ENVIRONMENTAL STATEMENT: 6.3 APPENDIX 7-4: BAT SURVEY REPORT

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

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Revision A

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

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EXECUTIVE SUMMARY

WSP UK Ltd has been commissioned by Cory Environmental Holdings Limited (Cory) (hereafter referred to as 'the Applicant') to undertake a bat activity survey, for the Cory Decarbonisation Project to be located at Norman Road, Belvedere in the London Borough of Bexley (LBB; National Grid Reference/NGR 549572, 180512).

Bat activity data was gathered using automated bat detectors (Wildlife Acoustics SongMeter 4 (SM4)), which were installed in pre-determined locations during each of the survey months of May, June, July, August and September. Three detectors were deployed in secure locations within habitats likely to be of value to bats; these locations are shown on **Figure 7-8: Bat Static Detector Locations (Volume 2)**. Surveys were carried out in accordance with the 3rd edition of the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists Good Practice Guidelines, which were current at the time of surveying[1].

Seven species/species groups were recorded during the survey.

Overall Location 1(L1), L1 recorded the lowest total number of bat passes in comparison to the other locations, indicating that the ditch on the western boundary of the Site was not frequently utilised by bats for foraging and/or commuting compared to the other locations. L1 is situated approximately 120m south of the ongoing construction of Riverside 2 and the operational Riverside 1, suggesting there was a higher amount of disturbance at L1 in comparison to the other locations. In addition, L1 recorded the highest proportion of 'noise' files in comparison to the other locations, further suggesting a higher level of disturbance at L1 in comparison to the other locations.

Location 2 (L2) recorded the second highest total number of bat passes in comparison to the other locations, indicating that this area of dense scrub and lengthy ditches provides adequate linear habitat for bats to both forage and commute.

Location 3 (L3) recorded the highest overall total number of bat passes in comparison to the other locations, indicating that the bats are using the woodland edge on the southern boundary of the Site to commute and/or forage more frequently than the ditches with reedbed and scrub habitat on Site.

1. INTRODUCTION

1.1.1. WSP UK Ltd has been commissioned by Cory Environmental Holdings Limited (Cory) (hereafter referred to as 'the Applicant') to undertake a bat activity survey, for the Cory Decarbonisation Project to be located at Norman Road, Belvedere in the London Borough of Bexley (LBB; National Grid Reference/NGR 549572, 180512).

1.1.2. The land upon which the Proposed Scheme is to be located is referred to as the 'Site' and the edge of this land referred to as the 'Site Boundary'.

1.1.3. A Preliminary Ecological Appraisal (PEA) of the Proposed Scheme was undertaken in February 2023 (**Appendix 7-2: Preliminary Ecological Appraisal (Volume 3)**), which identified habitat considered likely to be used by commuting or foraging bats within the Site.

1.1.4. A Preliminary Bat Roost Appraisal (PBRA) of all the buildings within the Site was carried out in July 2022 (included in **Appendix 7-2: Preliminary Ecological Appraisal (Volume 3)**). The PBRA of all buildings, including multiple temporary cabin structures concluded that all buildings on Site have negligible bat roost potential due to the absence of roosting features. Neither of the jetties (Middleton Jetty and Belvedere Power Station Jetty (disused)) had roost suitability, being metal and concrete structures open to the weather and splashed by the water below, with the active Middleton Jetty being heavily disturbed. Gulls were also a constant presence around both jetties which would pose a threat to bats and strongly dissuade them from roosting in these structures.

1.1.5. Further survey visits, undertaken in February 2023, identified no semi-mature or mature trees to be present (that can provide roosting opportunities for bats) however, this work was limited by access constraints. Further survey during spring and summer 2023, when access limitations were removed, did not identify semi-mature or mature trees that could support roosting bats in the remainder of the Site. The broadleaved woodland within the southern boundary of the Site could not be fully accessed, however this woodland is included within the Mitigation and Enhancement area for the Proposed Scheme and will therefore be retained, resulting in no loss of potential roosting features within this woodland.

1.1.6. Bat foraging habitat includes broadleaved woodland, coastal and floodplain grazing marsh and grassland, as well as linear features, such as the River Thames and ditches, which provide connectivity to the wider green area. The Site is considered to be of "High" suitability for foraging and commuting[1].

1.2. BRIEF AND OBJECTIVES

1.2.1. The Applicant commissioned WSP UK Ltd to complete a bat activity survey to:

- identify the species of bats active on Site; and
- identify key commuting/foraging areas within the Site.

2. METHODS

2.1. DESK STUDY

2.1.1. As part of the PEA, records of bat species were searched for within 2km of the centre of the Site within the last 10 years (see **Figure 7-1: Terrestrial Biodiversity Study Areas (Volume 2)**). Records were obtained from Greenspace Information for Greater London[2] (GiGL). A 2km search area was used to gather data within the minimum Core Sustenance Zone (CSZ) of UK bat species. A CSZ refers to the area surrounding a communal bat roost where habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. The CSZ for UK bat species ranges from 2km to 6km[3]. Although 6km is recommended to cover the maximum CSZ of UK bat species, the Site is based within an urban surrounding and therefore, a 2km search distance was deemed sufficient.

2.1.2. DEFRA's mapping website was reviewed for national statutory designated sites (Sites of Special Scientific Interest (SSSI)), within 10km of the Site Boundary, and 10km for Special Areas of Conservation (SAC) (see **Figure 7-1: Terrestrial Biodiversity Study Areas (Volume 2)**) where bats are the qualifying interest. Non-statutory sites were reviewed within 2km of the Survey Area. This was carried out in accordance with the Bat Conservation Trust (BCT) 3rd edition of the Bat Surveys for Professional Ecologist Good Practice Guidelines[1], which was the appropriate guidance at the time. However, this approach was also consistent with the recently updated BCT 4th edition of the Bat Surveys for Professional Ecologist Good Practice Guidelines[4].

2.1.3. Aerial imagery and maps of the local areas were used to provide an overview of habitats suitable for bats in the wider landscape.

2.2. AUTOMATED DETECTOR SURVEY

2.2.1. Bat activity data was gathered using automated bat detectors (Wildlife Acoustics SongMeter 4 (SM4[a])), which were installed in pre-determined locations during each of the survey months of May, June, July, August and September in 2023. Three detectors were deployed, in secure locations within habitats likely to be of value to bats; these locations are shown on **Figure 7-8: Bat Static Detector Locations (Volume 2)**. Surveys were carried out in accordance with the 3rd edition of the BCT Bat Surveys for Professional Ecologists Good Practice Guidelines, which were current at the time of surveying[1].

2.2.2. Detectors were installed to provide comparisons of habitat types to determine their value to local bat populations, and to determine potential adverse effects of severance /loss of potential commuting routes and loss of foraging habitat. The detectors were installed within two different habitat types: ditches with reedbed and

[a] Used with SMM-U2 and SMM-U1 ultrasonic microphones.

scrub, and mixed woodland (including edge habitats). The locations can be described as follows:

- **Location 1** (Grid ref: TQ 49464 80443) – a ditch with reedbed habitat, bordered by scrub on the western boundary of the Site, situated within Crossness LNR, that could be a potential commuting route and foraging habitat for bats.
- **Location 2** (Grid ref: TQ 49529 80175) - scrub alongside a ditch with reedbed habitat within the centre of the Site that could be a potential commuting route and foraging habitat for bats.
- **Location 3** (Grid ref: TQ 49409 79917) – an area of woodland located on the southern boundary of the Site that could be a potential commuting route and foraging habitat for bats.

2.2.3. The detectors were deployed in accordance with the current good practice guidance and were left in situ for a minimum of five nights in each month[1]. The guidance details that automated detectors should be set to commence recording at least 30 minutes before sunset and cease recording 30 minutes after sunrise, however due to errors in calibration, not all detectors followed this guidance (as detailed in **Section 2.5**).

2.3. ANALYSIS

SOUND ANALYSIS

2.3.1. Once triggered by ultrasound, the SM4 detectors were programmed to record sound files with a duration of 15 seconds, which may contain a number of individual bat calls (or passes), or discrete groups of ultrasounds 'pulses'. The assessment of relative bat activity is based on the relative abundance of recorded bat calls of each species within each survey period.

2.3.2. Where possible, bat calls were identified to species level. Due to the overlap in call characteristics, and inherent limitations using software for species identification, the following labels were used for the below species:

- *Myotis* species identified to genus only: *Myotis spp.*; and
- Noctule *Nyctalus noctule*, serotine *Eptesicus serotinus* and Leisler's bat *Nyctalus leisleri* grouped to: "NSL", where the call was above 20hz.

2.3.3. Manual identification of the noctule and NSL group was based on the following parameters[5]:

- Noctule - where the call was below 20hz; and
- NSL - call greater than 20 KHz.

2.3.4. For *Pipistrellus* species the following criteria based on measurements of peak frequency were used to manually identify calls:

- Common pipistrelle *Pipistrellus pipistrellus* ≥ 42 and <49KHz;
- Soprano pipistrelle *Pipistrellus pygmaeus* ≥ 51KHz; and
- Nathusius' pipistrelle *Pipistrellus nathusii* ≤39KHz.

