Land off New Brighton Road, New Brighton, Flintshire

Bat Transect & Automated Survey Report

Compiled by Ecology Services Ltd.

on behalf of

Stewart Milne Homes North West England Ltd.

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Update Surveys are being undertaken in 2021
Report updated June 2021 updates are in italic

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1.0 Introduction

1.1 Ecology Services Ltd was commissioned by Stewart Milne Home North West England in June 2018 to undertake bat habitat surveys on approximately 3.4ha of land off New Brighton Road, New Brighton, Flintshire, CH7 6RB, hereinafter referred to as 'the site'. The centre of the site is located by National Grid Reference; (NGR) 325190, 365560. The location and boundary of the site are shown on Figure 1.

1.2 The site is located in a rural area on the northern outskirts of the village of New Brighton in Flintshire, North Wales. Bordering the site to the south-west, south and south-east is residential development; to the north-east is New Brighton Road with a small number of detached residential properties located along it with land beyond comprising a mosaic of agricultural grassland, hedgerows, scattered trees and small areas of woodland. A large lake surrounded by a belt of woodland lies approximately 70m north of the site. Areas to the north-west of the site and land surrounding New Brighton are dominated by agricultural grassland with hedgerows, treelines and occasional scattered trees and small blocks of woodland.

Proposals

1.3 *The site is proposed for residential development with associated infrastructure and landscaping. See Figure 16 - New Brighton, Mold, Proposed Layout V23 07.04.21. There have been changes to the design from the previous application including a reduction in the number of units from 92 to 84, a new footpath along the northern boundary of the site, an increase in the size of the Local Equipped Area for Play (LEAP) to the south west of the site and of the Public Open Space (POS) to the north west of the site.*

Background

1.4 An ecological appraisal of the site, undertaken in June 2018, identified the potential for the proposed development to affect suitable foraging and commuting habitat for bats within the site. In order to advise appropriate avoidance, mitigation and compensation measures, bat habitat activity surveys in the form of transect and automated detector surveys were recommended.

1.5 This report details the findings of the bat habitat surveys carried out to inform an assessment of the importance of habitats within the site for foraging and commuting bats.

1.6 The bat habitat survey will be undertaken in the form of walked transect surveys and automated static detector surveys, which aim to observe:

- The assemblages of bat species using the site;
- The relative frequency with which the site is used by different bat species;
- The locations and distribution of activity for different species within the site;
- The nature of activity for different bat species, i.e. foraging, commuting etc.

1.7 The results from the habitat activity surveys detailed in this report will be used to inform any mitigation and or compensation requirements with regard to the proposed development works affecting habitats within the site.

2.0 Statutory and Planning Context

Legislation

2.1 The Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, also known as the Habitats Directive, affords all bat species protection under Annex IV. In addition to this, four bat species (greater horseshoe, lesser horseshoe, Bechstein's and barbastelle) are also listed under Annex II which may afford the noted species the designation of Special Areas of Conservation (SAC) ("Natura 200" sites").

2.2 All British bats and their roosts are afforded protection under the 1981 Wildlife & Countryside Act (as amended) and are listed in Schedule 2 of the Conservation of Habitats & Species Regulations 2017[1] (as amended).

2.3 In brief, this legislation makes it is an offence to: -

- Deliberately capture, injure or kill any wild animal;
- Deliberately disturb wild animals;
- Damage or destroy a breeding site or resting place of such an animal.

2.4 Disturbance is defined as that which is likely:

1. to impair their ability –
   - to survive, to breed or reproduce, or to rear or nurture their young, or
   - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
2. to affect significantly the local distribution or abundance of the species to which they belong.

2.5 Where bats are affected by development then a licence to derogate from the Conservation of Habitats and Species Regulations 2017 (as amended) would be required. European Protected Species (EPS) licence applications are processed and issued by Natural Resources Wales and can only be applied for, once planning permission is granted, if planning permission is required.

2.6 Natural Resources Wales (NRW) has the powers to grant an EPS licence for the following purposes;

- Regulation 55(2)(e) - preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment; or
- Regulation 55(2)(f) - preventing the spread of disease; or
- Regulation 55(2)(g) - preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber or any other form of property or to fisheries.

2.7 In addition, NRW can only issue a licence if it is satisfied that the activity meets one of the above purposes and is also satisfied of the following;

- Regulation 55(9)(a) - that there is no satisfactory alternative; and
- Regulation 55(9)(b) - that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favorable conservation status in their natural range.

2.8 When dealing with cases where a European Protected Species (EPS) (all UK bats) may be affected, a Local Authority is a ‘competent authority’ within the meaning of regulation 7 of the Conservation of Habitats & Species Regulations 2017 (as amended). The Local Authority must therefore exercise their functions under the provisions made within the 2017 Regulations and planning decisions should only be made when European Protected Species and their habitats are fully taken into account.

2.9 The Environment (Wales) Act 2016, sets out the requirement for the ‘sustainable management of natural resources’ together with new ways of working to achieve this. Part 1 of the Environment Act sets out Wales' approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act.

[1] As amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 which continue the same provision for European protected species, licensing requirements and protected areas after Brexit.

Section 6 – Biodiversity and resilience of ecosystems duty

2.10 Section 6 under Part 1 of the Environment (Wales) Act 2016 introduced an enhanced biodiversity and resilience of ecosystems duty (the S6 duty) for public authorities in the exercise of functions in relation to Wales. The S6 duty requires that public authorities must seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions and in so doing promote the resilience of ecosystems.

Section 7 - Biodiversity lists and duty to take steps to maintain and enhance biodiversity

2.11 This section replaces the duty in Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales.

2.12 The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps. Part 1 of the Act, including Sections 6 and 7, came in to force on May 21, 2016.

Planning Policy

2.13 *Planning Policy Wales Edition 11 (February 2021) places a clear responsibility on Local Planning Authorities (LPA) to contribute to conserving and enhancing the natural and local environment. LPAs should support the conservation of biodiversity, safeguard protected and priority species (e.g. Species of Principal importance, Local Biodiversity Action Plan species) and existing biodiversity assets from impacts and secure enhancement of and improvements to ecosystem resilience. Technical Advice Note (TAN) 5 Nature Conservation and Planning (2010) provides detailed planning advice which supplements Planning Policy Wales.*

2.14 *Protected species within the UK, such as bats, are a 'material consideration' in the determination of a planning application. Therefore, an LPA is unlikely to determine an application until all relevant information relating to protected species or habitats is submitted to fully inform the application. Relevant information includes adequate surveys and, where required, mitigation strategies, which will need to be submitted to inform a planning application.*

2.15 *The local planning authority (LPA) has a duty to ensure that protected and priority species (e.g. Species of Principal Importance, Biodiversity Action Plan species) are fully considered in a planning decision. Therefore, up to date survey information and, where required, mitigation strategies adequate to assess the impacts of the proposals and to demonstrate that opportunities for species using the site can be maintained, must be provided in support of a planning application.*

3.0 Methodology

Ecological Desktop Study

3.1 Ecological data and historic record searches were undertaken, up to 2km from the site, by contacting the following sources; listed in Table 1 below.

Table 1: Ecological Desktop Study Results and Record Centres Consulted

Source of information	Information supplied
COFNOD - North Wales Environmental Information Service	To identify locally protected sites or species of interest within 2km of the site.

Habitat Activity Survey Methodology

3.2 In order to understand how bats may be using the site, walked transect surveys and automated surveys were undertaken following standard methodologies set out in the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines 2016.

3.3 The site was classified in line with 'Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement' (see Appendix 1: Table 4.1).

3.4 The Bat Conservation Trust, Bat Surveys for Professional Ecologists: Good Practice Guidelines 2016 sets out guidance in relation to the number of surveys recommended in relation to the potential habitat suitability, as shown in Table 2 below.

Table 2: 'Guidelines on the number of bat activity surveys recommended to achieve a reasonable survey effort in relation to habitat suitability' (Table 8.3).

Survey Type	**Low suitability habitat for bats[a]**	**Moderate suitability habitat for bats**	**High suitability habitat for bats**
Transect/ spot count/ timed search surveys	One survey visit[b] per season (spring - April/May, summer - June/July/August, autumn - September/ October)[c] in appropriate weather conditions for bats Further surveys may be required if these survey visits reveal higher levels of bat activity than predicted by habitat.	One survey visit[b] per month (April to October)[c] in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two survey visits[b] per month (April to October)[c] in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.
AND			
Automated/static bat detectors surveys[d]	One location per transect, data to be collected on five consecutive nights per season (spring - April/May, summer - June/July/August, Autumn - September/October) in appropriate weather conditions for bats.	Two locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.	Three locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.

[a] If the habitat has been classified as having low suitability for bats, an ecologist should make a professional judgement on how to proceed based on all of the evidence available. It may or may not be appropriate or bat activity surveys to be carried out in low suitability habitats. However, caution should be exercised in fringe areas where 'low suitability habitat for bats' may be extremely important to local bat populations due to the relative scarcity of better habitats. In such situation, bats are likely to also be more widely dispersed and may use a larger number of sites, therefore survey effort may actually need to be increased to detect use on the proposed site in question.

[b] A survey visits should aim to cover all habitats represented in the survey are that could be impacted by the proposed activities. This may consist of a single transect carried out on a single night for small sites (e.g. small housing developments) with low habitat diversity but could range up to multiple transects carried out over one or several nights (depending on number of ecologists) on a larger site (e.g. Road schemes) with greater habitat diversity.

[c] April, September and October surveys are both weather - and location-dependent. Conditions may become more unsuitable on these months, particularly in Scotland, which may reduce the length of the survey season.

[d] Detector locations should be assigned to cover all habitats represented in the survey area that could be impacted by the proposed activities. This could mean a single detector location at a small site with only one habitat represented but could range up to many detector locations on larger sites. Automated/static surveys are particularly useful when assessing collision risk, e.g. Detectors can be placed at crossing points on proposed roads or railways.
Note: Multiple survey visits should be separated by at least two weeks, preferably longer, to observed temporal changes in activity.

3.5 In general terms, the site comprises a grassland field bordered by hedgerows with occasional mature trees, and a historic defunct hedgerow/ treeline with mature trees and scattered shrubs running north-south through the central western area of the site. In the east of the field is a damp area of grassland supporting abundant rushes and along the westernmost site boundary is a ditch which is expected to be dry for the majority of the year.

3.6 In combination, the habitats within the site are considered to provide '**moderate**' quality habitat for foraging and commuting bats.

