrub (B249B) near south eastern end of Site (Field 190)

- Location 4 – In centre of Field 173, adjacent to a dry ditch B267

- Location 5 – Hedgerow on northern boundary of Field 395 (outside current red-line)

- Location 6 – Southern boundary (B247) of Field 170, near to the sea wall/ Bristol Channel

- Location 7 – Southern boundary hedgerow (B236d) of Field 156

- Location 8 – Western boundary hedgerow (B213) of Field 144.

- Location 9 – On hedgerow to the west of Sea St Lane (B201)

- Location 10 - southern hedgerow (B193d) of Field F124 that lies c. 60m east of Windmill Reen

- Location 11 – South eastern hedgerow (B171b) of Field 108

- Location 12 – Southern boundary hedge/ dry-ditch (B48) of Field 20.

1.4.20   **Graph 8.5.1** below illustrates the relative abundance of bats during the survey period, with further clarity provided in **Graph 8.5.2**.

1.4.21   Location 9 supported the highest number of bat passes per hour overall, though Location 8 recorded the most passes from species considered to be more light-averse (primarily Myotis bats in this instance). Bat activity levels were noticeably lower at Location 4 compared to elsewhere on Site and this is likely to be due to the automated detector being located in the centre of a field rather than on a hedgerow/ reen.

1.4.22   Common pipistrelle was the most frequently recorded bat species (80.38% of recorded bat passes; 120,718 passes across all surveys), followed by noctule (9.0%; 13583 passes). There were significant peaks in levels of common pipistrelle activity at locations 8,9,10 and 12 which may indicate that there was a good foraging resource in these areas during April, or may indicate that there are transitional roosts nearby.

1.4.23   Myotis bats (5.95%; 8945), soprano pipistrelle (2.61%; 3922 passes) and serotine (1.76%; 2648 passes) also made up a significant percentage of the bats recorded. Other species recorded in low numbers comprised long-eared bats, lesser horseshoe, greater horseshoe, Nathusius' pipistrelle and barbastelle. An individual Leisler's bat call was recorded, however, owing to their similarity with noctule bats, it is likely that a number of Leisler's calls have been mislabelled as noctule. As their behavioural ecology is similar, this is not considered a constraint.

Graph 8.5.1: Average bat passes per hour during the automated detector survey period (2020)
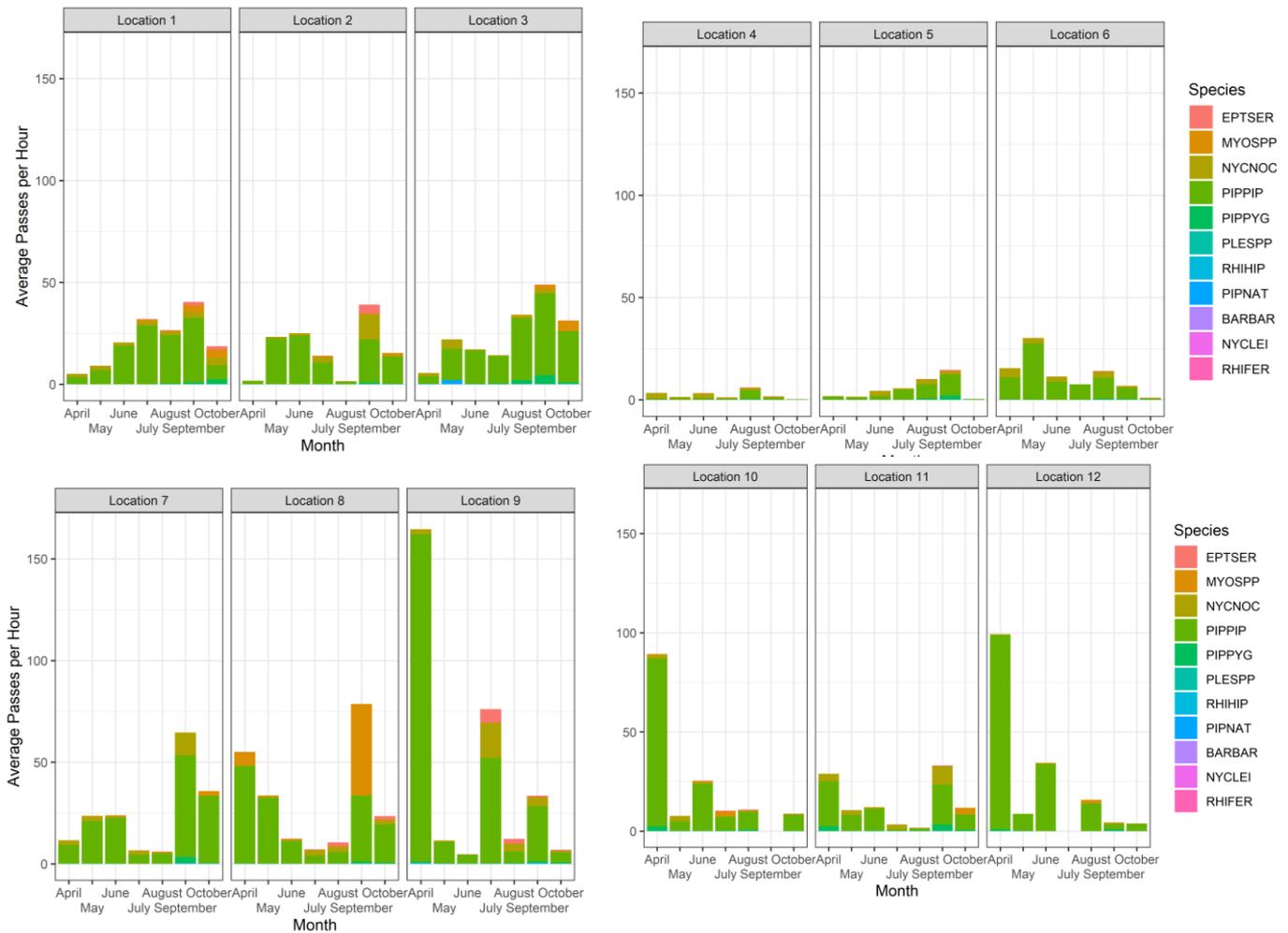
PIPPIP = common pipistrelle; PIPPYG = soprano pipistrelle; PIPNAT = Nathusius' pipistrelle; NYCNOC = noctule; NYCLEI = Leisler' s; NYCSPP = Nyctalus species; EPTSER = Serotine; MYOSPP = Myotis species; RHIHIP = lesser horseshoe bat.; RHIFER = greater horseshoe bat; BARBAR = barbastelle; PLESPP = Long-eared bat species.

1.4.24 **Graph 8.5.2** below excludes pipistrelles for a clearer picture of activity for other species.

1.4.25 This graph clearly demonstrates that Location 8 which is a north to south hedgerow close to the centre of the Site is of particular importance to Myotis bats, specifically in the Autumn (when there were on average 45 passes per hour) and to a lesser

extent in the Spring, indicating that there may be transitional roosts nearby. Myotis were recorded in low numbers at every location.

1.4.26 Serotine calls were recorded in low numbers across all locations and the highest number of calls were recorded at Location 9 near the central southern area of the Site, but this only equated to an average of 1.48 calls per hour, the majority of which were recorded in July.

1.4.27 Noctule were recorded in relatively low numbers across the Site with highest numbers of calls per hour (2-4 calls per hour) recorded at Locations 9, 7, 12, 2 and 1. These locations are scattered from east to west across the Site and confirm that noctule activity is widespread.

1.4.28 Long-eared bats were recorded across all locations, but in very low numbers (0.147calls per hour across the entire site; equating to 99 calls across the whole season). Nathusius' pipistrelle calls were recorded in eight of the locations, but again in very low numbers (157 calls recorded in total).