2.3.5. Sound files that could not identify *Pipistrellus* to species level and instead identified both common pipistrelle and soprano pipistrelle, were excluded from the data set; as these calls were a small percentage (at 7%) excluding them will not affect the assessment.

2.3.6. Both the grey long-eared bat *Plecotus austriacus* and the brown long-eared bat *Plecotus auritus* also have overlapping call characteristics. However, as the grey long-eared bat is considered to be 'not present' in London (Law, 2015) calls identified within the *Plecotus* genus were considered to be brown long-eared bats. Also, it is possible for long-eared species *Plecotus* sp. to be under recorded by detectors. This is because this species group generally uses low intensity calls which are rarely detected unless it passes within 5m of the detector and even then, not always, as echolocation is sometimes not used by the bats when foraging (Swift, 1998).

2.3.7. The recordings of bat echolocation calls collected during the surveys were analysed using specialist computer software Kaleidoscope Pro (Wildlife Acoustics version 5.6.4). This software allows identification of bats to species or species group level based on call parameters.

2.3.8. Automatic identification of all sound files was completed using Kaleidoscope Pro software, which separated the sound files to bat calls that could be identified as a bat call to species level or a bat call with no species ID, or to noise files which could not be identified as a bat call. The bat calls and noise files were then manually analysed using Kaleidoscope Pro, by ecologists competent in analysing bat calls and experienced in the use of Kaleidoscope software. Manual analysis comprised of the following:

- 100% of bat calls that identified as 'no ID';
- 100% of bat calls that were not soprano or common pipistrelle. Where the Auto-ID label was incorrect, the correct species label was attributed to the calls;
- Common pipistrelle and soprano pipistrelle files with a confidence interval of less than 0.6[b]; and
- 10% of noise files.

2.3.9. Noise files consist of any sound that has triggered the detector, but which has not been recognised as a bat call, such as crickets or rustling vegetation etc. Occasional bat calls may be present within these, although these are usually short sections of calls from bats which are likely to have been further away from the detector and therefore less relevant to the habitat feature under survey. Noise files identified as bat calls were only included within the results if the total number of noise files with bat calls reached 20% or greater than 10% of bat calls. If noise files with bat calls was >20% then this will trigger a full manual analysis of all sound files. Although slightly higher numbers of calls of all species may be recorded if all noise files were analysed,

[b] Following extensive call analysis and validation, WSP policy considers the automatic identification function of Kaleidoscope Pro is suitably accurate to record common pipistrelle and soprano pipistrelle calls without significant error.

this would not alter the results in terms of comparative assessment of habitat features with highest/lowest levels of bat activity.

2.3.10. Analysed data was subject to a quality assurance process which checked the following:

- 10% of files recorded from each detector, each month, which were identified as common or soprano pipistrelle;
- 20% of files recorded from each detector, each month, for all other species if represented by more than 10 calls; and
- 100% of files recorded from each detector, each month, for all other species if represented by less than 10 calls.

2.3.11. Files were randomly selected for quality assurance checks and the process was completed by a suitability competent ecologist with seven years of bat sound analysis experience, including the use Kaleidoscope software.

DATA ANALYSIS

2.3.12. A series of separate sound files may represent a series of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g. bats making repeated foraging passes within the range of a detector). Thus, the information generated by automated bat detectors represents bat 'activity density' rather than an absolute measurement of bat abundance. The assessment of relative bat activity between species is based on the relative abundance of recorded calls of each species across the combined study period.

2.3.13. To allow standardisation comparison of each automated detector survey location and to provide an index of activity across the Site, the data was transformed to number of bat 'Passes Per Night' (PPN):

- Bat PPN = Total bat passes recorded at a SM4 location/Number of night detector was deployed.

2.4. DATES OF SURVEY, WEATHER AND PERSONNEL

2.4.1. The dates, total nights analysed, and weather conditions of the automated bat activity surveys are summarised in **Table 2-1.**

Table 2-1: Dates for Automated Bat Activity Survey Visits

Month	Dates of Survey (2023)	Total of Detector Nights Collected[c]		Weather Conditions Summary
May	17th-21st	L1	5	Dry with winds ranging between 3-12mph. Night time temperatures ranging between 8-14ºC.
		L2	5	
		L3	5	
June	15th-19th	L1	3	Mostly dry with one night of rain, with winds ranging between 4-10mph. Night time temperatures ranging between 12-18ºC.
		L2	5	
		L3	5	
July	13th-17th	L1	1	Mostly dry with one day and night of rain, with winds ranging between 2-15mph. Night time temperatures ranging between 10-16ºC.
		L2	1	
		L3	0	
August	10th – 15th	L1	3	Mostly dry with one morning of rain, with winds ranging between 2-12mph. Night time temperatures ranging between 13-24ºC.
		L2	5	
		L3	5	
September	6th – 10th	L1	5	Dry with winds ranging between 1-10mph. Night time temperatures ranging between 15-29ºC.
		L2	5	
		L3	2	

2.5. NOTES AND LIMITATIONS

2.5.1. Desk study information has been used to provide an indication of species likely to be encountered within the Site to determine survey requirements and to aid in the design

[c] Total is calculated by the sum of the number of nights each detector recorded. The optimum number of nights to be analysed is 5 nights per detector. Where a lower number has been recorded, this is as a result of detector failure (see Section 2.5 Notes and Limitation).

of the surveys. A lack of desk study records does not prove species absence but is often merely a result of a lack of data.

2.5.2. The desk study information provided by GiGL did not detail known roost locations, however this is not considered a significant limitation as the only area of woodland on Site is to be retained and the GiGl data paired with the field survey data is sufficient to understand bat activity level overall.

2.5.3. Walked transect data are typically undertaken in tandem with automated detector data, as described in the good practice guidance[1]. No walked transect survey was undertaken in this case however, as automated detectors provide a much more extensive dataset (i.e. three detectors deployed for five nights every month) as opposed to a single monthly visit for transects comprising approximately 1.5 hours of recording. Although bat behaviours (i.e. flight patterns, height of flight) was not able to be recorded through automated detector surveys, the aim of the surveys was to gather information on the bat species and abundance present. Therefore, the lack of a transect survey is not considered to be a significant limitation to the automated detector survey.

2.5.4. The automated detector surveys were carried out between May and September 2023, and did not include April and October. This is not considered to be a significant limitation as the guidance[1] details that although the UK bat active period is generally considered to be between April and October inclusive, weather conditions during April and October may be unsuitable and thus may render surveys ineffective. Therefore, professional judgement should be applied to determine the most effective activity survey period for a particular project. Given the lack of mature trees and woodland on Site that could offer shelter for bats from heavy rain and strong winds, it was deemed suitable to exclude April and October from the automated surveys, and that sufficient data could be obtained between May and September to provide an effective assessment of the bat assemblage using the Site.

2.5.5. Weather data was not recorded directly during the survey but was instead sourced via a freely available weather resource[d]. This resource uses data from a network of local weather stations, so resolution of information varies. Due to this, weather data accuracy for any given automated detector night was limited, however it is sufficient to give an indication of the prevailing weather conditions during the periods in which the detectors were deployed.

2.5.6. NSL recordings have been grouped together where calls from noctule, serotine or Leisler's have overlapping parameters and could not be identified to species level. This is not considered to be a limitation as the assessment aims to understand the level of bat activity overall at each location.

[d] Weather data accessed from met office available at: https://www.metoffice.gov.uk/weather/forecast/u10heks7b#?date=2023-11-06.

2.5.7. The automated detectors were not calibrated to account for daylight savings for June to September. As such, the automated detectors recorded 90 minutes before sunset until 30 minutes before sunrise. This is different from industry standard of commencing recording 30 minutes before sunset and ceasing recording 30 minutes after sunrise. This issue did not affect the time each bat pass was recorded. However, late returning bats may have been missed when detectors switched off at dawn. Although slightly higher numbers of bat passes for late returning species may have been recorded, if the detectors had captured the period 30 minutes before sunrise to 30 minutes after sunrise, this would not likely have altered the results in terms of the locations with highest/lowest rates of bat activity. The dawn period generally captures lower rates of bat activity than during the middle of the night.

2.5.8. During May surveys, L1 and L3 were not calibrated to account for daylight savings and started recorded 90 minutes before sunset. L2 was programmed correctly and began recording calls 30 minutes before sunrise. This means the recording hours being L1, L2 and L3 in May are not directly comparable and is consequently a limitation to the automated detector survey.

2.5.9. During the recording period some detectors did not achieve a full five nights data each month. This failure to record to five nights was either due to detector errors, drained batteries and in some instances high levels of background noise, resulting in the SD cards reaching full capacity before the end of the recording period. **Table 2-1** states when surveys did not achieve a full five nights. However, the assessment of relative bat activity within this report was based on the number of bats passes per night, which was calculated from the number of recorded passes divided by the total of full nights the static was operational. As such the use of bat passes per night allowed standardisation despite differences in the number of total operational unit hours between different locations and/or between different months.