Transect Surveys

3.7 Three transect survey visits have been undertaken, one each month between July and September 2018 inclusive. The surveys consisted of walked transect surveys with a series of static listening points and were conducted by two surveyors at any one time. Recommended length of times for walked transect surveys is to start at sunset and end between 2 to 3 hours after sunset.

3.8 The walked transect surveys were aided with the use of heterodyne and frequency division bat detectors with calls recorded using AnaBat SD2 detectors. The transects were walked at a constant speed where possible, and regular listening point (LP) counts were undertaken for a minimum period of 3 minutes each along the route to record the number of passes, activity and species of bats. Bat passes were also recorded on the transit between the static point counts. The recorded echolocation calls were then analysed with computer software to verify the field results.

Automated Surveys

3.9 Automated surveys were designed following the Bat Conservation Trust (BCT) 2016 guidance.

3.10 Automated surveys to record bat echolocation calls were undertaken at one location along the line of trees in the central western area of the site (see Figure 7 for the automated detector location). The automated detector was deployed three times for a minimum of five consecutive nights at this location each month between July and September 2018 inclusive.

3.11 Automated detectors deployed comprised an Anabat Swift detector for periods 1 and 2, and an Anabat Express detector for period 3. Zero crossing recordings from the Anabat Express detector were analysed using AnaLookW software and full-spectrum recordings from the Anabat Swift detector were analysed using the Anabat Insight software.

3.12 Both transect and automated surveys provide a record of activity within the site on those specific periods and locations.

3.13 The frequency that bats are encountered during activity surveys depend upon several factors, including:

- Number of roosts within or in close proximity to the site and the number of individuals in the roost;
- The quality of foraging habitat within site and its surrounds and the distance to which it is located from a roost;
- The quantity and diversity of invertebrates; and

- The extent of the survey, in terms of distance for transect surveys and duration in terms of automated surveys.

Timing

Transects

3.14 A total of three walked transect surveys have been undertaken to date at the site between July and September 2018 inclusive. The survey visits were undertaken on the 9th July, 1st August and 11th September 2018.

3.15 All transect surveys were undertaken at dusk, starting up to 15 minutes before sunset and finishing between 1 hour 41 minutes and 1 hour 45 minutes after sunset.

Automated Surveys

3.16 A total of three automated surveys have been undertaken at the site, each with one detector being deployed for five consecutive nights each month between July and September 2018 inclusive. The surveys were conducted on the following dates: 9th to the 14th July; 1st to the 6th August; and 11th to the 16th September 2018.

3.17 During the five nights in each period, weather suitable for recording bat activity generally prevailed (no heavy rain, no strong winds and temperatures at sunset >9ºC).

3.18 The Anabat Express and Swift detectors were set to the 'night only' recording mode. This recording mode will automatically turn on the detector 30 minutes before sunset and off 30 minutes after sunrise on each night. This recording mode determines the correct sunset and sunrise times using the inbuilt GPS.

Personnel

3.19 The walked transect surveys were completed by two surveyors on each visit for safety reasons. The transect surveys were conducted by Senior Consultant Ecologist Mr. S. Booth who holds a Natural England Bat Class Licence (Level 2) (Registration number 2016-27296-CLS-CLS), Consultant Ecologist Mrs. Z. Foster who holds a Natural England Bat Class License (Level 2) (Registration number 2015-17219-CLS-CLS); and experienced Consultant Ecologist Charlotte Wood. All surveyors are experienced at undertaking bat habitat and activity surveys.

3.20 Analysis of bat calls was undertaken by Consultant Ecologist Mr A. Leishman, who holds a Natural England Bat Class Licence (Level 2) (Registration number 2017-29436-CLS-CLS).

Constraints

3.21 The habitat activity surveys provide a snapshot of habitat usage at the time that each visit was undertaken and the habitats present may be used by bats species for different purposes at different times of the year.

3.22 The BCT Bat Surveys for Professional Ecologists: Good Practice Guidelines 2016 requires surveys for sites classed as containing moderate habitats to be have one survey visit per month between April and September. In view of the later instruction of the surveys, the relatively small size of the site, the limited extent of higher quality habitats for bats present, and the nature of the proposals, only three transect automated surveys were carried out. Although no surveys were carried out in the spring period, this is not considered a significant constraint in view of these same factors.

3.23 The transect surveys lasted for a period of 2 hours in total, however surveys finished within 1.75 hours after sunset. It is considered that the surveys completed covered the site as a whole and that species present and usage of the site were fully identified. It is therefore considered that this constraint did not Adversely affect the results of the surveys.

3.24 For some species, the call parameters are very similar, overlapping considerably in different environments. This is particularly the case for species in the *Myotis* genus, and therefore species in the genus have not been separated to species level. In addition, species in the *Pipistrellus* can also have similar call parameters and cannot always be distinguishable. In these cases, they were not identified to species level.

3.25 The call of the brown long-eared bat is very quiet which often leads to this species being under recorded by bat detectors, particularly where there are high levels of activity by louder species (e.g. *Pipistrellus* spp.). This has been considered when estimating the abundance of brown long-eared bats using the site.

4.0 Results

Desktop Study

Species of Principal Importance

4.1 Section 7 of the Environment (Wales) Act 2016 puts a duty on Welsh Ministers to publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. This replaces the duty in Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006. Bat species included on the list of Species of Principal Importance in Wales are as follows:

- Noctule (*Nyctalus noctula*)
- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- Brown long-eared (*Plecotus auritus*)
- Lesser horseshoe (*Rhinolophus hipposideros)*
- Greater horseshoe (*Rhinolophus ferrumequinum)*
- Barbastelle (*Barbastella barbastellus*)
- Bechstein's (*Myotis bechsteinii*)

National Status

4.2 There are 18 species of bat that are native to the United Kingdom, 12 of which are known to breed in Wales. Little is known about the status of most species although the available evidence suggests a general decline in populations nationally (Harris, S. et al. 1995). The commonest species of bats are the pipistrelle family (*Pipistrellus* spp.), although these are also estimated to have declined in numbers by 70% between 1978 and 1993.

Local Development Plan

4.3 Flintshire Local Development Plan (2015) Biodiversity and Nature Conservation (Topic Paper No 1) notes that biodiversity conservation and enhancement is an essential contributor to sustainability. One of the key objectives is therefore to conserve and enhance species and their habitats that are of international, national and local importance and which may be threatened by new development.

4.4 A Local Planning Authority (LPA) has a duty to ensure that protected species and habitats within the UK are a "material consideration" in the determination of a planning application. Therefore, the LPA is unlikely to determine an application until all relevant information relating to protected species or habitats is submitted in support of the application. Relevant information includes; adequate surveys and a method statement (the latter only if required) for their approval which will need to be submitted along with the planning application.

Local Status

4.5 The vice-county of Clwyd includes the counties of Conwy, Denbighshire, Flintshire and Wrexham. It is a region that supports varied habitats and geology and provides an ideal environment to support sizeable and diverse bat populations. The area is considered to be

a strong hold for the nationally scarce lesser horseshoe bat. A total of at least 12 of the UK's 18 resident bat species can also be found roosting in the area including:

- Common pipistrelle
- Soprano pipistrelle
- Nathusius' pipistrelle
- Brown long-eared
- Daubenton's
- Natterer's
- Whiskered
- Brandt's
- Bechstein's
- Lesser Horseshoe
- Noctule
- Leisler's
- Barbastelle.

Data Search Results

4.6 The data search identified 10 records of bats within 1km of the site including records of common pipistrelle (*Pipsitrellus pipistrellus*) and unspecified bat species. The closest record is of common pipistrelle pertaining to the site itself, which dates from 1987. No further details were provided for this record. Two other records provided pertain to the village of New Brighton located approximately 50m and 250m east of the site and relate to common pipistrelle and unknown bat species respectively. The majority of other records pertain to Sychdyn between 700m and 1km north of the site and to Mynydd Isa around 1km south of the site.

4.7 The data search also identified records of an additional four species within 2km of the site; Daubenton's (*Myotis daubentonii*), noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*) and lesser horseshoe (*Rhinolophus hipposideros*), as well as undetermined pipistrelle and myotis species bats.

Transect Survey Results

4.8 Table 3 below shows the total bat recordings per transect on each night and the average recordings per hour during each transect.

Table 3: Bat recordings per transect & point count.

Transect	Survey 1	Survey 2	Survey 3
Month	July	August	September
Total bat recordings per survey	**62**	**33**	**46**
Total bat recordings per hour	**30.5**	**16.5**	**23.0**

4.9 During the five transect surveys undertaken, up to five bat species were encountered:

- Common pipistrelle – Detected during all transects.
- Soprano pipistrelle – Detected during the July and September transects.
- *Myotis* spp. – Detected during the September transect.
- Noctule – Detected during all transects.
- Unidentified pipistrelle species – Detected during the July transect.

4.10 Common pipistrelle accounted for the vast majority (approximately 80%) of bat activity recorded during the transect surveys and was recorded throughout all areas of the site. Soprano pipistrelle was recorded on a low number of occasions during the July and September surveys. *Myotis* spp. was recorded on one occasion during the September

transect and Noctule was recorded on one occasion during each of the transects. An undetermined pipistrelle species was recorded once during the July transect.

4.11 A summary of the data from the transect activity surveys is provided in Table 4 overleaf. Figure 2 shows the transect route and the static point count locations. Figures 3 - 5 show a summary of the results of each transect survey, with Figure 6 providing a combined summary of the five transect surveys completed to date.

Table 4: Summary of the transect activity surveys, see Figures 3 - 5 for results plans.