Graph 8.5.2: Average bat passes per hour during the automated detector survey period, excluding pipistrelles (2020)
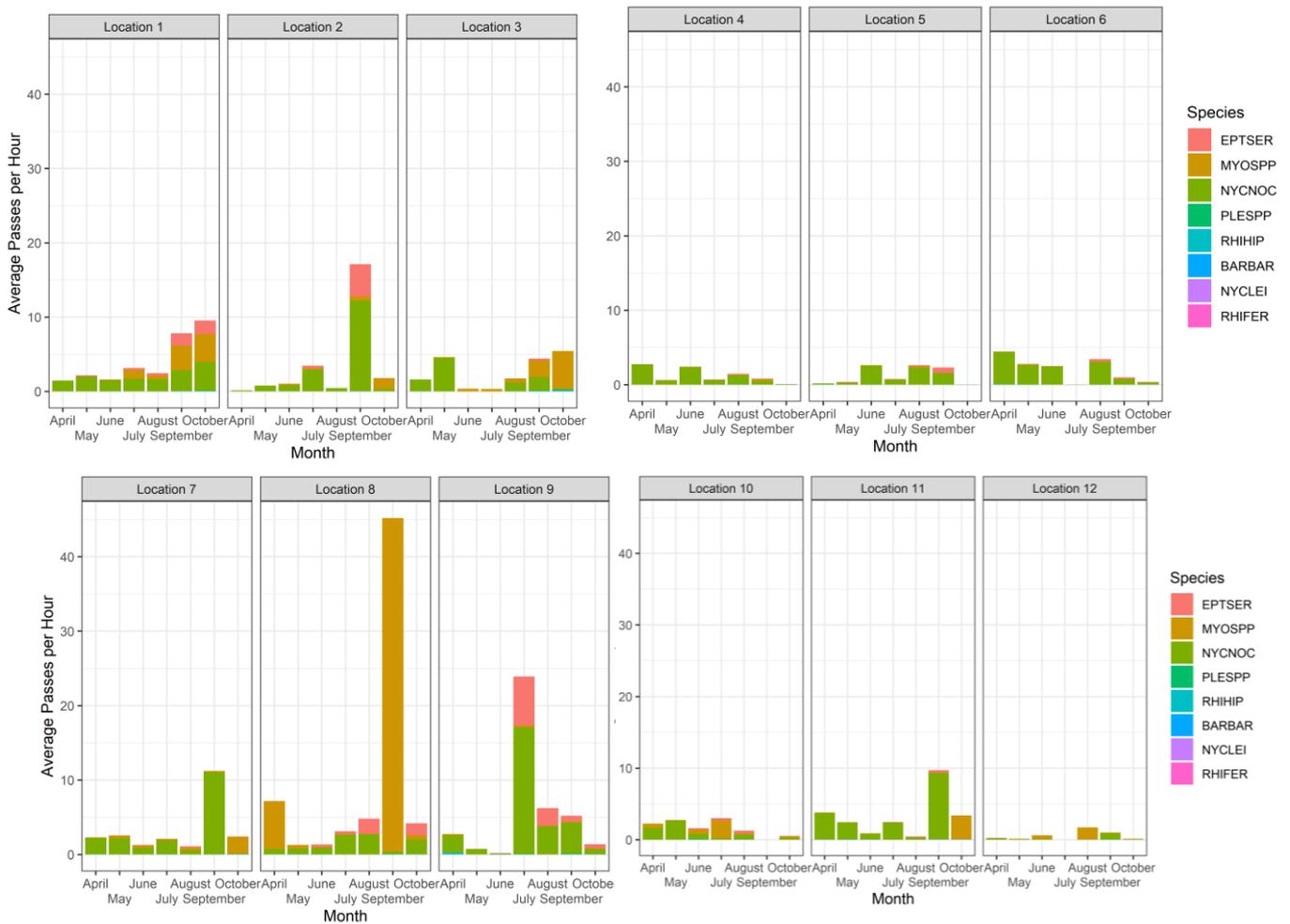
NYCNOC = noctule; **NYCLEI** = Leisler' s; **NYCSPP** = *Nyctalus* species; **EPTSER** = Serotine; **MYOSPP** = *Myotis* species; **RHIHIP** = lesser horseshoe bat.; **RHIFER** = greater horseshoe bat; **BARBAR** = barbastelle; **PLESPP** = Long-eared bat species.

1.4.29 **Graph 8.5.3** illustrates the abundance of Annex II species only. These species were recorded in only very low numbers. Low numbers of lesser horseshoe calls (60 in total) were recorded at Locations 1,3, 5, 6, 7, 8 and 9 indicating that they are widespread in low numbers across the Site. Greater horseshoe were recorded at only locations 11 and 12 towards the western end of the Site, but only a total of three passes were recorded across the season indicating very low levels of activity. A single barbastelle was recorded at Location 10 only.

Graph 8.5.3: Average bat passes per hour during the automated detector survey period, for Annex II species (2020)
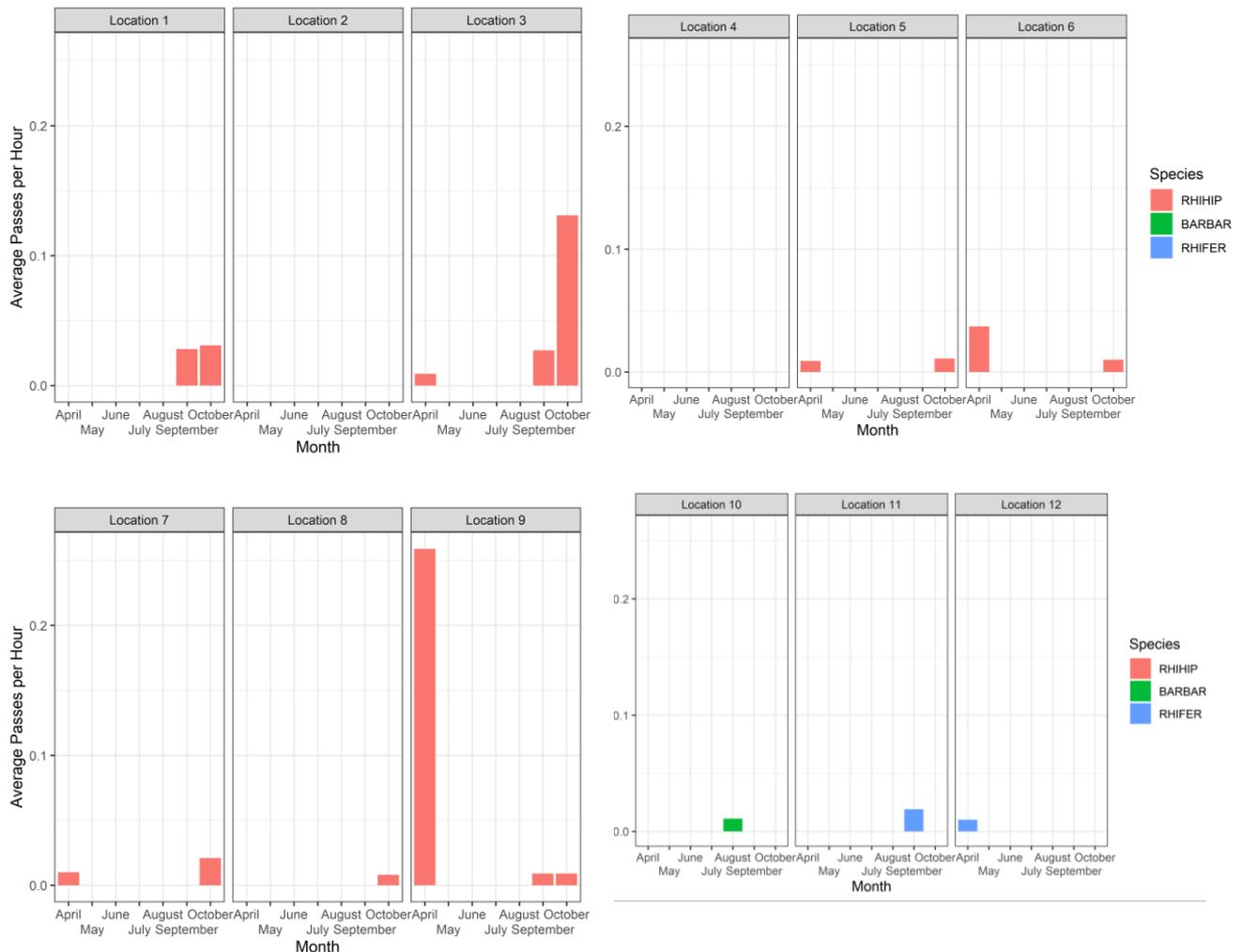
RHIHIP = lesser horseshoe bat.; **RHIFER** = greater horseshoe bat; **BARBAR** = barbastelle