3. RESULTS

3.1. DESK STUDY

3.1.1. No national statutory designated sites within 10km, or SAC within 10km of the Proposed Scheme with bats listed as a designated features were returned from the desk study.

3.1.2. Two non-statutory designated sites within 2km of the Proposed Scheme (see **Figure 7-4: Locally Important Non-statutory Designated Sites (Volume 2)**), were identified as having bats listed within their designated features. This includes:

- Erith Marshes SINC (Metropolitan – M041) (Within the Site): serves as an important commuting route for bats; and
- Franks Park, Belvedere SINC (Borough Grade I – BxBI03) (1km south of the Site): mature trees with hollows and cracks suitable for roosting bats.

3.1.3. Erith Marshes SINC encompasses all the coastal grazing marsh and grassland south of Riverside 1 and Riverside 2 within the Site (as presented in **Figure 7-8: Bat Static Detector Locations (Volume 2)**) and all three bat static locations are situated within Erith Marshes SINC.

3.1.4. The desk study data search completed as part of the PEA (**Appendix 7-2: Preliminary Ecological Appraisal (Volume 3)**) returned records of eight species of bats within 2km of the Proposed Scheme. This comprised:

- Serotine *Eptesicus serotinus*;
- Daubenton's bat *Myotis daubentonii*;
- Natterer's bat *Myotis nattereri*;
- [redacted];
- Common pipistrelle *Pipistrellus pipistrellus;*
- [redacted];
- Nauthusius's pipistrelle *Pipistrellus nathusii*; and
- [redacted].

3.1.5. The closest bat record was of [redacted] within 250m from the Site in May 2014. The most recent bat record was of Daubenton's bat in October 2018, approximately 1.5km from the Site. The desk study records depend on submission of local records and so may not detail all species that have the potential to be present (see **Section 2.5**).

3.2. BAT ACTIVITY SURVEY

AUTOMATED DETECTOR SURVEY

3.2.1. A least seven bat species, including unidentified calls from NSL genus, were recorded using habitats within proximity of the Proposed Scheme during the automated detector species. The confirmed species or species group includes:

- Common pipistrelle;
- [redacted];
- [redacted]
- [redacted]/Serotine/Leisler's ([redacted]SL);
- Nauthusius's pipistrelle;
- [redacted]; and
- *Myotis spp.*

3.2.2. The results of the automated monitoring were consistent with the species returned from the desk study data search. The local, regional and national distribution, and the conservation status of the species recorded during the surveys is listed within **Table 3-1** below. Although *Myotis* and NSL have not been identified to species level, their status has been taken from the species identified during the desk study: Daubenton's bat, Natterer's bat, noctule, serotine and Leisler's bat.

Table 3-1: Bat Species Recorded during Activity Surveys

Species	Local Distribution and Status (LBG (Law, 2015) & BCT (Collins, 2023))	UK Distribution and Conservation Status (JNCC & BCT (BCT, 2023); BCT (Collins, 2023); Mathews F, and Harrower C. (Matthew and Harrower, 2020))	International Status (IUCN, 2020)
Common pipistrelle	Widespread and common	Widespread, common Least concern	Least concern
Soprano pipistrelle	Widespread and common	Widespread, common Least concern	Least concern
[redacted]	Widespread and uncommon	Widespread, common Least concern UK BAP priority species	Least concern
[redacted]	[redacted] Widespread and uncommon	[redacted] Widespread, common Least concern UK BAP priority species	[redacted] Least concern

Species	Local Distribution and Status (LBG (Law, 2015) & BCT (Collins, 2023))	UK Distribution and Conservation Status (JNCC & BCT (BCT, 2023); BCT (Collins, 2023); Mathews F, and Harrower C. (Matthew and Harrower, 2020))	International Status (IUCN, 2020)
	Leisler's bat Widespread and rare **Serotine** Widespread and rare	**Leisler's bat** Local, rare Near Threatened **Serotine** Widespread in southern Britain, uncommon Vulnerable	**Leisler's bat** Least concern **Serotine** Least concern
Nathusius' pipistrelle	Rare in south and west London, uncommon in north and east London	Widespread, rare Near Threatened	Least concern
[redacted]	Widespread and common	Widespread, common Least concern UK BAP priority species	Least concern
Myotis spp	**Daubenton's bat:** Widespread and uncommon **Natterer's bat:** Widespread and uncommon	**Daubenton's bat:** Widespread, common Least concern **Natterer's bat:** Widespread, uncommon Least concern	**Daubenton's bat:** Least concern **Natterer's bat:** Least concern

3.2.3. The bat data recorded during the automated detector monitoring periods is summarised below in **Table 3-2**, showing the number of passes per species at each location per month. A more detailed dataset showing a breakdown of bat passes recorded per month is provided in **Annex A**. In addition, a breakdown of the total recordings per each bat species' at each location is provided in **Annex B**.

Table 3-2: Summary of Bat Species Recorded during Automated Detector Survey [e,f]

Area	Month	P.pip	P.pyg	Nyc Noc	NSL	P.nat	P.aur	Myo	Month Total	% Total
L1	May	227	35	8	8	0	0	0	278	45.3
	June	147	32	4	0	0	0	0	183	29.8
	July	19	20	2	1	0	0	0	42	6.8
	August	40	16	0	1	0	0	0	**57**	9.3
	September	15	9	21	6	2	0	1	**54**	8.8
	L1 total	**448**	**112**	**35**	**16**	**2**	**0**	**1**	**614**	100
L2	May	544	87	56	6	1	0	0	**694**	57.9
	June	240	61	18	2	2	0	0	**323**	27.0
	July	8	1	1	0	0	0	0	**10**	0.8
	August	108	32	1	4	2	0	0	**147**	12.3
	September	4	2	4	5	4	0	5	**24**	2.0
	L2 total	**904**	**183**	**80**	**17**	**9**	**0**	**5**	**1,198**	**100**
L3	May	917	497	6	3	4	1	0	**1,428**	68.5
	June	281	57	85	6	3	0	1	**433**	20.8
	July	0	0	0	0	0	**0**	**0**	**0**	0
	August	114	64	2	12	4	**0**	**5**	**201**	9.6
	September	10	9	0	4	1	**0**	**0**	**24**	1.2
	L3 total	**1322**	**627**	**93**	**25**	**12**	**1**	**6**	**2,086**	**100**

3.2.4. Common pipistrelle was the most abundant species recorded accounting for 68.6% of the total bat passes across all months and over the whole Site. [redacted] was the next most common species, accounting for 23.7% of all bat passes. [redacted] was the least abundant species, having recorded only a single pass in May, at L3.

[e] Each count within Table 4-2 constitutes a single bat pass recorded as the species or species group in question.
[f] B.bar = Barbastelle bat; [redacted], Serotine, Leisler; [redacted]; P.nat = Nauthusius's pipistrelle; P.pip = Common pipistrelle; [redacted], [redacted], Myo = *Myotis spp*

3.2.5. May had the highest number of bat calls (2,400), followed by June (939) and August (405) (see **Annex A**). At each location, L1, L2 and L3 recorded a peak of bat activity in May, with 45.3%, 57.9 and 68.5% of all bats passes in total recorded during May at each location respectively. This can be seen in **Plate 3-1**.