Survey details	Summary of bat activity
Survey 1 - 9th July 2018 21:24 – 23:26 (Sunset 21:39)	(Start to LP1 - LP10 to Finish) Activity by three species Common pipistrelle: • Activity recorded from 21:56 onwards. • Approximately 30 bats recorded commuting across the site from houses in the south-west to New Brighton Road on the northern site boundary along the central treeline/ hedgerows (LP5 to LP3) – between 21:56 and 22:17. • Occasional to frequent activity recorded after this time including passes/ foraging activity by low numbers of bats along boundary hedgerows around the site. • The highest concentrations of bats were recorded along the south-western boundary hedgerow and central treeline with more occasional activity recorded along the south-eastern and northern boundary hedgerows. Soprano pipistrelle: • Activity recorded from 22:08 onwards. • Three records including individual bats foraging/ passing along the south boundary hedgerow and northern boundary hedgerow. Noctule: • A single brief registration at 22:27 of an individual passing/ foraging over the central area of the site close to LP6.
Survey 2 - 1st August 2018 20:52 – 22:52 (Sunset 21:07)	(Finish to LP10 - LP1 to Start) Activity by two species Common pipistrelle: • Activity recorded from 21:16 onwards. • Approximately 10 bats recorded commuting across the site from houses in the south to New Brighton Road on the northern site boundary along the central treeline/ hedgerows (LP5 to LP3) – between 22:02 and 22:21. • Occasional to frequent activity recorded throughout the survey including passes/ foraging activity by low numbers of bats along the southern boundary hedgerow and hedgerows in the western area of the site. A low number of registrations made in the vicinity of houses to the east of the site. Noctule: • A single brief registration at 21:35 of an individual commuting over the eastern area of the site close to LP7.
Survey 3 - 11th September 2018 19:24 – 21:24 (Sunset 19:39)	(Start to LP1 - LP10 to Finish) Activity by three species Common pipistrelle: • Activity recorded from 19:59 onwards. • Approximately 8 bats recorded commuting northwards along the south-western boundary hedgerow (LP6 to LP4) – between 19:59 and 20:09. • Occasional activity recorded throughout the survey including passes/ foraging activity by low numbers of bats along boundary hedgerows around the site. • Most bats were recorded along the south-western boundary hedgerow and central treeline with one registration in the south-eastern corner of the site. Soprano pipistrelle: • Activity recorded from 21:00 onwards. • Four records of individuals foraging along the northern boundary hedgerow between LP9 and LP10.

Survey details	Summary of bat activity
	(Survey 3 cont.) *Myotis* spp: • Up to two bats recorded foraging on the southern boundary of the site close to gardens between LP6 and LP7 at 20:36-40. Noctule: • A single brief registration at 20:05 of an individual close to the south-western site boundary at LP5.

4.12 In summary, the vast majority of activity recorded during the transect surveys relates to common pipistrelle bats. Up to around 30 common pipistrelle bats were recorded during any one survey visit commuting northwards along the south-western site boundary then following the central treeline to the northern site boundary early on after sunset. Following this survey on each visit, individual/ very low numbers of common pipistrelle bats were recorded on an occasional to frequent basis foraging along the site boundary hedgerows and central treeline with concentrations of records often along the central treeline. Canopies of hedgerow standard trees were generally favoured for foraging.

4.13 Low numbers of soprano pipistrelle were recorded along the northern boundary hedgerow relating to foraging individuals and one record was made along the south-western boundary hedgerow. Up to two *Myotis* spp. bats were recorded together on the third visit on the southern boundary of the site. Individual noctule bats were recorded passing or briefly foraging over the site on one occasional during each of the transect survey visits.

Automated Survey Results

4.14 Figure 7 shows the location of the automated detector and Figures 8 - 15 provide charts summarising the results from the automated detector survey. In total, 8271 bat recordings were made over five nights during three automated survey periods. The most active period was September (Period 3: 6190 recordings) followed by August (Period 2: 1250 recordings). The lowest levels of activity were recorded in July (Period 1: 831 recordings). All percentages below are rounded to 2 decimal places.

4.15 Overall, the following species/ species groups were detected through data analysis:

- Common pipistrelle
- Soprano pipistrelle
- *Pipistrellus* spp.
- *Myotis* spp.
- Brown long-eared
- Noctule

4.16 Species recorded included a genus of bat (*Myotis* spp.) which are difficult to separate into species due to the similarity of their calls. However, the *Myotis* spp. calls recorded were considered to be characteristic of Daubenton's bat and potentially whiskered bat.

4.17 The detector was deployed on an ash tree in the middle of the central treeline facing southwards. An analysis of bat activity recorded at this location during each survey period is provided below.

Period 1

4.18 During Period 1 (9th to 14th July), at least five bat species were detected, as detailed below:

- Common pipistrelle – 81.95% of total bat recordings over the period. Detected on all five nights.
- Soprano pipistrelle – 13.48% of total bat recordings over the period. Detected on all five nights.

- *Pipistrellus* spp. – 0.12% of total bat recordings over the period. Detected on the first night only.
- Brown long-eared – 0.12% of total bat recordings over the period. Detected on the first night only.
- *Myotis* spp. – 0.84% of total bat recordings over the period. Detected on all but night five.
- Noctule – 3.49% of total bat recordings over the period. Detected on all five nights.

4.19 Bat activity was recorded on all nights over the period. Common pipistrelle was the most frequently recorded species on every night. The second most recorded species over the period was soprano pipistrelle and then noctule, which was recorded up to eight times during each night. *Myotis* spp. was recorded up to two times during most nights, and brown long-eared and *Pipistrellus* spp. were recorded once during the first night only (see Figures 8 and 9). The recording of the unidentified pipistrelle bat comprised a social call and on balance of probability most likely relates to a common pipistrelle bat.

4.20 Bat activity was recorded within all hours of every night between dusk and dawn over the period. The greatest levels of bat activity were recorded between 22:00 and 00:00 during each night, during the first 2 hours after sunset. There were also very small peaks between 2:00 and 4:00 during most nights before dawn (see Figure 10).

Period 2

4.21 During Period 2 (1st to 6th August), five bat species were detected, as detailed below:

- Common pipistrelle – 49.52% of total bat recordings over the period. Detected on all five nights.
- Soprano pipistrelle – 46.00% of total bat recordings over the period. Detected on all five nights.
- Brown long-eared – 1.04% of total bat recordings over the period. Detected on nights three to five.
- *Myotis* spp. – 2.00% of total bat recordings over the period. Detected on nights two to five.
- Noctule – 1.44% of total bat recordings over the period. Detected on nights two to four.

4.22 Bat activity was recorded on all nights over the period. Common pipistrelle was the most frequently recorded species over the period as a whole and was the most recorded species on nights one and four. The second most recorded species over the period was soprano pipistrelle which was the most recorded species on nights two, three and five. *Myotis* spp. was recorded the third most recorded species with 5-7 registrations recorded during nights two to five. Noctule was recorded up to 8 times on each of three nights and brown long-eared was recorded up to nine times (but often fewer) on each of three nights (see Figures 11 and 12).

4.23 Bat activity was recorded within all hours of every night between dusk and dawn over the period. The times of peak levels of bat activity varied over each night. During the first night, a large peak of activity was recorded between 4:00 and 5:00 just before dawn. During the second, third and fifth nights, most recordings were generally made between 01:00 and 04:00. On the fourth night, the peak levels of activity were recorded between 10:00 and 01:00 (see Figure 13).

Period 3

4.24 During Period 3 (11th to 16th September), three bat species were detected, as detailed below:

- Common pipistrelle – 39.31% of total bat recordings over the period. Detected on all five nights.

- Soprano pipistrelle – 43.93% of total bat recordings over the period. Detected on all five nights.
- *Myotis* spp. – 16.77% of total bat recordings over the period. Detected on all five nights.

4.25 Bat activity was recorded on all nights over the period. Soprano pipistrelle was the most frequently recorded species over the period as a whole and was the most recorded species on nights two, three and five. The second most recorded species over the period as a whole was common pipistrelle, which was the most recorded species on nights one and four. *Myotis* spp. was recorded frequently during every night with up to 320 registrations on any one night (see Figure 14).

4.26 Bat activity was recorded within all hours of every night between dusk and dawn over the period with the exception of the first night (11/09) when no bat activity was recorded between 02:00 and 04:00. The times of peak levels of bat activity varied over each night however, overall levels of activity were generally higher between dusk and midnight, and in the hours just before dawn. This differed on the second and third nights though as high levels of activity were recorded between midnight and 03:00 (see Figure 15).

Summary

4.27 8271 bat registrations were recorded over all three survey periods. 74.84% of registrations were recorded during the September period, 15.11% were recorded during the August period, and 10.05% of registrations were recorded during the July period. Common pipistrelle was the most frequently recorded species during the July and August periods and soprano pipistrelle was the most frequently recorded species in September. Brown long-eared, noctule and *Myotis* spp. bats were recorded on most nights during the July and August periods on a low number of occasions (up to 10 registrations each night). However, noctule and brown long-eared were not recorded during the September period whilst *Myotis* spp. bats were recorded frequently (between 41 and 320 registrations each night) over this period.

4.28 One recording of an unidentified pipistrelle bat was made during the July period which comprised a social call which, on balance of probability, is likely to relate to a common pipistrelle bat in view of the dominance of common pipistrelle recorded over this period.

5.0 Evaluation and Impact Assessment

5.1 The habitat surveys (transect and automated surveys) identified five bat species/ species groups at the site, as listed below:

- Common pipistrelle
- Soprano pipistrelle
- *Pipistrellus* spp.
- *Myotis* spp.
- Brown long-eared
- Noctule

Transect Survey

5.2 During the three transect surveys, four bat species/ species groups were encountered; common pipistrelle, soprano pipistrelle, *Myotis* spp. and noctule.

5.3 Common pipistrelle bats accounted for the vast majority of activity recorded during the transect surveys. Around 30 common pipistrelle bats were recorded during any one survey visit commuting northwards along the south-western site boundary hedgerow then following the central treeline to the northern site boundary early after sunset. This suggests the presence of a well-used commuting route between a roost located to the south of the site

and foraging areas to the north of the site. In addition, individual/ very low numbers of common pipistrelle bats were recorded on an occasional to frequent basis foraging along the site boundary hedgerows and central treeline. Favoured areas of the site for foraging appeared to be around mature trees, particularly along the central treeline/ hedgerow.

5.4 Low numbers of soprano pipistrelle records were noted along the northern boundary hedgerow which appeared to relate to foraging individuals, and one record was made along the south-western boundary hedgerow. Up to two *Myotis* spp. bats were recorded together on the third visit on the southern boundary of the site. Individual noctule bats were recorded passing or briefly foraging over the site on one occasion during each of the transect survey visits.

Automated Survey

5.5 During the three automated survey periods completed between July and September 2018, at least five bat species were recorded, including a genus of bat (*Myotis* spp.) which are difficult to separate into species due to the similarity of their calls. However, many of the *Myotis* spp. calls recorded were considered to be characteristic of Daubenton's bat and possibly also whiskered bat.

5.6 In total, 8271 bat recordings were made over the three survey periods. 6190 (74.84%) of the registrations were recorded during the September period, 1,250 (15.11%) were recorded during the August period, and 831 (10.05%) were recorded during the July period.