1.4.30 **Graph 8.5.4** shows passes of species in relation to expected emergence times from Andrews and Pearson 2022, included on pg. 34-35 in the BCT survey guidelines (Collins 2023). The graph shows that noctule, common pipistrelle, soprano pipistrelle, Myotis species and long-eared species were recorded on Site during their expected emergence period and therefore may be emerging from a roost nearby and/ or on Site and commuting through the Site. These species are highly likely to be using the Site for foraging close to their roosting site before heading further afield.

1.4.31 Noctule was recorded throughout and/ or prior to typical emergence times for this species, indicating that this species is roosting in trees on or in the immediate vicinity

of the Site. In particular, multiple very early calls (up to 15 minutes prior to sunset) were recorded at Location 1, 2, 4, 7 and 10. However it should be noted that as noctule calls are strong/ loud, they can be recorded from longer distances than most species and therefore these calls may be recorded from bats flying off-site.

1.4.32   Another species which showed a concentration of activity on site at usual emergence time was common pipistrelle, although most calls were recorded in the latter part of the typical emergence period. This activity was widespread across the Site indicating that there are likely to be multiple common pipistrelle roosts in the local area.

1.4.33   Myotis calls were recorded during typical emergence times at multiple locations with highest numbers recorded at Locations 1, 3 and 8. These locations are widespread across the Site indicating that there may be multiple roosts in the surrounding area (potentially different species).   Numbers of calls around emergence time were particularly high at Location 3 – it is noted that there are farm buildings near to this location (Chapel Farm) that could provide suitable roosting habitat.

1.4.34   Long-eared bats were recorded during emergence times, mainly at Location 1 (off-site to the east) although a few calls were also recorded during this period at Locations 3, 8, 9 and 11 indicating that there are likely to be roosts, for example, in off-site buildings.

1.4.35   Soprano pipistrelle were also recorded during typical emergence times to a greater or lesser extent at all locations, although these were concentrated in the latter half of the typical emergence period which suggests that roosts are more likely to be off-site than on/ immediately adjacent.

1.4.36   Serotine were consistently first recorded well after typical emergence time except for an anomalous call at Location 10. Therefore, it is most likely that this species is coming to the Site to forage from roosts that are further afield. Similarly, the small number of calls from Annex II species were recorded well after sunset suggesting that they are travelling to the Site to forage on an occasional basis.

Graph 8.5.4: All bat passes in relation to emergence periods for each species (2020)
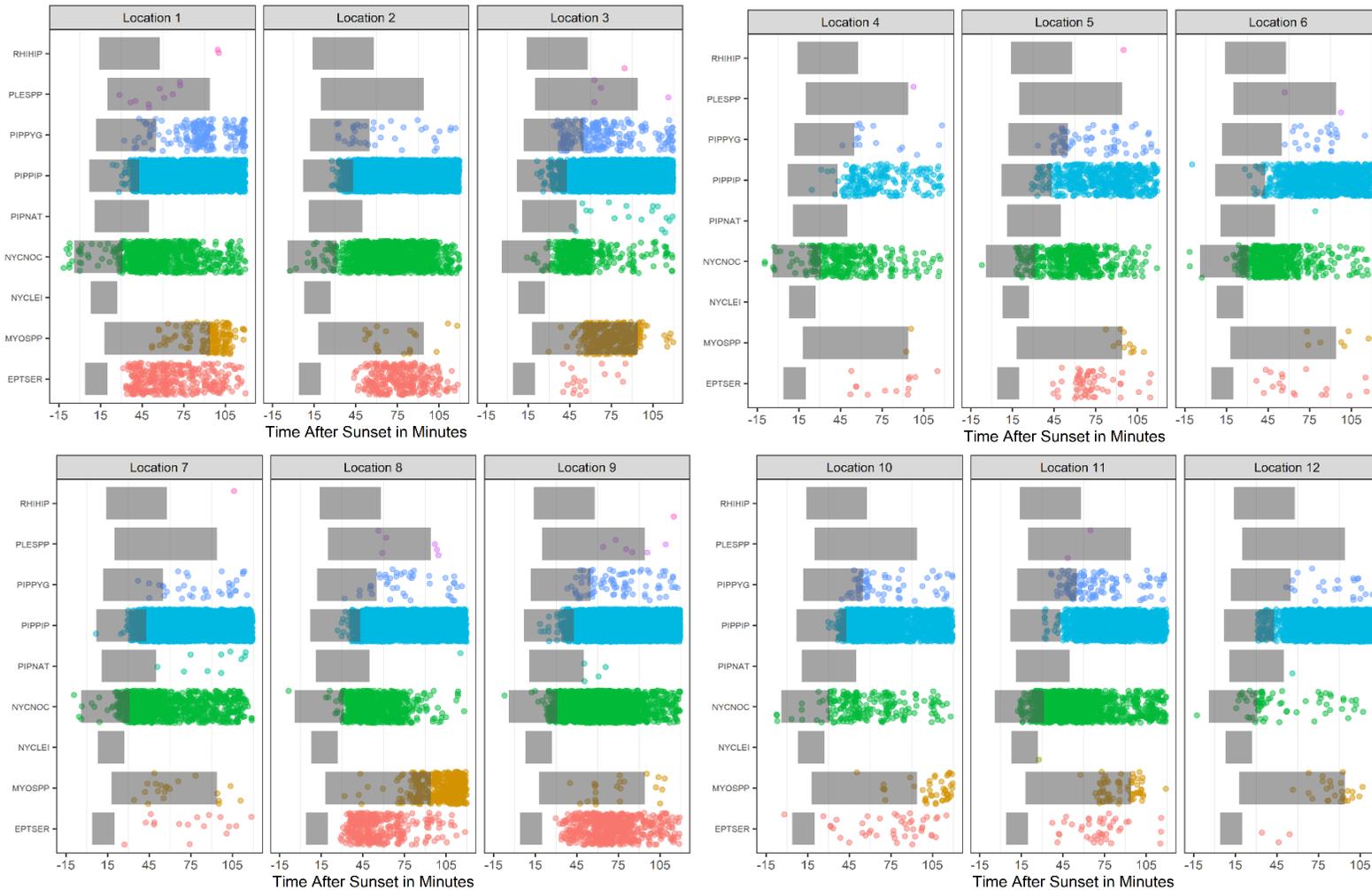
PIPPIP = common pipistrelle; PIPPYG = soprano pipistrelle; PIPNAT = Nathusius' pipistrelle; NYCNOC = noctule; NYCLEI = Leisler' s; NYCSPP = Nyctalus species; EPTSER = Serotine; MYOSPP = Myotis species; RHIHIP = lesser horseshoe bat.; PLESPP = Long-eared bat species.