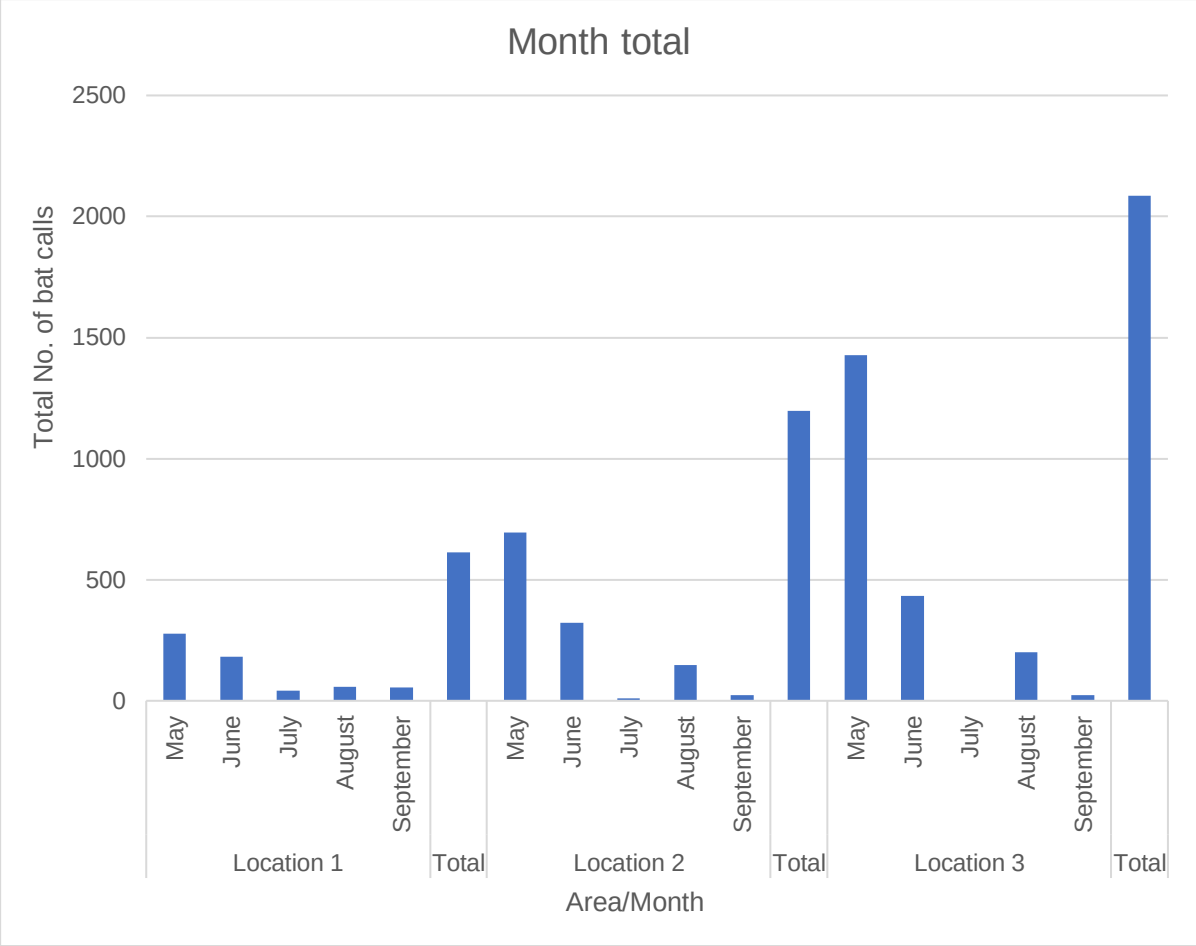

Plate 3-1: Monthly Bat Pass Totals for Locations 1-3

BAT PASSES PER NIGHT

3.2.6. The data presented within **Table 3-3** shows bat activity in PPN by species, detector location and month. This data is also present per species in **Plate 3-2** to **Plate 3-8**.

Table 3-3: Summary of Bat Passes Per Night during Automated Detector Survey[g]

Location	Month	Total no. of Nights	P.pip	P.pyg	Nyc Noc	NSL	P.nat	P.aur	Myo
L1	May	5	45.4	7.0	1.6	1.6	0.0	0.0	0.0
	June	3	49.0	10.7	1.3	0.0	0.0	0.0	0.0
	July	1	19.0	20.0	2.0	1.0	0.0	0.0	0.0
	August	3	13.3	5.3	0.0	0.3	0.0	0.0	0.0
	September	5	3.0	1.8	4.2	1.2	0.4	0.0	0.2
L2	May	5	108.8	17.4	11.2	1.2	0.2	0.0	0.0
	June	5	48.0	12.2	3.6	0.4	0.4	0.0	0.0
	July	1	8.0	1.0	1.0	0.0	0.0	0.0	0.0
	August	5	21.6	6.4	0.2	0.8	0.4	0.0	0.0
	September	5	0.8	0.4	0.8	1.0	0.8	0.0	1.0
L3	May	5	183.4	99.4	1.2	0.6	0.8	0.2	0.0
	June	5	56.2	11.4	17.0	1.2	0.6	0.0	0.2
	July	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	August	5	22.8	12.8	0.4	2.4	0.8	0.0	1.0
	September	2	5.0	4.5	0.0	2.0	0.5	0.0	0.0

[g] [redacted], Serotine, Leisler; [redacted]; P.nat = Nauthusius's pipistrelle; P.pip = Common pipistrelle; [redacted], [redacted], Myo = *Myotis spp*

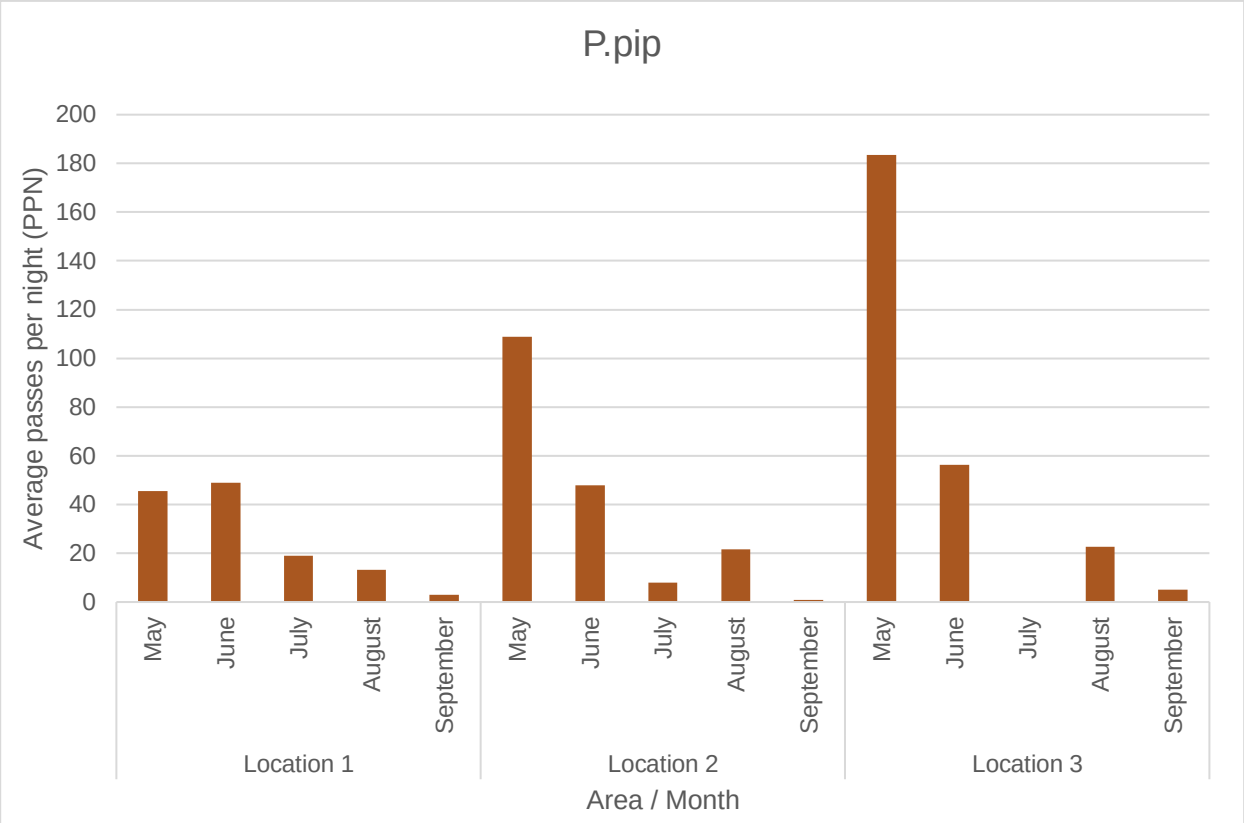

Plate 3-2: Passes per Night of Common Pipistrelle

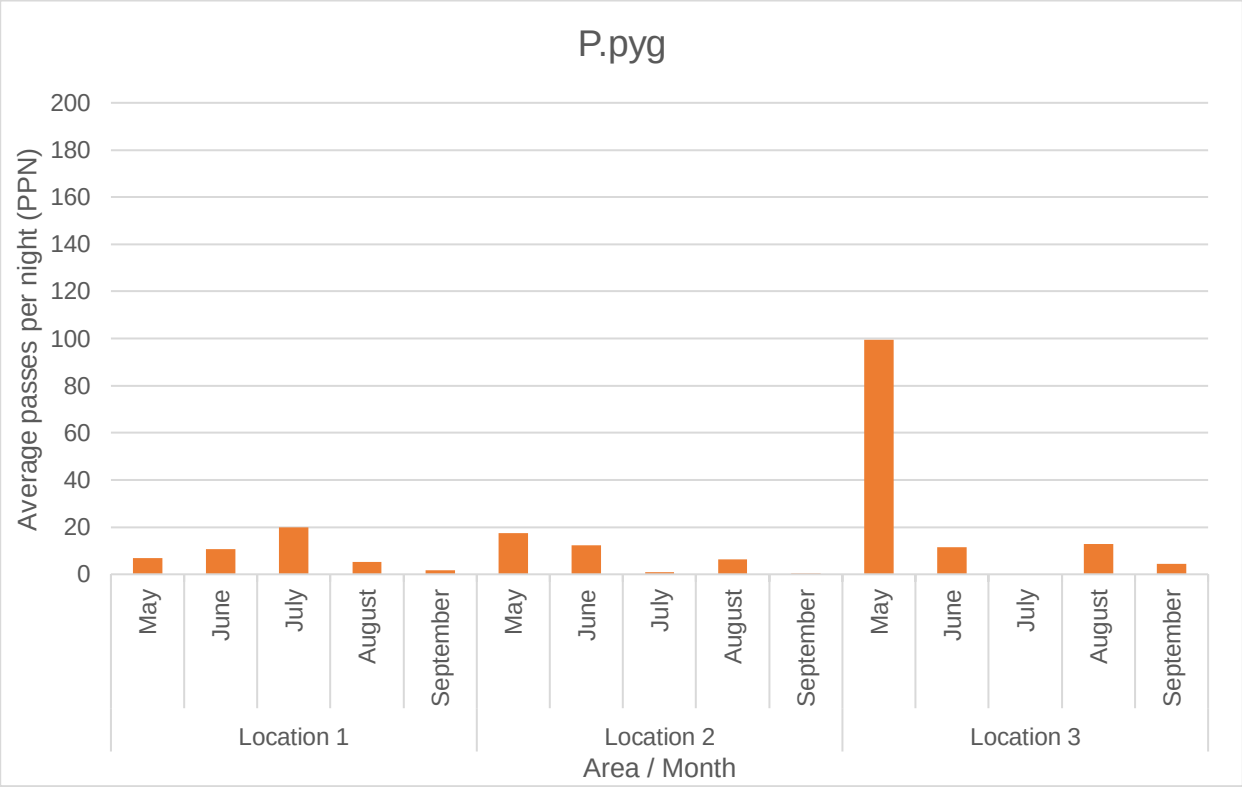

Plate 3-3: Passes per Night of [redacted]