5.7 During each period, a single detector was deployed on an ash tree in the middle of the central treeline facing southwards. An analysis of bat activity recorded at this location during each survey period is provided below.

5.8 Common pipistrelle was the most frequently recorded species during the July and August periods and soprano pipistrelle was the most frequently recorded species in September.

5.9 The detector is likely to have recorded common pipistrelle bats following the commuting route identified during the transect survey and therefore some of the activity recorded within the first hour after sunset at this location is likely to include commuting common pipistrelle bats. Peak periods of activity recorded over varied between nights however, highest levels of activity were generally between dusk and midnight, and then in the hours just before dawn. The results suggest that overall, the central treeline was used regularly by foraging and/ or commuting common pipistrelle bats throughout each night over the three survey periods.

5.10 Soprano pipistrelle bats were detected infrequently during the first survey period but fairly heavy usage of the treeline by foraging bats of this species was recorded during the August and September periods. It is therefore expected that the treeline is used regularly by soprano pipistrelle bats for foraging, and potentially commuting, during some periods of the active bat season.

5.11 Brown long-eared, noctule and *Myotis* spp. bats were recorded on most nights during the July and August periods on a low number of occasions (up to 10 registrations each night). However, noctule and brown long-eared were not recorded during the September period whilst *Myotis* spp. bats were recorded frequently (between 41 and 320 registrations each night) over this period. This suggests that the treeline is likely to be used regularly by low numbers of brown long-eared and noctule bats throughout the active season, and is heavily used by low numbers of foraging *Myotis* spp. bats on a more occasional/ sporadic basis.

5.12 It should be noted that brown long-eared bats have a very quiet echolocation call which often leads to this species being under recorded, and it should therefore be considered that the site is used on a fairly frequent basis by low numbers of this species.

5.13 One recording of an unidentified pipistrelle bat was made during the July period which comprised a social call which, on balance of probability, is likely to relate to a common pipistrelle bat in view of the dominance of common pipistrelle recorded over this period.

Back-tracking survey

5.14 A further back-tracking activity survey was also completed at the site in an effort to identify any heavily used commuting routes and any nearby roost locations. The full details of the back-tracking survey can be found within the Protected Species Survey Report (Bats) dated January 2019 by Ecology Services Ltd.

5.15 The back-tracking survey recorded occasional passes and periods of foraging activity along the treeline in the centre of the site and along Argoed View to the south west of the site. The majority of activity related to common pipistrelle bats with a possible small number of brown long-eared and *Myotis* sp. bats.

5.16 In addition to the three bat habitat surveys and back-tracking survey, a detailed habitat appraisal has been undertaken bringing together the survey results, the habitats assessment and considering the specific requirements of each bat species recorded. The assessment has been based upon experience and knowledge of the species identified at the site.

Habitat Assessment

5.17 Habitats within the site and its immediate surrounds were assessed to assist in the determination of impacts. Table 5 reviews habitat preferences for the species identified during the surveys.

Table 5: Foraging habitat preferences and foraging strategies of different UK species (taken from BCT (2016) 3rd edition).

Species	Habitat Preferences
Common pipistrelle	Shows preference to deciduous woodland but a generalist using a wide range of habitats.
Soprano pipistrelle	Tends to select riparian habitats over other habitat types available.
Daubenton's	Preferred foraging habitat is over water, this species favours riverine habitats but is also known to forage in woodland.
Whiskered/ Brandt's	Buckley et al. (2013) found whiskered bat used mixed woodland, riparian vegetation, arable and rough grassland habitats although selected the first two as core foraging habitats. Berge (2007) found that whiskered bat selected pasture and hedgerows. A German study showed Brandt's bat favours woodland and whiskered bat favours areas near water and more open habitats with hedges and coppices (Taake, 1984).
Brown long-eared	Strongly associated with tree cover, prefers woodland with cluttered under storey, including native species particularly deciduous woodland. Also forages in mixed woodland edge and among conifers. Use of hedgerows increases though the active season.
Noctule	Found in a range of habitats, forages out in the open, often over trees and with strong affinity to water. Reported as selecting broad-leaved woodland and pasture.

5.18 The site comprises a grassland field bordered by hedgerows with occasional mature trees, and a historic defunct hedgerow/ treeline with mature trees and scattered shrubs running north-south through the central western area of the site.

5.19 Land surrounding the site includes residential development to the south-west, south and south-east, forming the small village of New Brighton. Bordering to the north-east is New Brighton Road with a small number of detached residential properties located along it with land beyond comprising a mosaic of agricultural grassland, hedgerows, scattered trees and small areas of woodland. A large lake surrounded by a belt of woodland lies approximately 70m north of the site which provides high quality foraging habitat for bats. Areas to the north-west of the site and the wider area surrounding New Brighton are dominated by agricultural grassland with hedgerows, treelines and occasional scattered trees and small blocks of woodland.

5.20 In addition to areas of suitable foraging and commuting habitat nearby, there are a number of buildings and trees in the area that could provide suitable roosting habitat for bats within the adjacent habitats to the site. However, no bat roosts have been identified within the site during the suite of roost surveys carried out at the site (see Protected Species Survey Report (Bats) dated November 2018.

5.21 The scheme would result in the loss of a large proportion of the grassland habitats within the site to facilitate construction of residential dwellings and associated infrastructure. The majority of hedgerows associated with the site are located along the outer boundaries and will therefore be retained with only small loss required to provide road access. There will also be loss of hedgerows and mature trees along the northern part of the central treeline/ hedgerow running north-south through the central western area of the site.

5.22 Proposed loss of grassland habitats from the northern and central areas of the site is considered unlikely to have a significant effect on the use of the site by foraging common pipistrelle, soprano pipistrelle and noctule bats, which have a wide range of habitat preferences and regularly forage around residential development and gardens. It is expected that the majority of hedgerows and associated standard trees along the boundaries of the site will be retained and therefore foraging and commuting habitats relating to these habitats would be maintained. It is possible that tree loss from the central treeline/ hedgerow would reduce the quality of this habitat for species shown to use this area for foraging and/ or commuting including common pipistrelle, soprano pipistrelle, *Myotis* spp. and brown long-eared bats. However, brown long-eared bats are also known to forage in gardens, parkland and along woodland edges, providing these areas are not affected by artificial light spill. Development proposals should seek to maintain suitable opportunities for these species within the site with high importance given to the maintaining areas of high-quality foraging habitat and commuting corridors.

5.23 Pipistrelles and noctule are known to be relatively tolerant of artificial light spill and are even known to actively seek out light sources which can attract their insect prey. However, brown long-eared bats and some species of *Myotis* bats are very intolerant of artificial light spill and therefore the residential development within the site has the potential to significantly reduce the suitability of these areas for these species if measures are not implemented to minimise light pollution associated with the new dwellings and infrastructure. Recommendations to achieve this are outlined in Section 6 below.

6.0 Recommendations and Conclusion

6.1 The bat habitat activity surveys (transect and automated detector surveys) recorded at least five species of bat foraging and/ or commuting within the site.

6.2 Common pipistrelle and soprano pipistrelle made up the vast majority of activity recorded during the surveys which demonstrated occasional to frequent use of hedgerows and treelines throughout the site by low to moderate numbers of pipistrelle bats during each

night. The transect survey demonstrated that the most frequently used areas of the site are along the central western treeline/ hedgerow and to a lesser extent along the south-western boundary hedgerow which was used, in combination with the central treeline/ hedgerow, as a well-used commuting route by common pipistrelle bats. Up to 30 common pipistrelle bats were recorded commuting northwards along the central treeline/ hedgerow during the transect surveys. The back-tracking survey recorded occasional passes and periods of foraging activity along the treeline in the centre of the site and along Argoed View to the south west of the site. The majority of activity related to common pipistrelle bats with a possible small number of brown long-eared and *Myotis* sp. bats.

6.3 The results of the automated surveys demonstrate that the central treeline/ hedgerow was also used by low numbers of brown long-eared bats and appears to be used heavily by low numbers of *Myotis* spp. (probably Daubenton's and possibly whiskered) bats over occasional periods. Low numbers of noctule also briefly forage/ commute over the site on an occasional basis.

6.4 The southern part of the central treeline/ hedgerow will be retained, however the northern part will be lost to the development (see Figure 16 Proposed Planning Layout (Rev R)).

Foraging habitat

6.5 Loss of hedgerow, trees and native shrubs within the site should be minimised wherever possible in order to maintain opportunities for bat species favouring wooded, parkland and scrub interface habitats such as pipistrelles, brown long-eared and some *Myotis* species. Habitat loss should be compensated for, through the enhancement of retained habitats and/ or creation of new high-quality habitats within areas of informal open space which should be included within the development scheme. This could include provision of native species-rich hedgerow, tree and shrub planting, meadow grassland, and waterbody and wetland creation as part of the SuDS strategy. The landscaping scheme includes a large SUDs feature in the east of the site, designed to include an area of permanent water with the surrounding area seeded with an appropriate wildflower mix. There is also a 0.12ha dedicated great crested newt compensation area including a pond in the north west of the site and the landscape scheme includes planting of 190m of new native species hedgerow around the perimeter of the site. These features will provide good foraging habitat for bats.

6.6 The value of proposed gardens could be maximised through the use of native species-rich hedgerow as boundary features, native tree and shrub planting and use of wildlife friendly shrubs and flowers in planting schemes to encourage invertebrate diversity on site.

Commuting features

6.7 One small section of boundary hedgerow will be lost to allow construction of a new access road into the site. Furthermore, the northern section of the central running treeline/ hedgerow will be lost which has been shown to be regularly used as a commuting route by common pipistrelle bats. It is recommended that proposals seek to minimise any boundary hedgerow or tree loss in order to maintain commuting routes around the site for bats.

6.8 Hedgerow or tree loss along identified commuting routes has the potential to sever these corridors or reduce their suitability for species recorded using the site. The effects of this could be mitigated for through minimising the width of any gaps created along the corridors and through implementing measures to reduce the likelihood of traffic mortality if intersected by a road. This could include traffic calming and strategic planting to raise the height of bat flight lines.

6.9 Severance of commuting corridors should be compensated for through the provision of new or enhanced linear vegetated habitats across or around the site. This could be achieved through the provision of new native species-rich hedgerow, scrub and/ or treeline planting

within the site. Existing boundary hedgerows could also be enhanced through complimentary scrub and tree planting to create 'ecotone' habitats which are known for supporting high levels of biodiversity. In particular, the south western and western boundaries of the site should be enhanced to compensate the loss of the section of the central treeline/ hedgerow.