2023 Automated Detector Surveys

1.4.37 During the 2023 automated detector surveys, statics were placed at the following locations (illustrated in **Plate 8.5.2**). Field and boundary reference numbers relate to those listed in **Figures 8.2.2** and **8.2.3**.

Plate 8.5.2: Automated detector locations in 2023
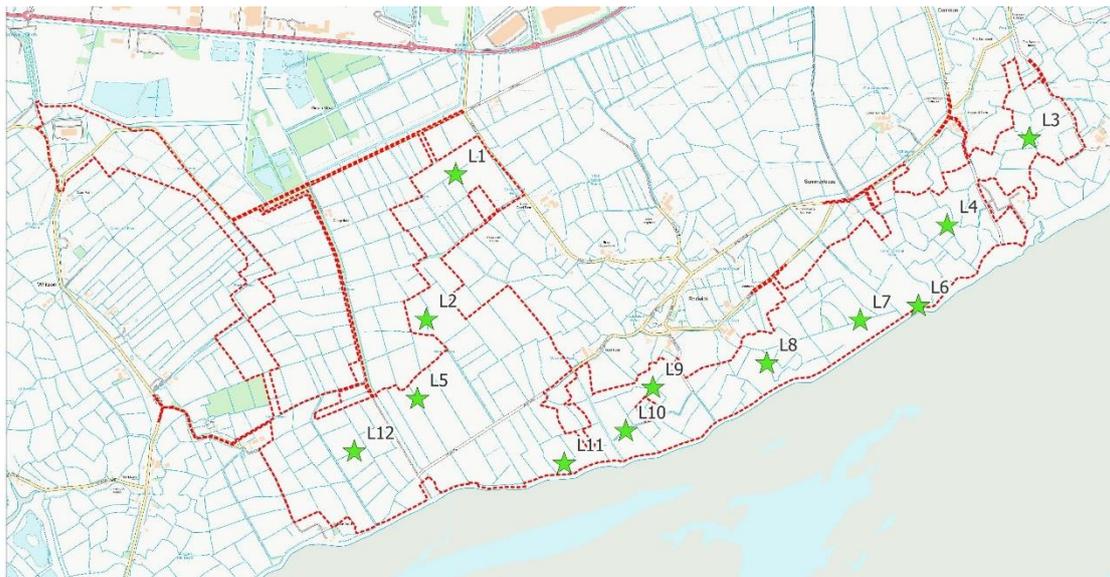
- Location 1 – adjacent to a double hedgerow/ wet ditch at northern end of Site (B105) overlooking cattle grazed pasture.

- Location 2 – In centre of Site on a single hedgerow with a wet ditch (B95), overlooking sheep grazed pasture.

- Location 3 – Eastern end of Site (Field 184) adjacent to Pratt Reen, in a maize crop field

- Location 4 – In centre of Field 173, adjacent to a dry ditch (B267) overlooking cattle grazed grassland

- Location 5 – Western end of Site on the hedgerow boundary of Field 52, overlooking the maize crop field.

- Location 6 – Southern boundary (B247) of Field 170, near to the sea wall/ Bristol Channel and cattle grazed grassland

- Location 7 – Southern boundary hedgerow (B236d) of Field 156, which was cattle grazed grassland

- Location 8 – Western boundary hedgerow (B213) of Field 144, which was cattle grazed grassland

- Location 9 – Near centre of Site on southern boundary hedgerow of Field 129, which was cattle grazed

- Location 10 – Near southern edge of Site, on northern boundary hedgerow/ track of Field 126 (rye-ley), close to Yoke Reen.

- Location 11 – Near southern edge of Site in boundary of Field108 (B171b) overlooking rye-ley.

- Location 12 – Southern boundary hedge/ dry-ditch (B48) of Field 20, which was marshy grassland managed for hay.

1.4.38   **Graph 8.5.5** below illustrates the relative abundance of bats during the survey period, with further clarity provided in **Graph 8.5.6**.

1.4.39   Location 8 supported the highest number of bat passes per hour overall, though Location 4 recorded the most passes from species considered to be more light-averse (primarily Myotis bats in this instance). Bat activity levels were noticeably lower at Locations 2, 3 and 11 compared to elsewhere on Site. At location 2 this is likely to be due to the automated detector being located in the centre of a field rather than on a hedgerow/ reen.

1.4.40   As in 2020, common pipistrelle was the most frequently recorded bat species (79.42% of recorded bat passes; 61187 passes across all surveys), followed by noctule (11.46%; 8827 passes).

1.4.41   As in 2020 Myotis bats (3.74%; 2882 passes), soprano pipistrelle (3.66%; 2816 passes) and serotine (1.59%; 1223 passes) also made up a significant percentage of the bats recorded. Other species recorded in low numbers comprised long-eared bats, lesser horseshoe, Nathusius' pipistrelle and barbastelle.

Graph 8.5.5: Average bat passes per hour during the automated detector survey period (2023)
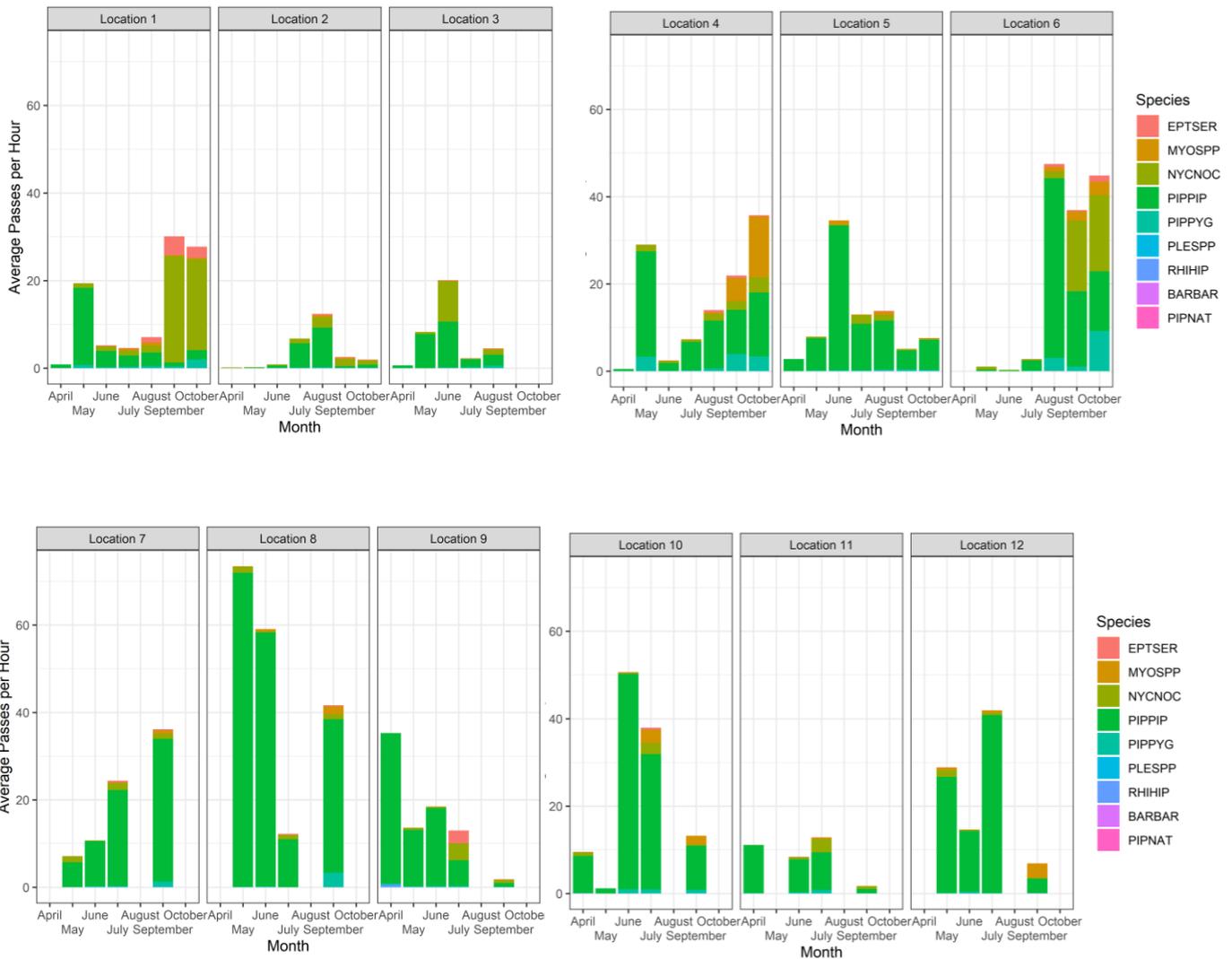
1.4.42 **Graph 8.5.6** below excludes pipistrelles for a clearer picture of activity for other species.