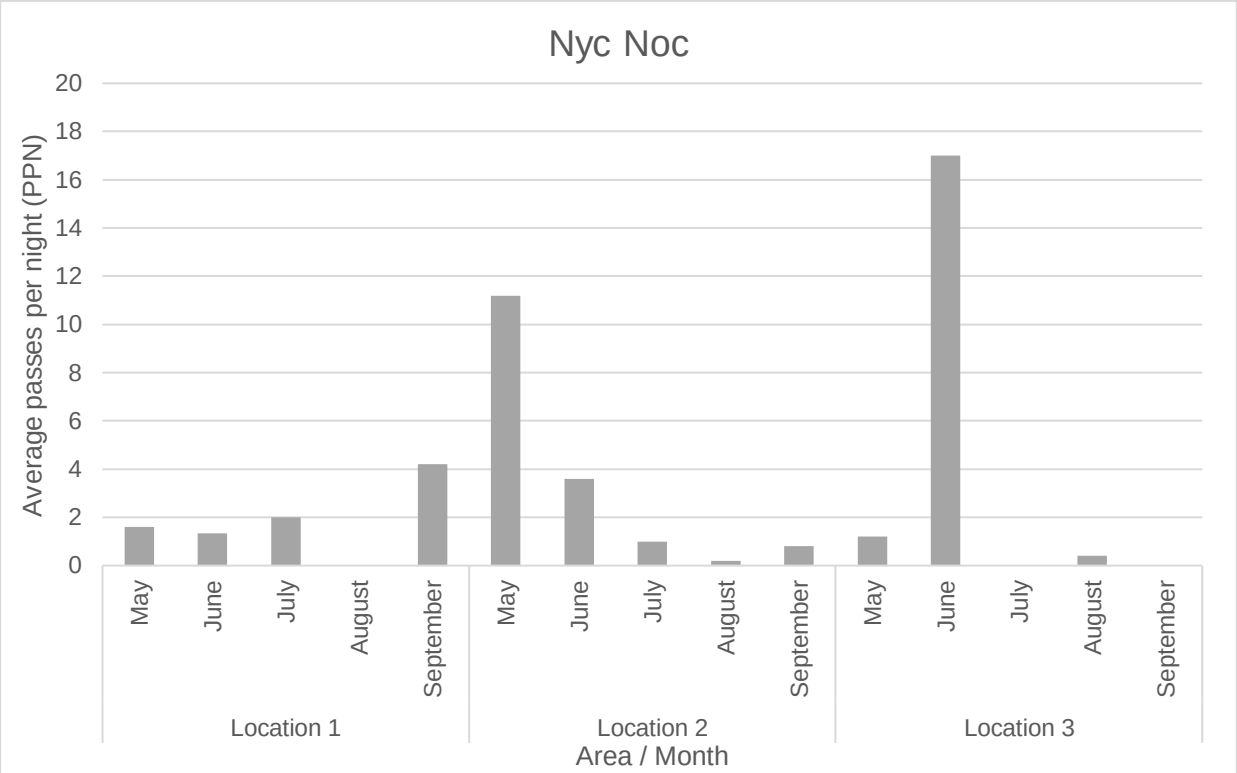

Plate 3-4: Passes per Night of Noctule

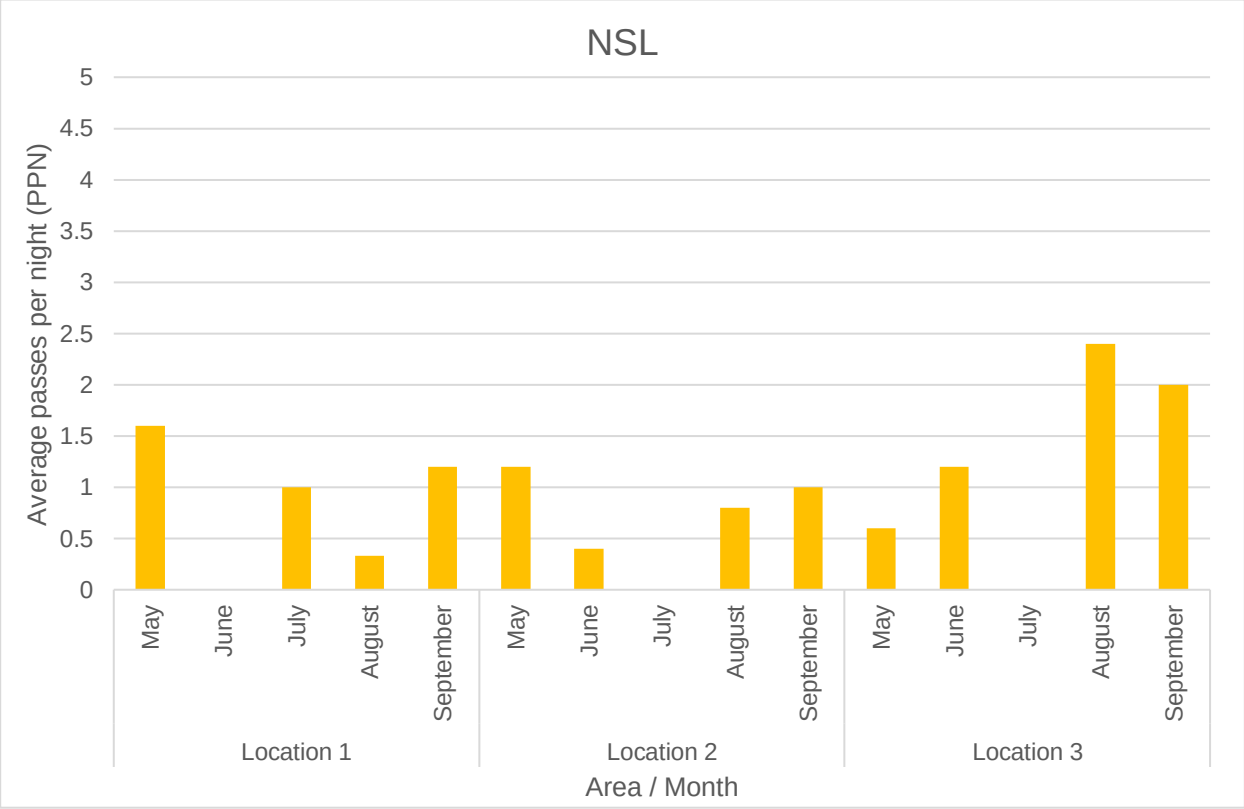

Plate 3-5: Passes per Night of NSL

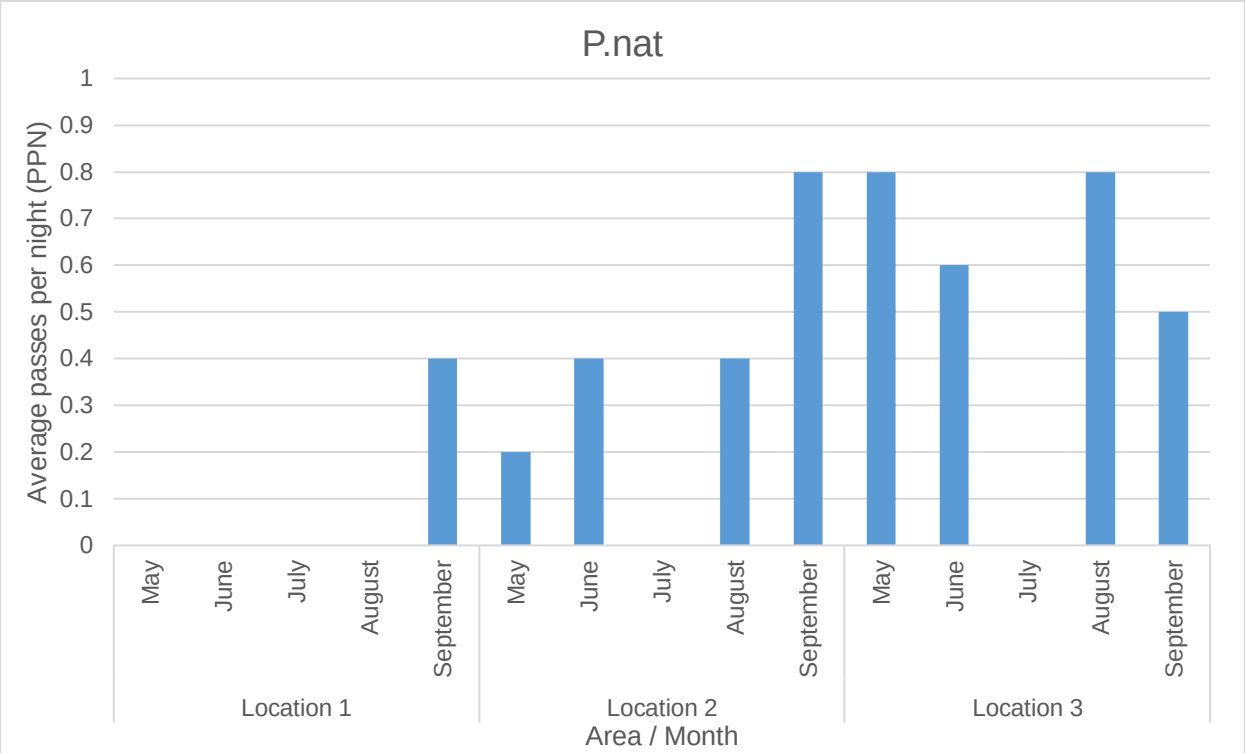

Plate 3-6: Passes per Night of Nathusisus' Pipistrelle

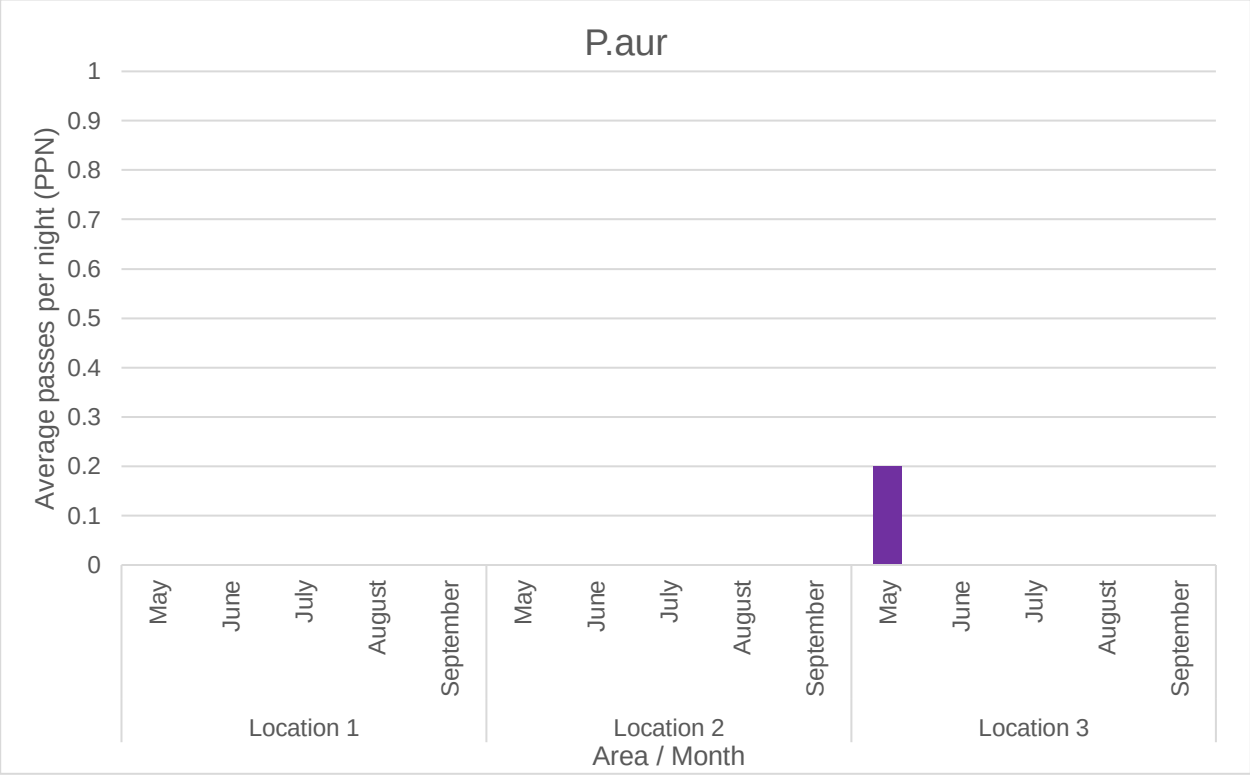

Plate 3-7: Passes per Night of [redacted]

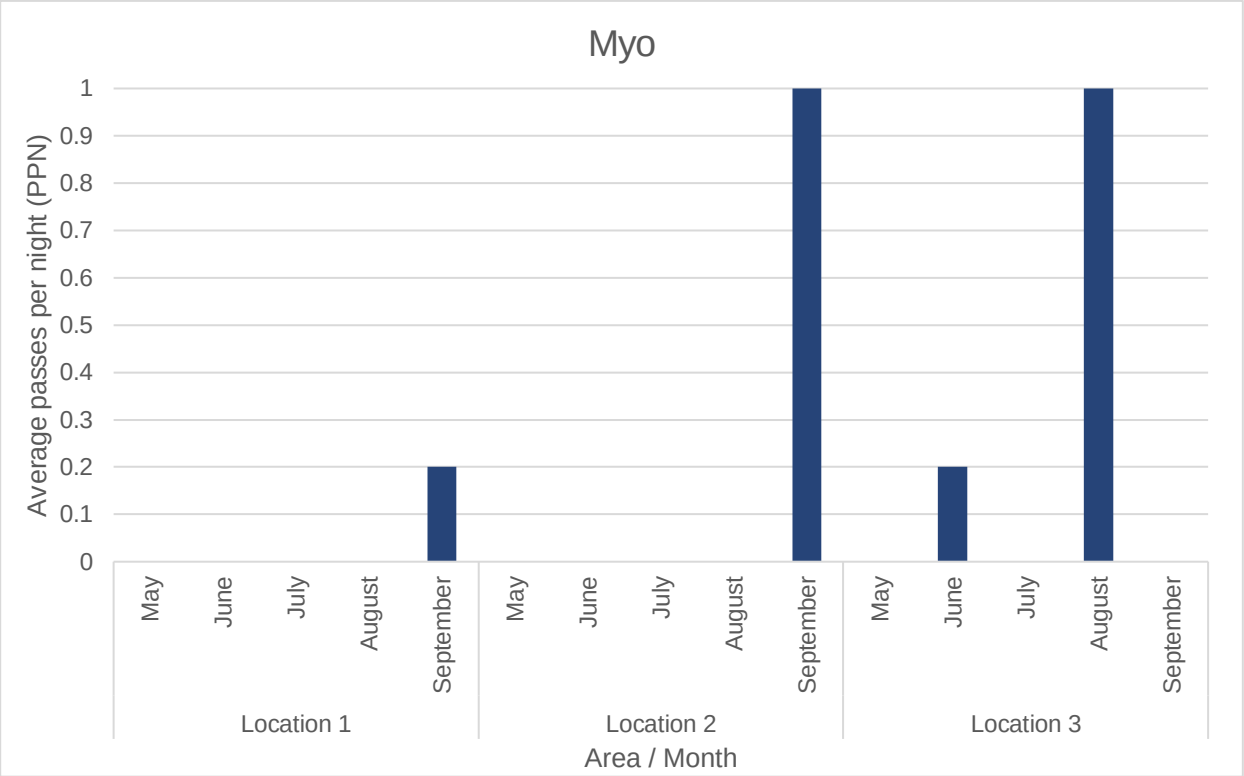

Plate 3-8: Passes per night of *Myotis spp*

INTERPRETATION OF AUTOMATED DETECTOR RESULTS – SUMMARY

3.2.7. At each survey location, bat calls were predominantly common pipistrelle, followed by [redacted] and [redacted]. In order to show a clear breakdown of species present, the graphs provided above (**Plate 3-2** to **Plate 3-8**) show the frequency of each species in each area. All locations recorded at least seven species, as *Myotis* spp. and NSL may represent multiple species. Graphs present in **Annex B** show the proportions of each bat species recorded at each location. The y-axis on **Plate 3-2 to Plate 3-8** is variable and cannot be used comparatively. Common and [redacted] (**Plate 3-2** and **Plate 3-3**) share the same y-axis of 200 average passes per night (PPN). Noctule **Plate 3-4**) has a y-axis of 20 PPN; NSL **Plate 3-5**) has a y-axis of 5 PPN. [redacted] (**Plate 3-6**), Nathusius' pipistrelle (**Plate 3-7**) and *Myotis spp.* (**Plate 3-8**) all share a y-axis of 1 PPN.