6.10 In order to maintain the suitability of retained and newly created habitat corridors for commuting bats, the proposals should seek to minimise indirect effects of artificial light spill onto areas of semi-natural vegetation (see below).

Lighting

6.11 In order to minimise potential effects of artificial lighting, both during construction and the operational phase upon completion of the proposed development, a sensitive lighting scheme should be designed and implemented to maintain the site as suitable for foraging and commuting bat species which are sensitive to light such as *Myotis* spp. and brown long-eared bats. Lighting levels should be at the minimum required for health and safety, and avoided wherever possible. The effects of lighting could be reduced through the use of low-level lighting and/ or using bulbs emitting low UV light and should be directed away from sensitive habitats that could be used by foraging or commuting bats such as boundary hedgerows, treelines, scrub and scattered trees. The lighting strategy should be reviewed at an appropriate stage of design by a suitably qualified ecologist.

Conclusion

6.12 Effects that are likely to occur due to the proposed development have been reviewed. Through the implementation of the above measures which aim to maintain areas of good quality foraging and commuting habitat within the site for bats and minimise potential effects of artificial lighting associated with the proposals, it is considered that opportunities for foraging and commuting bat species recorded at the site can be maintained in the long-term. Subject to the recommended measures being implemented and no further impacts arising, it is concluded unlikely that the proposed development would result in a significant reduction in the interest of the site for foraging and commuting bats.

7.0 References

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Figure 1:
Site Location Plan

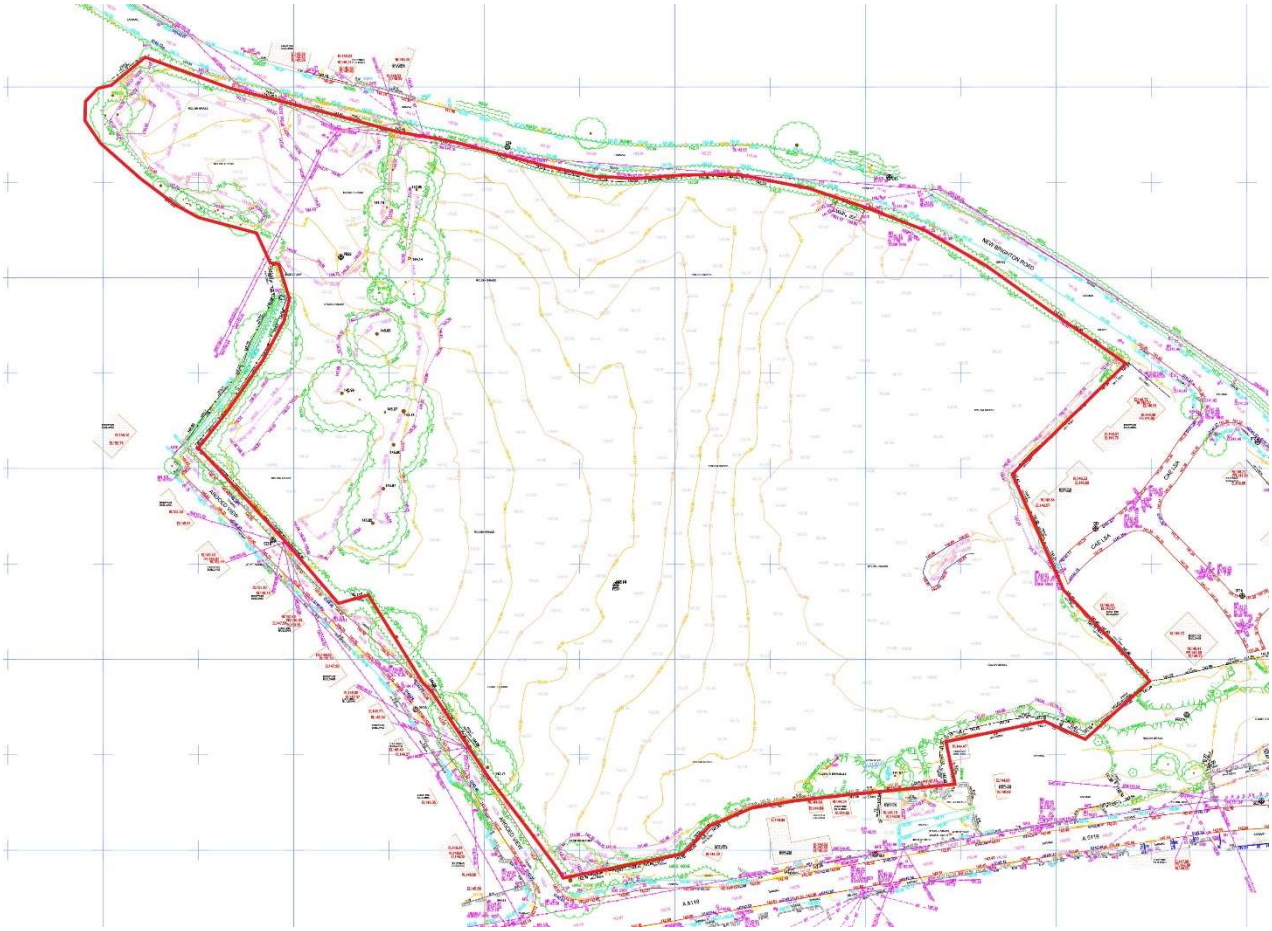


Figure 2:
Transect Route and Static Point Count Locations

Figure 3:
Transect Survey 1 – Results Summary Plan

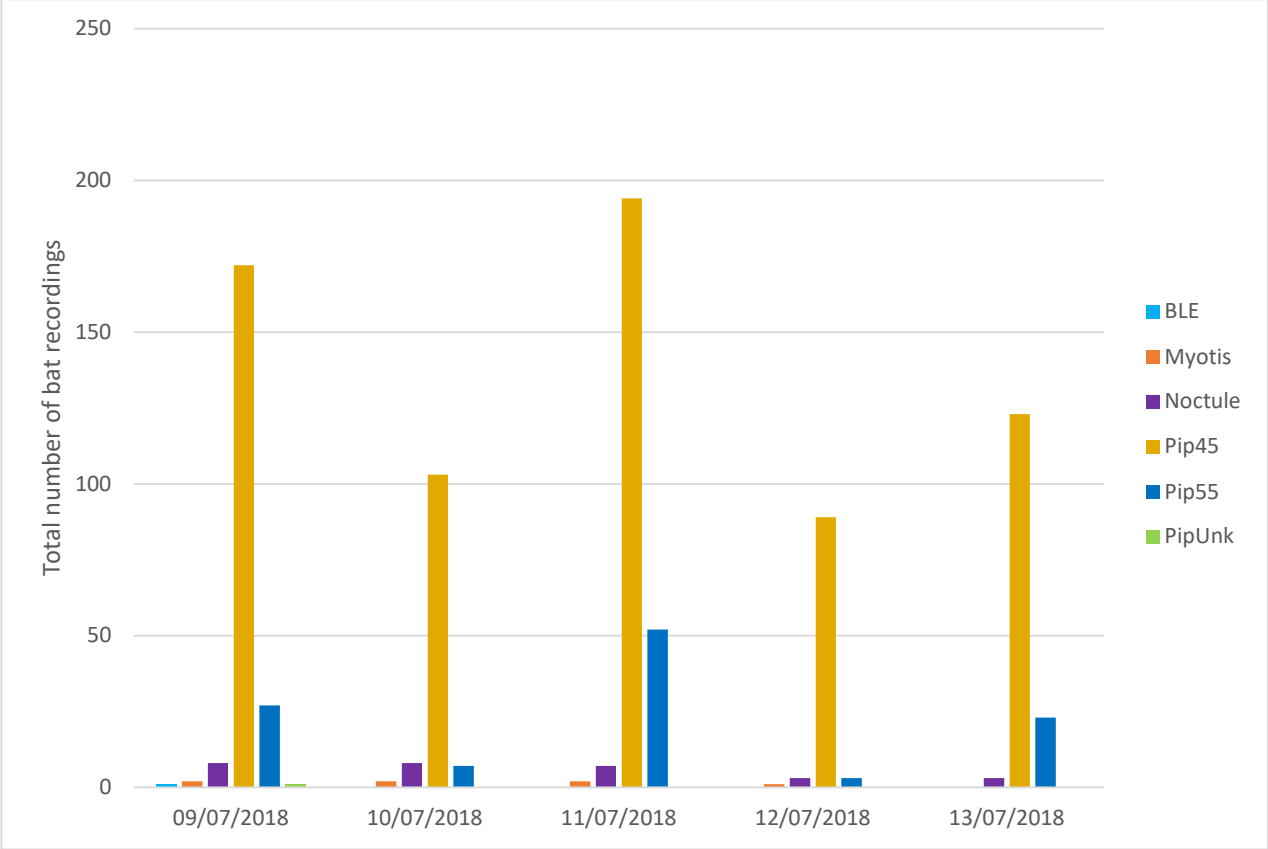
Figure 4:
Transect Survey 2 – Results Summary Plan