1.4.43 This graph clearly shows that activity by species other than common and soprano pipistrelle bats is significantly higher at Locations 1, 6 and 4 compared to other locations.

1.4.44 At locations 1 and 6 (southern and northern sides of Site), this mainly related to noctule calls recorded during the Autumn. Noctule calls were also recorded at all other static locations during each season, but in lower numbers.

1.4.45 At location 4, the majority of non-pipistrelle calls recorded were by Myotis bats, also in the Autumn with a peak of 13.87 calls per hour on average during the October survey. This species was recorded at all detector locations, but generally in very low numbers.

1.4.46 Serotine calls were recorded in very low numbers across all locations and the highest

number of calls were recorded at Location 1 at the northern end of the Site, but this only equated to an average of 1.21 calls per hour, the majority of which were recorded in the Autumn.

1.4.47 Long-eared bats were recorded across all locations except for Location 6, but in very low numbers (53 calls across the whole season). A total of two Nathusius' pipistrelle calls were recorded.

1.4.48 Overall, Location 4 was identified as being of highest importance for light sensitive species.

Graph 8.5.6: Average bat passes per hour during the automated detector survey period, excluding pipistrelles (2023)
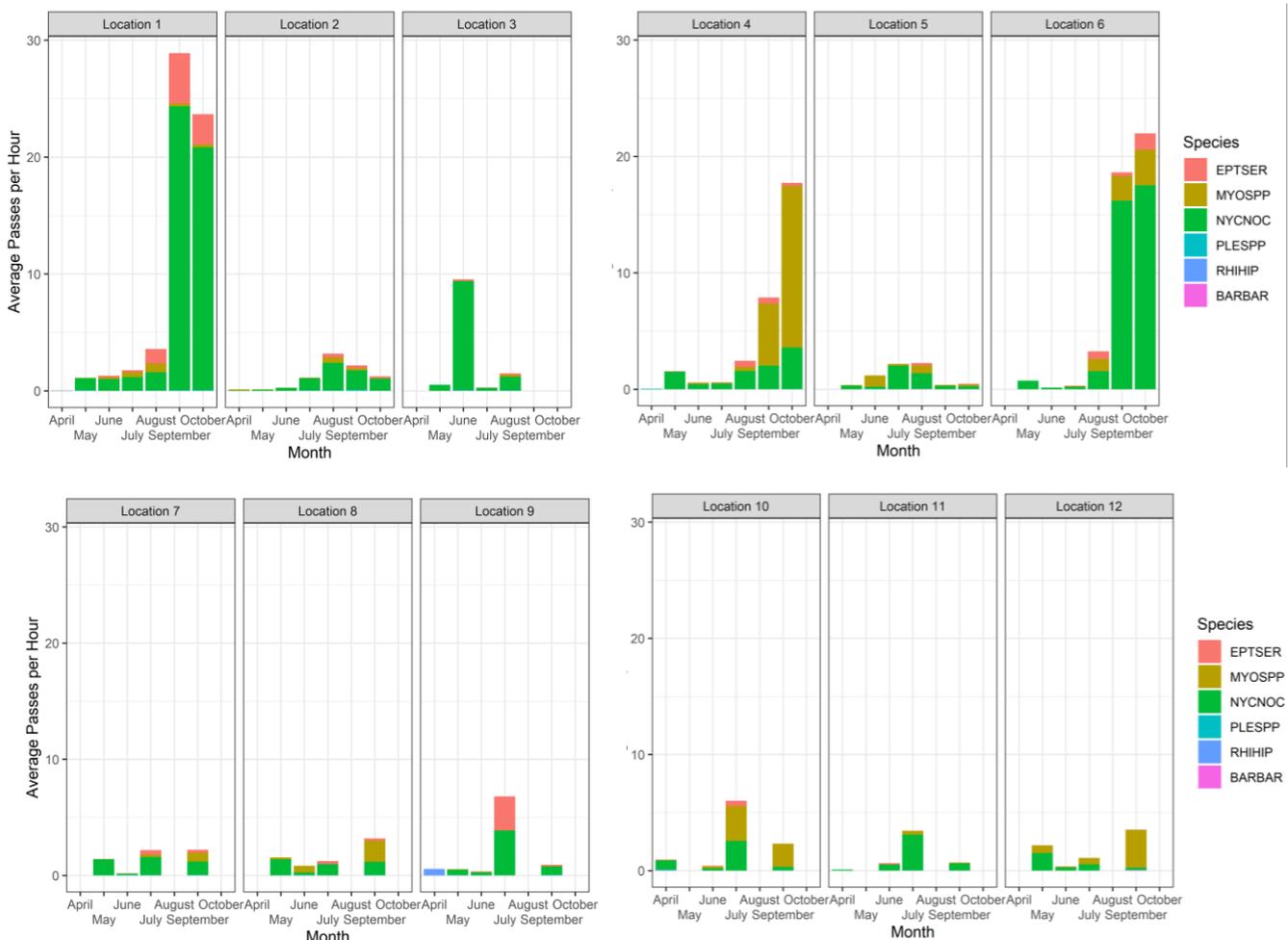
1.4.49 **Graph 8.5.7** illustrates the abundance of Annex II species only. These species were recorded in only very low numbers and not at consistent locations throughout the survey period. Low numbers of lesser horseshoe calls (44 in total) were recorded at Locations 1,3,7,9 and 10 indicating that they are widespread in low numbers across the Site. A total

of four barbastelle calls were recorded at locations 5 and 12 only.