Common pipistrelle

3.2.8. Common pipistrelle was the most frequently recorded species by far and was recorded in high numbers (relative to other species) at all locations (see **Annex A** and **Annex B**). Common pipistrelles are known to be a generalist species, spending foraging time in a wide range of habitats[6], which explains their abundance across the range of detector locations.

3.2.9. Particular peaks in common pipistrelle activity were recorded at L3, and a monthly peak was recorded in May for all three locations: L1 – 45.4 PPN, L2 – 108.8 PPN, L3

– 183.4 PPN. 183.4 PPN is also the peak activity of all species across all months. In addition, bat activity generally decreases from May through to September, with the highest PPN values for L2 (108.8) and L3 (183.4) being in May, whilst the lowest PPN values for L2 (0.8) and L3 (5) were recorded in September.

[redacted]

3.2.10. Similarly, to common pipistrelle, [redacted] is a common and widespread species in the UK and was consistently present at higher numbers (relative to other species) in all areas.

3.2.11. Similar peaks to those as common pipistrelle were observed for this species, with particular peaks recorded at L3 (see **Annex A** and **Annex B**), and a monthly peak in May for two locations: L2 – 17.4 PPN and L3 – 99.4 PPN. Comparatively, the monthly peak activity for L1 was recorded during June, with a total of 10.7 PPN recorded. In addition, with the exception of 99.4 PPN recorded at L2 during May, all other PPN recorded at all locations during all months did not exceed 20 PPN.

Noctule

3.2.12. [redacted] was the third most frequently recorded species, following common and [redacted], and was recorded in higher numbers (relative to other species) in all areas.

3.2.13. Particular peaks in activity were recorded at L3, with monthly peaks recorded in September for L1 (4.2 PPN), May for L2 (11.2 PPN) and June for L3 (17 PPN).

[redacted]SL

3.2.14. [redacted]SL was recorded a total of 58 times across all locations and months, making it the fourth most frequently recorded species group relative to other species.

3.2.15. Particular peaks in activity were recorded at L1 and L3, with monthly peak activity for [redacted]SL recorded in May at L1 and L2 with a total of 1.6 PPN and 1.2 PPN recorded respectively. Comparatively, the monthly peak for L3 was recorded during August with a total of 2.4 PPN recorded.

Nathusius' pipistrelle

3.2.16. Nathusius' pipistrelle was recorded at low frequency (relative to other species), with only a total of 23 recordings across all locations and months and no recordings at all during July.

3.2.17. Particular peaks in activity were recorded at L2 and L3, with monthly peak activity for Nathusius' pipistrelle recorded in September at L1 and L2, with a total of two passes and four passes recorded respectively. Comparatively, the monthly peak for L3 was recorded during May and August with a total of four passes recorded in both months. In addition, Nathusius' pipistrelle was only recorded during September at L1, whilst they were recorded during all months apart from July at L2 and L3.

[redacted]

3.2.18. [redacted] was recorded at a very low frequency (relative to other species), only registering one total recording from May at L3 across all months and locations.

3.2.19. Although this is comparatively low relative to other common and widespread species (i.e. common and soprano pipistrelle), a fair comparison cannot be made given that [redacted] bats echolocate more quietly and therefore may have a lower 'detectability' than other species[7].

Myotis

3.2.20. *Myotis* sp. was recorded at a low frequency (relative to other species), only registering 12 total recordings from all locations across all months. *Myotis* sp. were only recorded in September for L1 and L2, with one bat pass and five bat passes recorded respectively. Peak activity for *Myotis* sp. at L3 was recorded in August with five bat passes, although there was only one other recording at L3 in June of one bat pass.

Location 1 (L1)

3.2.21. L1 recorded the lowest number of total bat calls (614) in comparison to the other locations, comprising 15.8% of all bat calls recorded across all months and locations. L1 recorded between 2.0% (in July) and 8.7% (in June) of the total number of bat passes per month recorded. The highest peak in bat activity at L1 was recorded in May, particularly from common pipistrelle which recorded 45.4 PPN. However, peaks in bat activity >20 PPN were only exceeded three times at L1 across all months and bat species, suggesting that overall bat activity was low at L1. L1 also recorded the lowest number of total passes for all bat species across all months, in comparison to the other locations.

3.2.22. The data indicates that the ditch on the western boundary of the Site, was not a regularly used foraging and/or commuting area for bats. Although this area does have high quality foraging and commuting habitat present, L1 is situated approximately 120m south of the ongoing construction of Riverside 2 and the existing Riverside 1, suggesting there was a higher amount of disturbance at L1 in comparison to the other locations. In addition, L1 recorded the highest proportion of 'noise' files in comparison to the other locations, further suggesting a higher level of disturbance at L1 in comparison to the other locations. The habitats surrounding L1 consist of coastal grazing marsh and grassland, several neutral grassland fields regularly grazed by horses, and other ditches bordered by scrub.

Location 2 (L2)

3.2.23. L2, which is located adjacent to a ditch and on the edge of an area of dense scrub, recorded peak activity in the months of May and June, the highest being 108.8 PPN for common pipistrelle in May. In regard to overall bat activity, L2 recorded a total of 1198 bat passes, comprising 30.7% of total recordings across all months and locations. Of this, 57.9% of which were recorded in May and 27% of which were recorded in June. The number of bat passes per month at L2 was greater than L1, but less than L3, in the months of May, June and August. For July, L2 recorded the second most bat passes out of all locations with 10 total passes, compared to 42 total passes at L1. For September, L2 recorded the joint least number of bat passes in comparison to the other locations with L3, recording 24 total passes, which was much lower than 54 passes recorded at L1. This location provides optimal linear habitat that is clearly being utilised by bats on Site for foraging and commuting. Peaks of common pipistrelle activity from May and June at L2 indicate that this area could be of value as commuting and/or foraging habitat for a nearby maternity roost.

Location 3 (L3)

3.2.24. L3 recorded the highest overall number of bats passes across all months, with 2086 passes recorded, comprising 53.5% of total bat calls across all months and locations. A peak in bat activity was recorded at L3 in May, with 36.6% of total bat passes recorded across all months and locations recorded at L3 in May. Common pipistrelle recorded a peak in bat activity of 183.4 PPN in May, which was the highest peak in bat activity across all months and locations. The data suggests that bats are using the woodland edge to commute and/or forage more regularly than the ditches with reedbed habitat and scrub on Site. Similarly, to L2, peaks of common pipistrelle activity from May and June at L3 indicate that this area could also be of value as commuting and/or foraging habitat for a nearby maternity roost.

4. IMPLICATIONS FOR THE PROPOSED SCHEME

4.1. LEGAL COMPLIANCE

4.1.1. Bats and their roosts are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2019 (as amended) (the 'Habitat Regulations'). The legislation means that it is an offence to:

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

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

4.1.3. If the Proposed Scheme were to impact roosting bats, then a Natural England protected species mitigation licence for bats will be required to undertake works. However, the PBRA concluded that all buildings on Site have negligible bat roost potential due to the absence of roosting features and the woodland within the Site is included within the Mitigation and Enhancement area for the Proposed Scheme and will therefore be retained.

4.1.4. Certain species recorded during the activity survey including the n[redacted] bat are also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England under Section 41 of the NERC Act 2006. Section 40(1) of the NERC Act 2006 (which was amended with the Environment Act 2021) asks public bodies (including local planning authorities) to "*consider what action the authority can properly take, consistently with the proper exercise of its functions, to further the general biodiversity objective"* which is to conserve and enhance biodiversity.

4.1.5. Vegetation clearance associated with the Proposed Scheme has the potential to reduce the range of bat habitats present including woodland edge, sheltered scrub/woodland lake margins and wet woodland. Additionally, degradation of the Site's habitats could cause disturbance to local bat populations by reducing a key foraging area and thus the ability of local populations to survive and breed.

4.2. PLANNING POLICY

4.2.1. All relevant planning policies are detailed within this **Environmental Statement (Volume 1) (Document Reference 6.1)**.

5. CONCLUSIONS

5.1.1. Seven species/species groups were recorded during the survey including:

- Common pipistrelle;
- [redacted];
- [redacted];
- Noctule/Serotine/Leisler's (NSL);
- Nauthusius's pipistrelle;
- [redacted]; and
- *Myotis spp.*

5.1.2. Common pipistrelle was the most abundant species recorded during the surveys, followed by [redacted] and [redacted] Other less widespread bat species included Nathusius' pipistrelle, [redacted] and *Myotis* spp., were recorded at very low frequency during the surveys.

5.1.3. Bats are protected under a range of national legislation, including the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitat Regulations') and Wildlife and Countryside Act 1981 (as amended). The **Outline LaBARDS (Document Reference 7.9)** includes measures to avoid, mitigate and compensate for the potential loss of suitable bat commuting habitat.

5.1.4. Overall, L1 recorded the lowest total number of bat passes in comparison to the other locations, indicating that the ditch on the western boundary of the Site was not frequently utilised by bats for foraging and/or commuting compared to the other locations. L1 is situated approximately 120m south of the ongoing construction of Riverside 2 and the existing Riverside 1, suggesting there was a higher amount of disturbance at L1 in comparison to the other locations. In addition, L1 recorded the highest proportion of 'noise' files in comparison to the other locations, further suggesting a higher level of disturbance at L1 in comparison to the other locations.