Figure 5:
Transect Survey 3 – Results Summary Plan

Figure 6:
All Transect Surveys Combined – Results Summary Plan

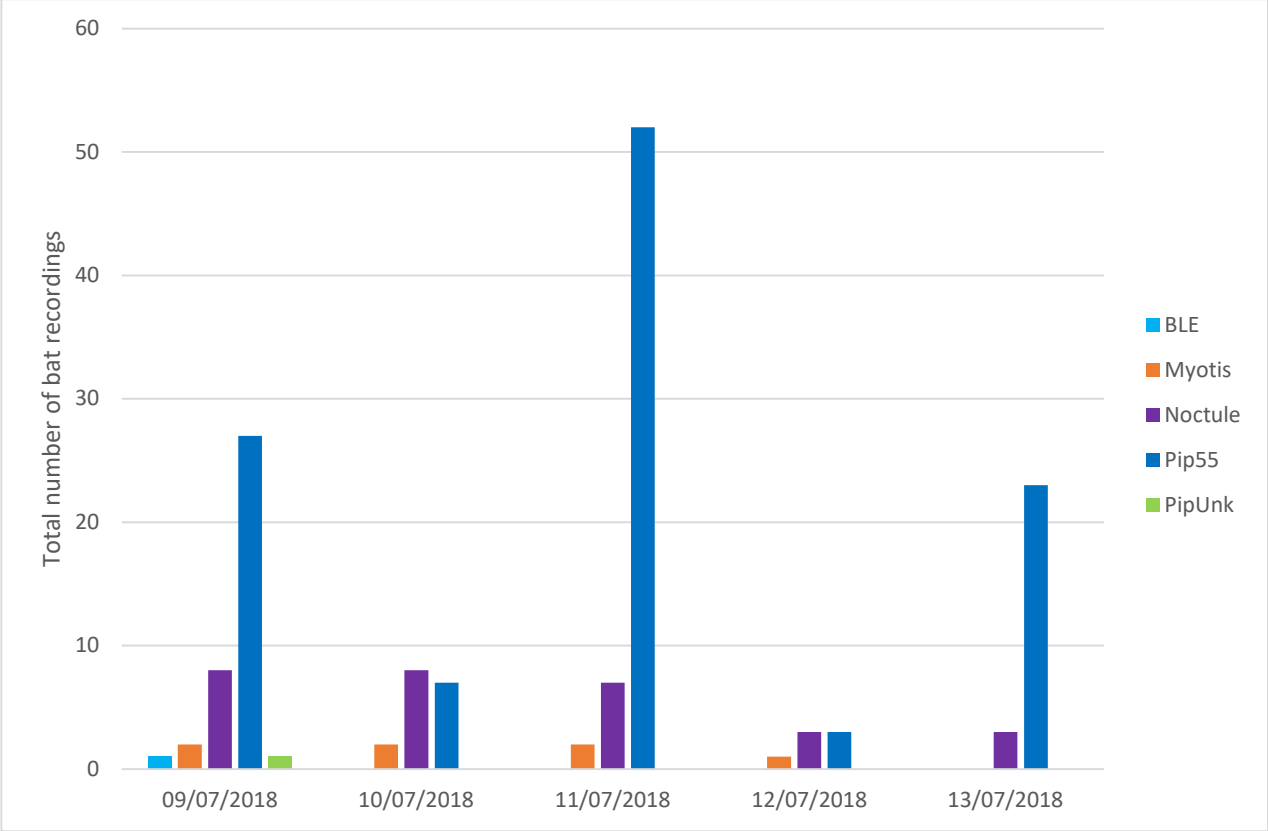
Figure 7:
Location of Automated Detector

Figure 8:
Automated Survey Period 1 – All species recordings per night



BLE = Brown Long-eared (*Plecotus auritus*), Myotis = *Myotis* spp., Noctule = Noctule (*Nyctalus noctula*), Pip45 = Common Pipistrelle (*Pipistrellus pipistrellus*), Pip55 = Soprano Pipistrelle (*Pipistrellus pygmaeus*), PipUnk = *Pipistrellus* spp. (Common Pipistrelle or Soprano Pipistrelle).

Figure 9:
Automated Survey Period 1 – Species recordings per night*



*excluding Common Pipistrelle (Pip45).

BLE = Brown Long-eared (*Plecotus auritus*), Myotis = *Myotis* spp., Noctule = Noctule (*Nyctalus noctula*), Pip45 = Common Pipistrelle (*Pipistrellus pipistrellus*), Pip55 = Soprano Pipistrelle (*Pipistrellus pygmaeus*), PipUnk = *Pipistrellus* spp. (Common Pipistrelle or Soprano Pipistrelle).

Figure 10:
Automated Survey Period 1 – Total recordings per hour

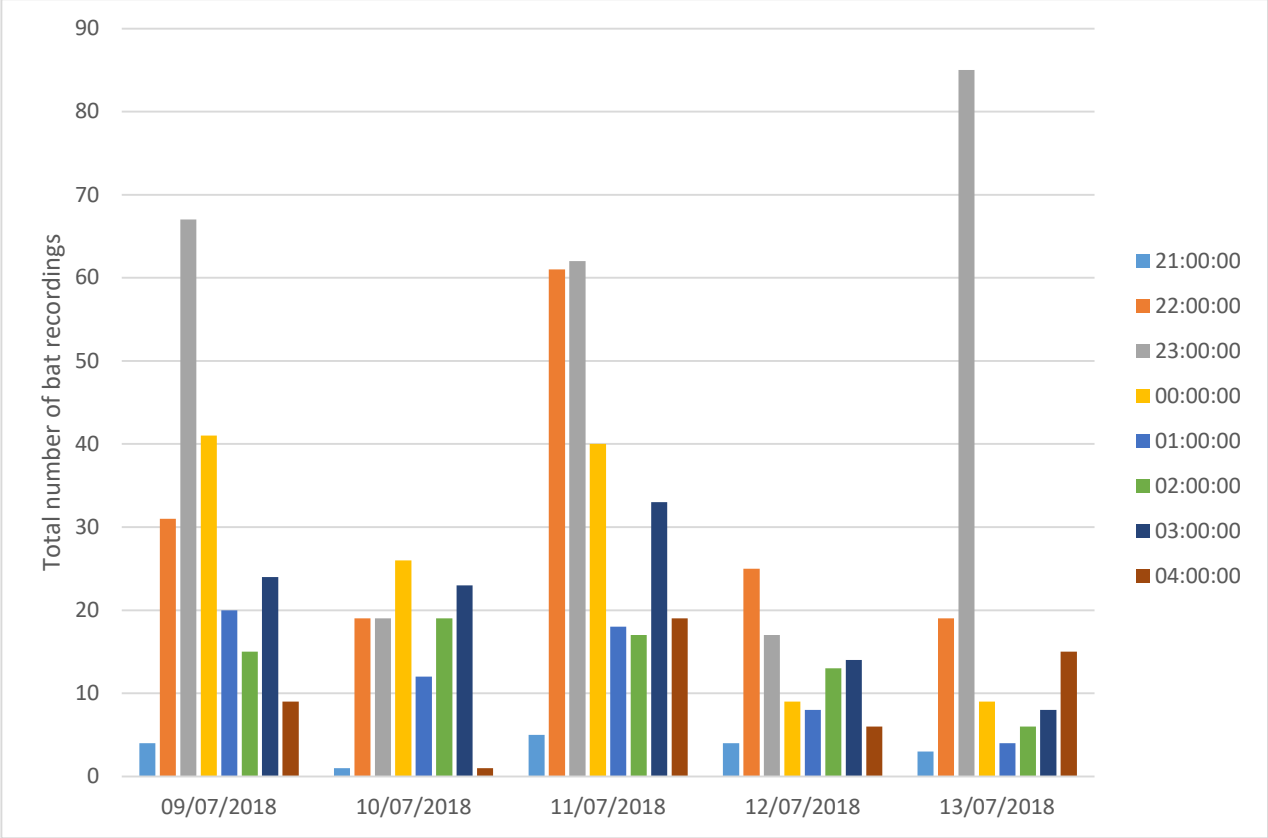
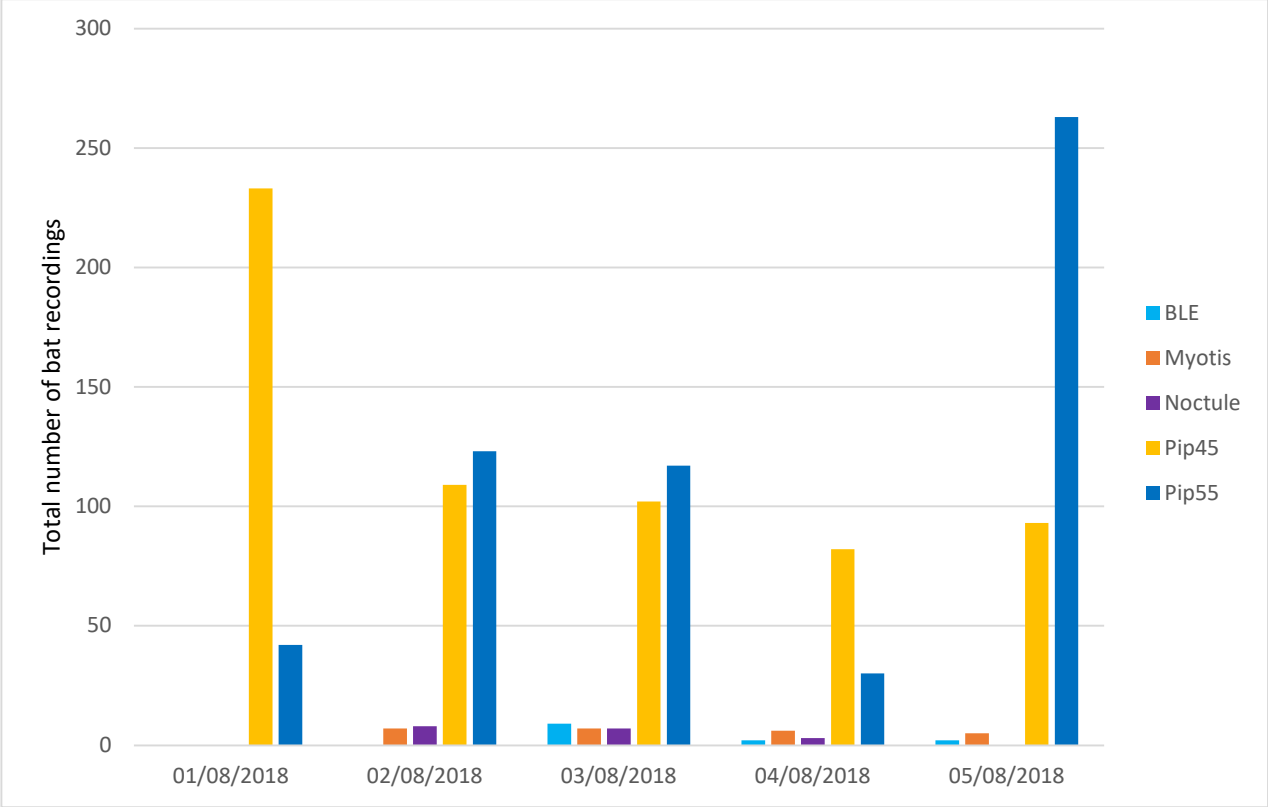
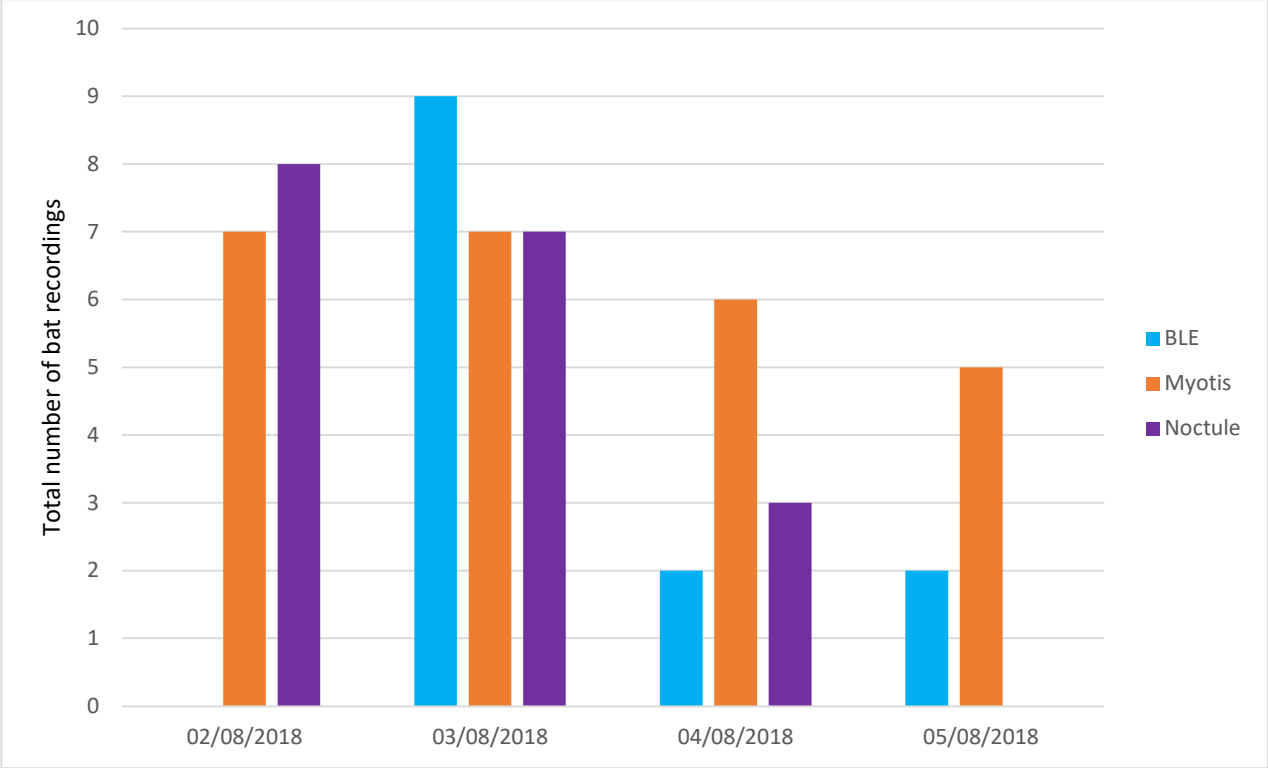