Graph 8.5.7: Average bat passes per hour during the automated detector survey period, for Annex II species (2023)
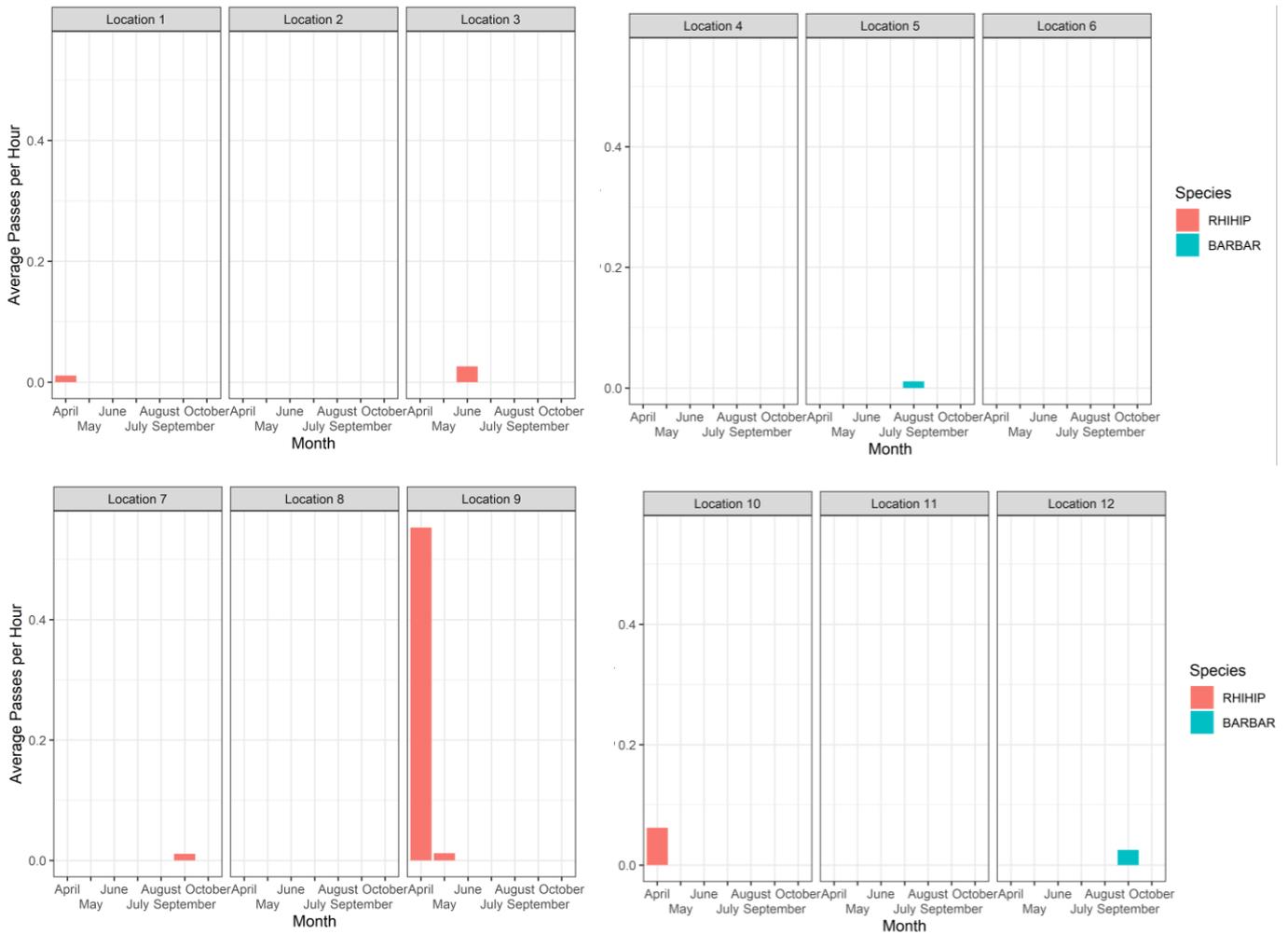
1.4.50 **Graph 8.5.8** shows passes of species in relation to expected emergence times from Andrews and Pearson 2022, included on pg. 34-35 in the BCT survey guidelines (Collins 2023). The graph shows that noctule, common pipistrelle, soprano pipistrelle and Myotis species were recorded on Site during their expected emergence period and therefore may be emerging from a roost nearby and/ or on Site and commuting through the Site. These species are highly likely to be using the Site for foraging close to their roosting site before heading further afield.

1.4.51 In most locations, noctule was recorded at the very end or later than typical emergence times, suggesting that they were arriving to forage from further afield. However, at Location 6 on the southern edge of the Site, a high number of calls were recorded during or prior to typical emergence times so this species is likely to be roosting in trees on or

in the immediate vicinity of this area of the Site. Although it is not known where these bats are roosting, it is worth noting that Trees 17 and 19 (T17 and T19) which were identified as having moderate roosting potential, and T18 that was categorised as having high roosting potential for bats are all within c.500m of this location (see **Figure 8.5.5** for tree locations). This was also the case to a lesser extent at Locations 1 (T14 which has high roosting potential within c.250m) and 4 (within c.500m of T19 and T20, which have moderate and high roosting potential respectively). It should be noted that as noctule calls are strong/ loud, they can be recorded from longer distances than most species and therefore these calls may be recorded from bats flying off-site rather than the trees listed above.

1.4.52   Another species which showed a concentration of activity on site at typical emergence time was common pipistrelle, although most calls were recorded in the latter part of the typical emergence period. This activity was widespread across the Site indicating that there are likely to be multiple common pipistrelle roosts in the local area.

1.4.53   Myotis calls were recorded during typical emergence times at most locations with highest numbers of calls recorded at Location 3, and to a lesser extent at Locations 1, 6, 7 and 10. These locations are widespread across the Site indicating that there may be multiple roosts in the surrounding area (potentially different species).

1.4.54   Soprano pipistrelle were also recorded during the earlier part of typical emergence time, particularly at Locations 1 and 4, so it is likely that there are roosts near to these two locations which lie to the northern edge and southern edge of the Site.

1.4.55   Serotine were consistently first recorded after typical emergence time. Therefore, it is most likely that this species is coming to the Site to forage from roosts that are further afield. Similarly, the small number of calls from Annex II species were recorded well after sunset suggesting that they are travelling to the Site to forage on an occasional basis.

Graph 8.5.8: All bat passes in relation to emergence periods for each species (2023)
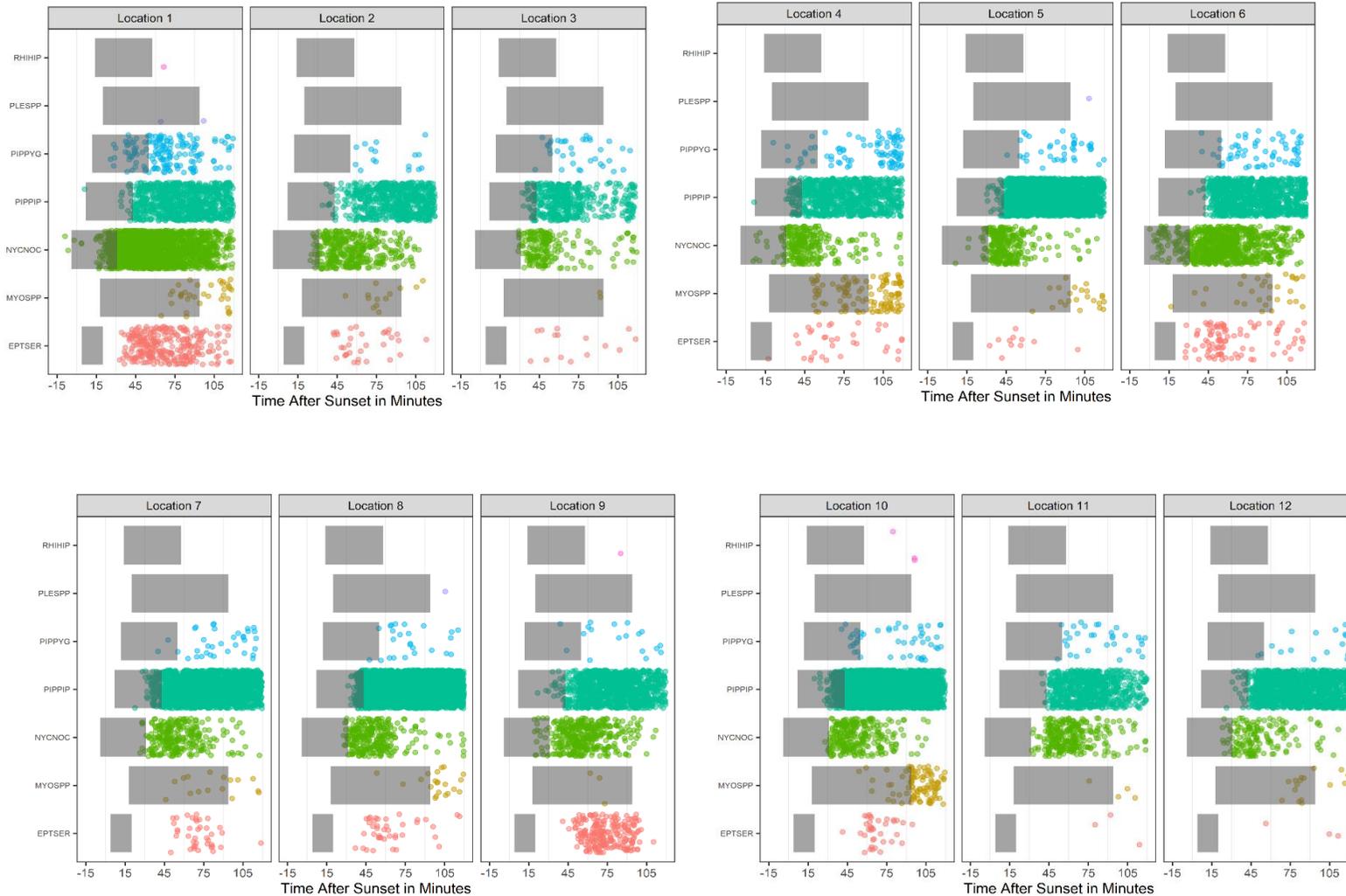
PIPPIP = common pipistrelle; PIPPYG = soprano pipistrelle; PIPNAT = Nathusius' pipistrelle; NYCNOC = noctule; NYCSPP = Nyctalus species; EPTSER = Serotine; MYOSPP = Myotis species; RHIHIP = lesser horseshoe bat.; PLESPP = Long-eared bat species.