5.1.5. L2 recorded the second highest total number of bat passes in comparison to the other locations, indicating that this area of dense scrub and lengthy ditches provides adequate linear habitat for bats to both forage and commute.

5.1.6. L3 recorded the highest overall total number of bat passes in comparison to the other locations, indicating that the bats are using the woodland edge on the southern boundary of the Site to commute and/or forage more frequently than the ditches with reedbed and scrub habitat on Site.

Annex A

RAW DATA

A1 – RAW DATA

Table A-1: Summary of Bat Species Recorded during Automated Detector[h,i]

Location	P.Pip	P.Pyg	Nyc Noc	NSL	P.nat	P.aur	Myo	Location Total	% Total
	May								
L1	227	35	8	8	0	0	0	278	11.6
L2	544	87	56	6	1	0	0	694	28.9
L3	917	497	6	3	4	1	0	1428	59.5
Species total	1688	619	70	17	5	1	0	2400	-
% total	70.3	25.8	2.9	0.7	0.25	0.05	0	-	-
	June								
L1	147	32	4	0	0	0	0	183	19.5
L2	240	61	18	2	2	0	0	323	34.4
L3	281	57	85	6	3	0	1	433	46.1
Species total	668	150	107	8	5	0	1	939	-
% total	71.1	16.0	11.4	0.9	0.5	0	0.1	-	-
	July								
L1	19	20	2	1	0	0	0	42	80.8
L2	8	1	1	0	0	0	0	10	19.2
L3	0	0	0	0	0	0	0	**0**	0
Species total	27	21	3	1	0	0	0	52	-
% total	51.92	40.38	5.78	1.92	0	0	0	-	-
	August								
L1	40	16	0	1	0	0	0	57	14.1
L2	108	32	1	4	2	0	0	147	36.3
L3	114	64	2	12	4	0	5	201	49.6

[h] Each count within Table 3-2 constitutes a single bat pass recorded as the species or species group in question.
[i] B.bar = Barbastelle bat; NSL = Noctule, Serotine, Leisler; [redacted]; P.nat = Nauthusius's pipistrelle; P.pip = Common pipistrelle; [redacted], [redacted], Myo = *Myotis spp*

Location	P.Pip	P.Pyg	Nyc Noc	NSL	P.nat	P.aur	Myo	Location Total	% Total
Species total	262	112	3	17	6	0	5	405	-
% total	64.70	27.65	0.74	4.20	1.48	0	1.23	-	-
	September								
L1	15	9	21	6	2	0	1	54	53.0
L2	4	2	4	5	4	0	5	24	23.5
L3	10	9	0	4	1	0	0	24	23.5
Species total	29	20	25	15	7	0	6	102	-
% total	28.43	19.61	24.51	14.71	6.86	0	5.88	-	-

Annex B

BAT SPECIES PER AUTOMATED STATIC DETECTOR LOCATION

B1 – TOTAL PASSES FOR EACH BAT SPECIES RECORDED PER AUTOMATED STATIC DETECTOR LOCATION

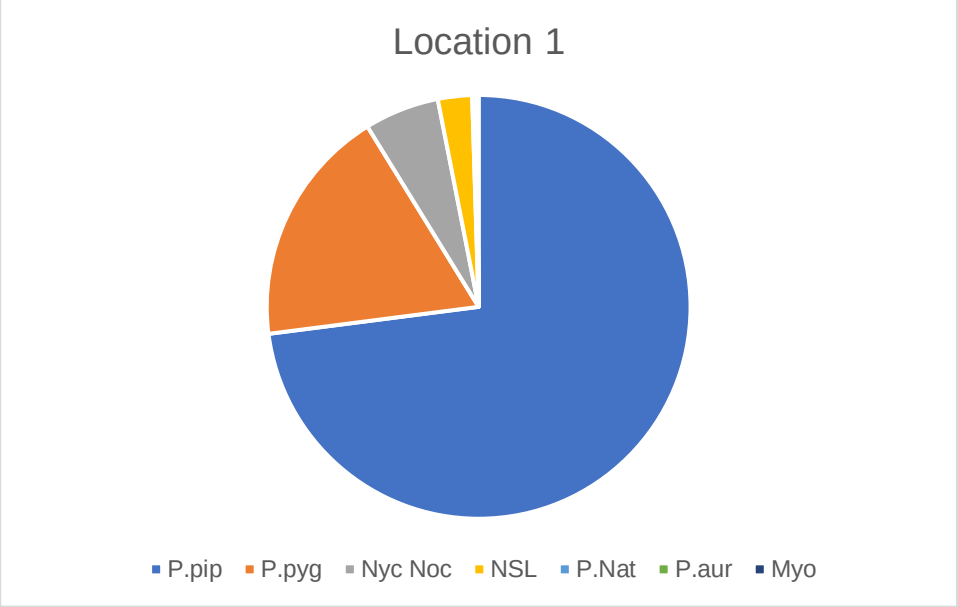

Figure B1: Total Passes for Bat Species per L1

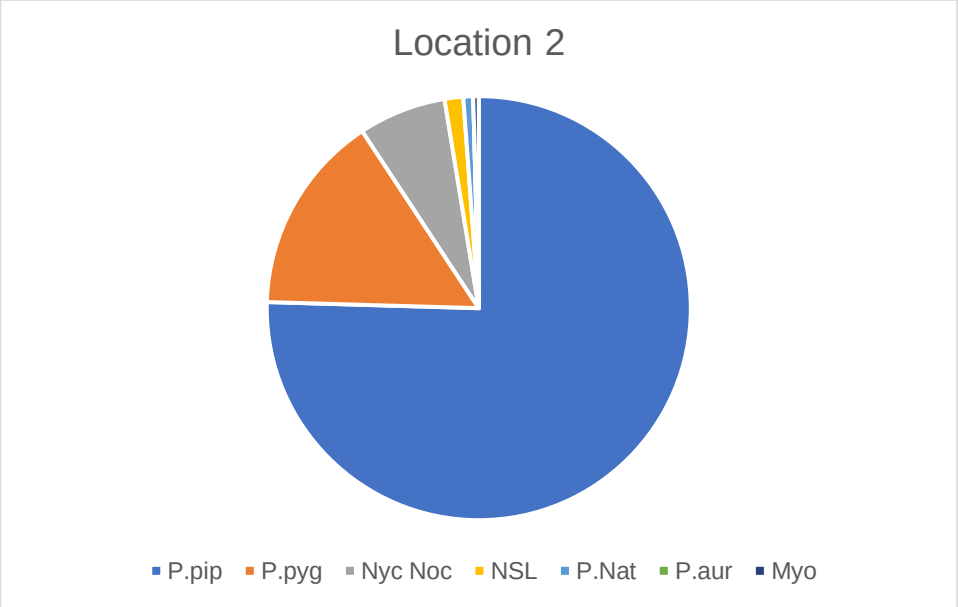

Figure B2: Total Passes for Bat Species per L2

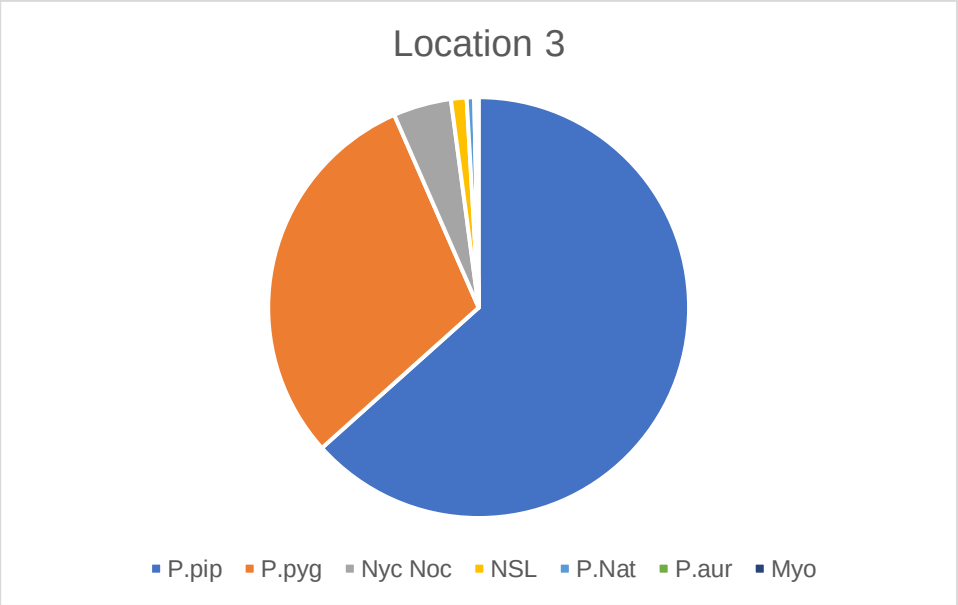

Figure B3: Total passes for Bat Species per L3

6. REFERENCES

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