Figure 11:
Automated Survey Period 2 – All species recordings per night



BLE = Brown Long-eared (*Plecotus auritus*), Myotis = *Myotis* spp., Noctule = Noctule (*Nyctalus noctula*), Pip45 = Common Pipistrelle (*Pipistrellus pipistrellus*), Pip55 = Soprano Pipistrelle (*Pipistrellus pygmaeus*).

Figure 12:
Automated Survey Period 2 – Species recordings per night*



*excluding Common Pipistrelle (Pip45) and Soprano Pipistrelle (Pip55).

BLE = Brown Long-eared (*Plecotus auritus*), Myotis = *Myotis* spp., Noctule = Noctule (*Nyctalus noctula*), Pip45 = Common Pipistrelle (*Pipistrellus pipistrellus*).

Figure 13:
Automated Survey Period 2 – Total recordings per hour

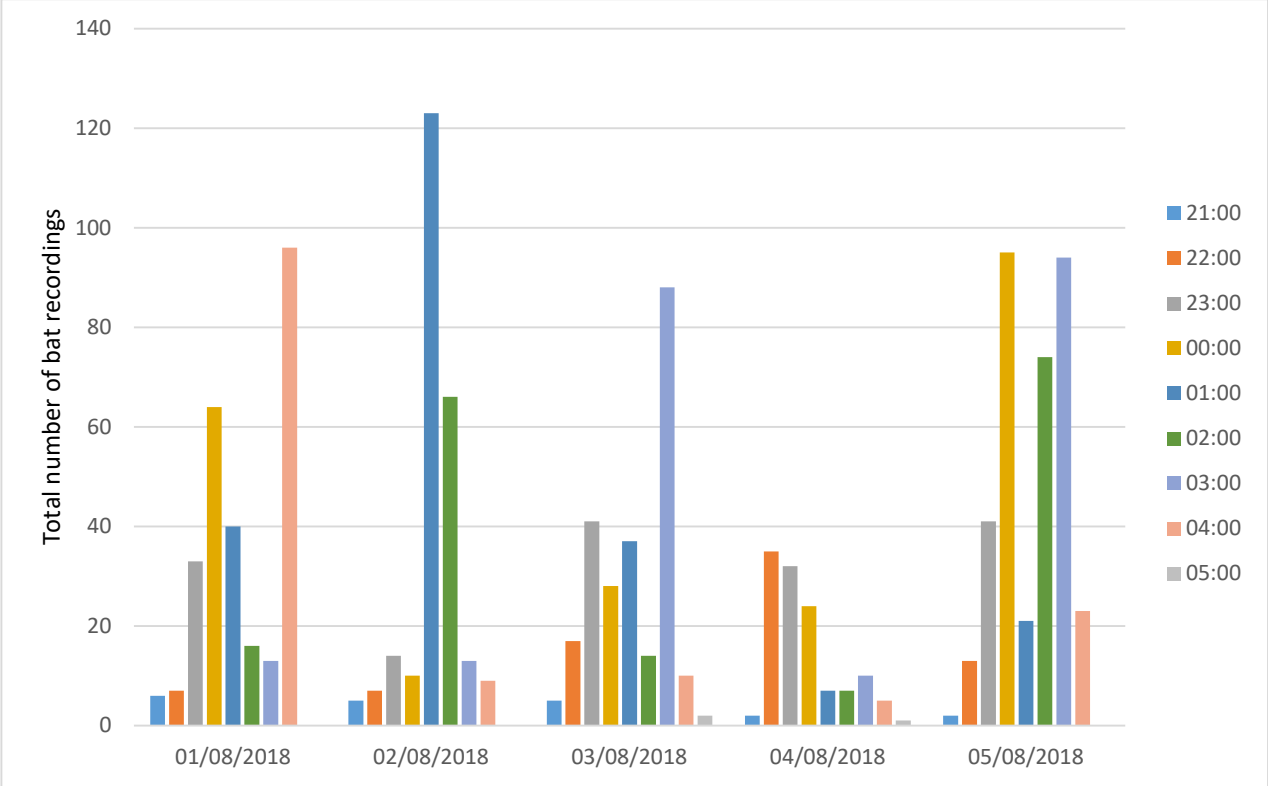
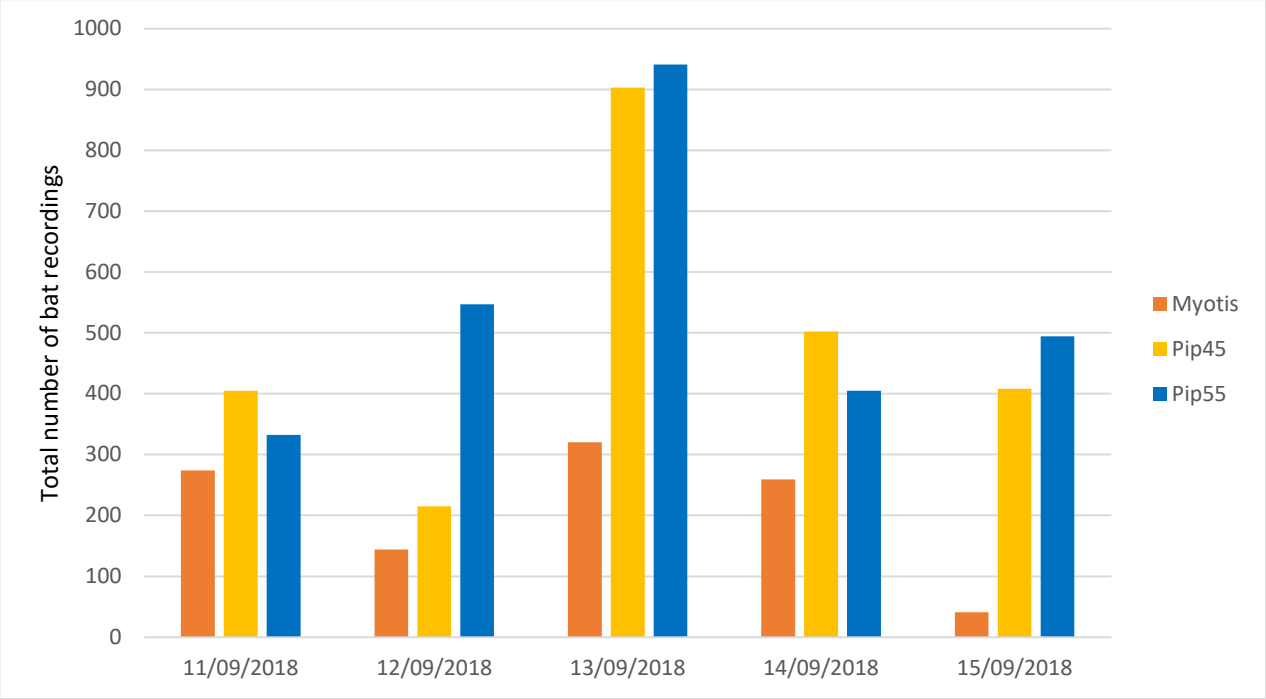


Figure 14:
Automated Survey Period 3 – All species recordings per night



Myotis = *Myotis* spp., Pip45 = Common Pipistrelle (*Pipistrellus pipistrellus*), Pip55 = Soprano Pipistrelle (*Pipistrellus pygmaeus*).