Summary

1.4.56   The 2020 and 2023 data sets were consistent in terms of species composition and relative frequency of calls recorded. The surveys indicate that a wide range of species use the site for foraging and/or commuting, with transects indicating that bats favour the boundary hedgerows and reens, with little activity over the open fields.

1.4.57   The majority of calls in both years were from common pipistrelle and this species was widespread and abundant across the Site, with calls recorded during typical emergence times indicating that there are multiple roosts in close proximity to the Site.

1.4.58   Noctule was the second most frequently recorded species in both years. Calls were recorded prior to and during typical emergence times in both years indicating that there are likely to be noctule roosts on or in the immediate vicinity, although due to the strength of noctule calls and the speed at which they fly, it is difficult to determine how close these roosts are.

1.4.59   Results in both years suggest that there are multiple Myotis roosts in close proximity to the Site due to the fact that calls were recorded at typical emergence times in various locations across the Site. These roosts are most likely to be in farm buildings.

1.4.60   Soprano pipistrelle were widespread in low numbers across the Site in both years, with timing of calls in 2023 suggesting the presence of roosts near the northern and southern ends of the Site.

1.4.61   Serotine bat calls were recorded in moderate numbers across the whole Site in both years. This species arrived after typical emergence times in both years indicating that they are travelling to the Site to forage.

1.4.62   Annex II species (lesser horseshoe, barbastelle and greater horseshoe) were recorded in very low numbers and after typical emergence times in both years, indicating that these species are travelling to the Site to forage on an occasional basis.

Bats in Trees

Ground Level Tree Roost Assessment

1.4.63 During the ground level tree roost assessment 22 trees (within the survey area at that time) were identified as having moderate to high roosting potential. An aerial assessment of these trees was subsequently undertaken as detailed below. The assessed trees are scattered throughout the Site and are shown on **Figure 8.5.5**.

Aerial Assessment

1.4.64 The table below summarises the findings in relation to those trees identified as having moderate or high roosting potential from the ground level tree assessment, with final categorisations updated based on the findings of the aerial assessments.

Table 1E-11 Summary of aerial tree assessment results

Tree ref.	Species	Potential Roost Features (PRF)	Tree category (Collins 2016)	Results of Aerial Inspection
T1	Willow	Hazard beam on primary limb to north at 2m.	Low	No evidence of bats.
T2	Willow	Hollow stem of significant girth. Multiple access points to stem from east and west.	High	Unable to confirm absence of bats due to size of hollow stem.
T3	Willow	Potential cavity on stem at 1m to north.	Negligible	Feature not suitable for roosting bats.
T4	Willow	Vertical split from base to 3m to south.	Low	No evidence of bats. Feature suitable for low numbers of bats.
T5	Willow	Horizontal cavity on upper side of primary limb to east at 1m.	Low	No evidence of bats.
T6	Willow	Cavity in stem with access at 1.2m south.	Moderate	No evidence of bats.
T7	Willow	Cavity in stem with access at 1.5m south.	Low	No evidence of bats.
T8	Willow	Cavity in stem accessed at 1.5m northwest.	Moderate	No evidence of bats.
T9	Willow	Cavity in primary limb to east at 1m.	Negligible	No evidence of bats.
T10	Willow	Vertical split 4-7m to northwest and open at top.	Low	Tree unsafe to climb.
T11	Willow	Vertical split with cavity under bark at 1m south.	Low	No evidence of bats.

T12	Willow	Remains of stem forming chimney with water and light ingress. Lifted bark to west.	Low	No evidence of bats.
T13	Ash	Cavity in stem with entrance at 2.5m to southwest.	Moderate	No evidence of bats.
T14	Ash	Hollow stem. Large cavity extends up primary limb to northeast. Woodpeckers on primary limb.	High	Tree unsafe to climb.
T15	Ash	Large cavity to north at 2m.	Moderate	No evidence of bats.
T16	Willow	Failed tree. Large limb with feature previously removed and processed on ground.	Negligible	No evidence of bats within feature on ground.
T17	Ash	Woodpecker holes 8m to east. Large wound and decay in stem with suitable roost sites under bark.	Moderate	Tree unsafe to climb.
T18	Ash	Woodpecker hole at 7m to north on underside of primary limb. Hollow stem.	High	Tree unsafe to climb.
T19	Elder	Dead tree. Cavity on stem 2m to southwest.	Moderate	No evidence of bats.
T20	Ash	Veteran tree. Hollow stem and primary limbs. Cavity in primary limb to east.	High	Barn owl present at time of survey limiting thorough inspection.
T21	Ash	Multiple woodpecker holes on east and north of stem.	Negligible	Holes do not provide suitable features for roosting bats.
T22	Ash	Partially failed hazard beam to south at 6m on primary limb.	Low	No evidence of bats.

1.5   Summary

1.5.1   Overall the bat surveys indicate that the site is used by a wide diversity of bat species, although the majority of that activity can be attributed to common pipistrelle. Transects indicate that bat activity is primarily concentrated around the boundary features (hedges and reens) with no or low levels of activity recorded where transects passed through the centre of the fields. Surveys indicate that common pipistrelle, Myotis bats, noctule and soprano pipistrelle roost on or in close proximity to the Site as calls for these species were recorded during or prior to typical emergence times. Other species, including Annex II species were recorded later during the night indicating that they are travelling from further afield to forage on Site on an occasional basis.

1.5.2   No evidence of roosting was identified during the aerial tree inspections, however suitable roosting features were identified and due to the transitional nature of tree roosting activity, these trees may be used at other times of year and in the future.

1.6 References

Bat Conservation Trust (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London.

Collins, J. (ed.) (2016) Bat Survey for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London.

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Mitchell-Jones A.J. (2004) *Bat Mitigation Guidelines.* English Nature, Peterborough.

Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation, and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management, Ampfield.

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

Annex A: Figures

Key:

- - - - Site Boundary
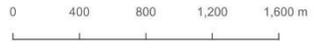
▶ - - ◀ Bat Transect

Number of Bat Passes:

72

1

Figure 8.5.1:
Bat Transect Survey Results 2020

Project:
Future Energy Llanwern

Client:
Future Energy Llanwern Limited

Date: 23/10/2025

Drawn: EB

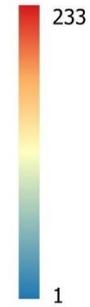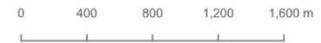Ref: 0840-ETA-8.5.1

Revision: -
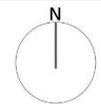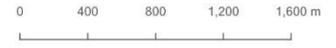
Imagery ©2025 CNES / Airbus, Getmapping plc, Infoterra Ltd
& Bluesky, Maxar Technologies. Map data ©2025 Google

0   400   800   1,200   1,600 m

N

ge

Key:

- ⬚ Site Boundary
- ▸---- Bat Transect

Number of Bat Passes:

233

1

Imagery ©2025 CNES / Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies. Map data ©2025 Google

Figure 8.5.2:
Bat Transect Survey Results 2023

Project:
Future Energy Llanwern

Client:
Future Energy Llanwern Limited

Date:	Drawn:
23/10/2025	EB
Ref:	Revision:
0840-ETA-8.5.2	-

Key:
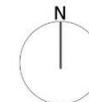
- - - - Site Boundary
● Bat Static Locations 2020

Figure 8.5.3:
Automated Bat Detector Locations 2020

Project:
Future Energy Llanwern

Client:
Future Energy Llanwern Limited
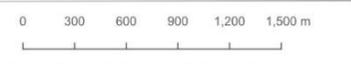
Date: 23/10/2025
Drawn: EB
Ref: 0840-ETA-8.5.3
Revision: -

(c) Crown copyright and database rights 2025. Ordnance Survey 0100031673.
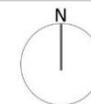
Key:

- Site Boundary
- Static Locations 2023

Figure 8.5.4:
Automated Bat Detector Locations 2023

Project:
Future Energy Llanwern

Client:
Future Energy Llanwern Limited

Date: 23/10/2025
Drawn: EB

Ref: 0840-ETA-8.5.4
Revision: -

(c) Crown copyright and database rights 2025. Ordnance Survey 0100031673.

Key:

- ⬚ Site Boundary (red dashed)

Bat Roost Potential (Based on Aerial Assessments)

- ◆ High Bat Roost Potential
- ◆ Low Bat Roost Potential
- ◆ Moderate Bat Roost Potential
- ◆ Negligible Bat Roost Potential
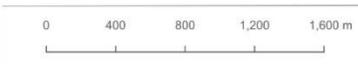
(c) Crown copyright and database rights 2025. Ordnance Survey 0100031673.

Figure 8.5.5:
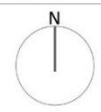Aerial Bat Tree Roost Inspection 2021

Project:
Future Energy Llanwern
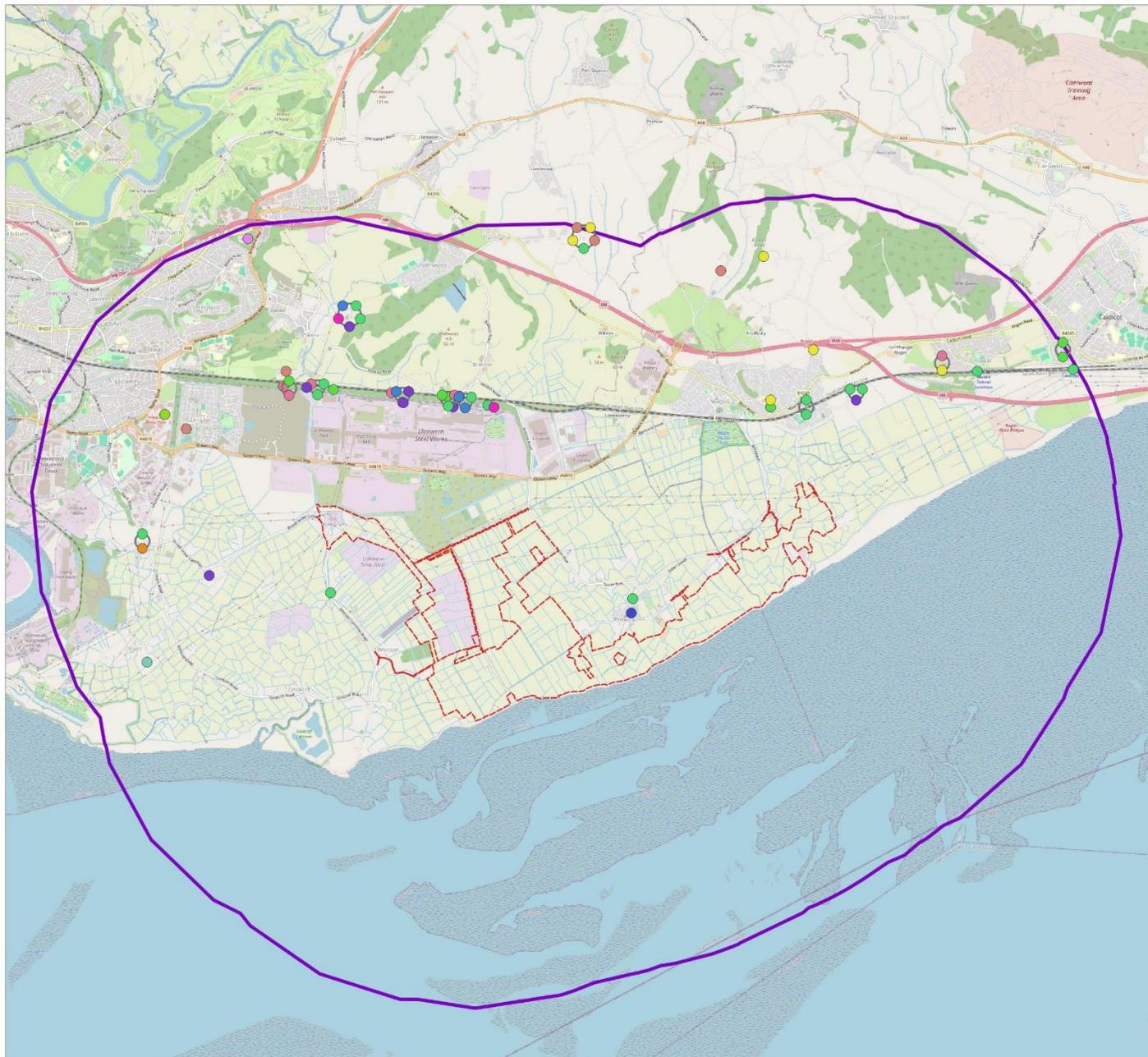
Client:
Future Energy Llanwern Limited

Date:	Drawn:
23/10/2025	JH
Ref:	Revision:
0840-ETA-8.5.5	-

Key:

- ⬚ Site Boundary
- ▢ 4km Buffer
- 🟢 Unkown Bat Species
- 🔴 Brown Long-eared Bat
- 🟢 Common Pipistrelle
- 🟡 Lesser Horseshoe Bat
- 🟣 Long-eared Bat species
- 🟢 Nathusius"s Pipistrelle
- 🟠 Natterer"s Bat
- 🟣 Noctule Bat
- 🟢 Pipistrelle
- 🟣 Pipistrelle Bat species
- 🔴 Serotine
- 🔵 Soprano Pipistrelle
- 🔵 Whiskered Bat

0   800   1,600   2,400   3,200 m

Base Map: (c) Crown copyright and database rights 2025.
Ordnance Survey 0100031673

Figure 8.5.6:
Bat Desk Study Results

Project:
Future Energy Llanwern

Client:
Future Energy Llanwern Limited

Date:	Drawn:
11/11/2025	JH
Ref:	Revision:
0840-ETA-8.5.6	-