Figure 15:
Automated Survey Period 3 – Total recordings per hour

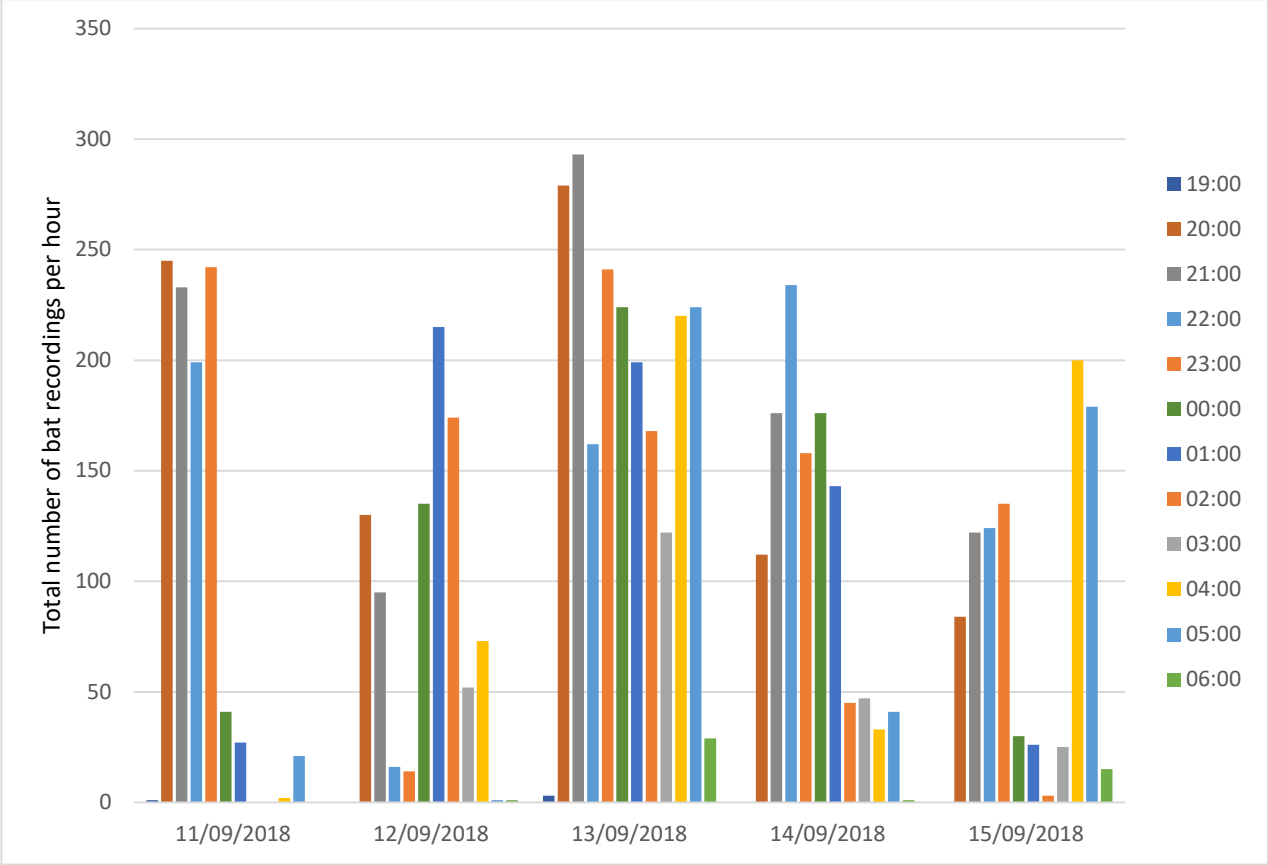
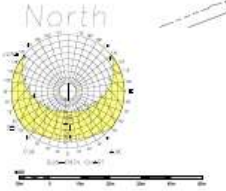


Figure 16:
Proposed Planning Layout V23 07.04.21

Argoed View, Nr Mold
Proposed Sketch Layout - 1:500



STEWART Milne HOMES

Schedule of Accommodation

DATE	03.2021	DRAWN	DJM
SCALE	1:500	CHK	

Argoed View, Nr Mold

Proposed Planning Layout

Dwg No SK286/NBM/PL50

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Appendix 1:

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement (Taken from the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines, 2016).

Suitability	Description	
	Roosting habitats	**Commuting & foraging habitats**
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure 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[1] 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[2]. A tree of sufficient size and age to contain PRF's but with none seen from the ground or features seen with only very limited roosting potential[3].	Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) of a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[1] 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).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back to gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland and water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[1] and surrounding habitat.	Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broad-leaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

[1]For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[2]Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.
[3]This system of categorisation aligns with BS8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

Appendix 2:
Raw Survey Data - Walked Transects

Type by Survey:	Survey 1	**Project:**	New Brighton		
Date:	09/07/2018	**Start Time:**	21:24	**Finish Time:**	23:26
Sunset:	21:39	**Start °C:**	16.8	**Finish °C:**	12.0
Weather condition:	Calm	**Cloud cover (%):**	10-40	**Wind strength:**	Beaufort 0
Transect No. 1	**Surveyor:** Zoe Foster & Simon Booth				

Time:	**Listening Point (LP No.)/ Walk (W No.)**	**Bat Passes Heard & Activity**
21:24-21:32	Start/W1	None
21:32-21:37	LP1	None
21:37-21:41	W2	None
21:41-21:46	LP2	None
21:46-21:49	W3	None
21:49-21:54	LP3	None
21:54-22:00	W4	**P45** briefly HNS (8 bats); **P45** flying from houses then foraging (7 bats).
22:00-22:05	LP4	**P45** foraging around trees (at least 2 bats); **P45** commuting along tree line (6 bats)
22:05-22:12	W5	**P45** foraging HNS (at least 2 bats recorded); **P55** & **P45** passing/ foraging briefly along hedgerow.
22:12-22:17	LP5	**P45** commuting around 2m above ground below lowest tree canopy (5 recorded).
22:17-22:30	W6	2x **P45** passing (HNS), **Noctule** HNS.
22:30-22:35	LP6	**Pipistrelle species** bat (SNH) flying across field.
22:35-22:50	W7	**P45** pass; 2x **P45** foraging repeatedly nearby.
22:50-22:55	LP7	**P45** pass (HNS)
22:55-23:00	W8	None
23:00-23:05	LP8	**P45** & **P55** (HNS) passes; **P45** commuting and foraging along hedgerow (5 in total).
23:05-23:10	W9	**P45** & **P55** (3 bats recorded).
23:10-23:15	LP9	**P45** repeatedly foraging and feeding along hedgerow (5 recordings).
23:15-23:20	W10	**P45** foraging repeatedly along treeline; **P45** foraging around trees.
23:20-23:25	LP10	**P45** foraging along treeline.
23:25-23:26	W11	**P45** (HNS).
23:26	Finish	

P45 – Common pipistrelle; P55 – Soprano pipistrelle; HNS – Heard Not Seen.

Type by Survey:	Survey 2	**Project:**	New Brighton		
Date:	01/08/2018	**Start Time:**	20:52	**Finish Time:**	22:52
Sunset:	21:07	**Start °C:**	18.9	**Finish °C:**	17.6
Weather condition:	Calm, muggy	**Cloud cover (%):**	90	**Wind strength:**	Beaufort 1-2
Transect No. 1	**Surveyor:** Zoe Foster & Charlotte Wood				

Time:	**Listening Point (LP No.)/ Walk (W No.)**	**Bat Passes Heard & Activity**
20:52-20:56	Finish/W11	None
20:56-21:01	LP10	None
21:01-21:05	W10	None
21:05-21:10	LP9	None
21:10-21:14	W9	None
21:14-21:19	LP8	**P45** HNS.
21:19-21:25	W8	None
21:25-21:30	LP7	**P45** commuting.
21:30-21:47	W7	**P45** and **Noctule** (HNS) passes/ commuting.
21:47-21:52	LP6	None
21:52-21:57	W6	None
21:57-22:02	LP5	3x **P45** commuting northwards along treeline across field.
22:02-22:10	W5	**P45** commuting along treeline.
22:10-22:15	LP4	**P45** commuting along treeline.
22:15-22:21	W4	2x **P45** commuting along treeline; **P45** (HNS) foraging repeatedly nearby.
22:21-22:26	LP3	3x **P45** (HNS) commuting along treeline.
22:26-22:31	W3	None
22:31-22:36	LP2	**P45** foraging - circling over vegetation in corner of field; **P45** (HNS) foraging; **P45** commuting along hedgerow.
22:36-22:40	W2	**P45** foraging repeatedly along hedgerow.
22:40-22:45	LP1	**P45** HNS foraging (at least 4 bats recorded).
22:45-22:52	W1	**P45** foraging in corner of field; 2x **P45** foraging repeatedly along hedgerow.
22:52	Start	

P45 – Common pipistrelle; HNS – Heard Not Seen.

Type by Survey:	Survey 3	**Project:**	New Brighton		
Date:	11/09/2018	**Start Time:**	19:24	**Finish Time:**	21:24
Sunset:	19:39	**Start °C:**	14.8	**Finish °C:**	14.2
Weather condition:	Light rain for last 3 mins	**Cloud cover (%):**	95	**Wind strength:**	Beaufort 0-1
Transect No. 1	**Surveyor:** Zoe Foster & Simon Booth				

Time:	**Listening Point (LP No.)/ Walk (W No.)**	**Bat Passes Heard & Activity**
19:24-19:28	Start/W1	None
19:28-19:31	LP1	None
19:31-19:34	W2	None
19:34-19:37	LP2	None
19:37-19:44	W3	None
19:44-19:47	LP3	None
19:47-19:53	W4	None
19:53-19:56	LP4	None
19:56-20:03	W5	**P45** (HNS) commuting - brief.
20:03-20:06	LP5	**P45** (HNS) brief; 3x **P45** commuting below tree canopy on opposite side of hedgerow to street lights within site; 1x **Noctule** pass/ forage.
20:06-20:19	W6	3x **P45** commuting 3m above ground; 2x **P45** foraging 4m above ground repeatedly along hedgerow.
20:19-20:22	LP6	None
20:22-20:41	W7	1x ***Myotis*** spp. foraging, repeatedly swooping to around 0.5m above ground; approx. 4x ***Myotis*** spp. passes/ foraging (HNS).
20:41-20:44	LP7	None
20:44-20:52	W8	None
20:52-20:55	LP8	None
20:55-21:00	W9	None
21:00-21:03	LP9	**P55** (HNS) - 3x passes/ forage.
21:03-21:15	W10	1x **P45** and 1x **P55** foraging along road and over hedgerow; 1x **P45** continuously foraging along hedgerow.
21:15-21:18	LP10	None
21:18-21:24	W11	None
21:24	Finish	

P45 – Common pipistrelle; P55 – Soprano pipistrelle; HNS – Heard Not Seen.