

**Harthill Depot, Calderstones Park, Liverpool, L18 3HU**

**ECOLOGICAL SURVEY AND ASSESSMENT  
(including a Licensed Bat Survey)**

**October 2016**

**[ERAP Ltd ref: 2015/296]**

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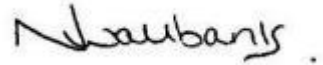
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## Document Control

Survey type:	Surveyors <sup>1</sup>	Survey date(s)
Phase 1 Habitat survey	Nicola Wallbank B.Sc (Hons) Ph.D. GradCIEEM	1 <sup>st</sup> December 2015
Daylight bat survey	Brian Robinson B.Sc. (Hons) MCIEEM Nicola Wallbank	3 <sup>rd</sup> March 2016
Bat activity surveys	Brian Robinson, Amy Sharples B.Sc. (Hons) M.Sc. GradCIEEM, Chris Schofield B.Sc. (Hons) M.Sc., Gareth Harrison B.Sc. (Hons), Nicola Wallbank and Tracy Cumberbatch	11 <sup>th</sup> to 15 <sup>th</sup> May 2016
Bat roost present/absence surveys	Aidan Pickering B.Sc. (Hons), Brian Robinson, Amy Sharples, Chris Schofield, Marie Pickering B.Sc (Hons), Nicola Wallbank and Tracy Cumberbatch.	17 <sup>th</sup> May 2016 24 <sup>th</sup> May 2016 3 <sup>rd</sup> June 2016
Reporting	Personnel	Date
Author	Nicola Wallbank B.Sc. (Hons) Ph.D. GradCIEEM	6 <sup>th</sup> June 2016
Signature(s)		
Checked by	Brian Robinson B.Sc. (Hons) MCIEEM Senior Ecologist	6 <sup>th</sup> June 2016
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Report issued to	Redrow Homes Limited	
Copy Number	2 <sup>2</sup>	
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<b>Great crested newt</b>		
<ul style="list-style-type: none"> <li>Nicola Wallbank Natural England Class Survey Licence (Level 1) Registration Number 2015-17731-CLS-CLS</li> </ul>		
<sup>2</sup> Updated Report Information		
Revised 23 <sup>rd</sup> September 2016 to include the following:		
<ul style="list-style-type: none"> <li>Re-entry, transect and automated bat survey results; and</li> <li>Tree inspection results.</li> </ul>		
Checked by	Victoria Burrows B.Sc. (Hons) M.Sc. CEnv MCIEEM Principal Ecologist	28 <sup>th</sup> September 2016
Revised and issued by	Nicola Wallbank	3 <sup>rd</sup> October 2016

## SUMMARY

### Introduction and Scope

- i. This Ecological Appraisal presents the ecological, biodiversity and nature conservation status of the Harthill Depot Site, Calderstones Park, Liverpool. The appraisal was requested in connection with proposals to develop the site to housing.
- ii. The appraisal presents the results of a desktop study, an extended Phase 1 Habitat Survey and a licensed daylight bat survey carried out between December 2015 and March 2016, bat re-entry and activity surveys conducted between May and September 2016, and licensed bat tree inspection in August 2016.
- iii. The scope of survey undertaken is appropriate to enable the identification of any potential ecological constraints, the remit of mitigation required and opportunities for biodiversity associated with the development proposals.

### Results and Recommendations

- iv. The site comprises woodland, hedgerows, scattered trees, introduced shrubs, semi-improved, improved and amenity grassland, buildings and hard standing.
- v. Calderstones Park Local Wildlife Site (current) lies immediately adjacent to the sites eastern boundary. The habitats at the sites eastern boundary will be retained and protected. In addition, potential adverse effects on the Local Wildlife Site will be further minimised through the implementation of an appropriate management plan for retained habitats to ensure the longevity is conserved for wildlife.
- vi. The woodland, Hedgerow 1 and areas of parkland are Priority Habitats in accordance with Section 41 of the *NERC Act 2006*, and are of local value to wildlife such as bats and breeding birds. Furthermore, the mature trees and shrubs within the site are of local value as they add structural diversity and support breeding birds.
- vii. Invasive species listed on Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) namely Japanese Knotweed, Indian Balsam, and Rhododendron were detected. It is an offence to cause the spread of these species in the wild; measures for the control of these species are recommended at **Section 5.4**.
- viii. Features suitable for roosting bats were observed at Buildings 1, 2, 3, 10, 11 and 12 during the licensed daylight bat survey. During the re-entry surveys a day roost of one common pipistrelle was detected at a gap between the wall top and soffit box and at a hole in the brick work at Building 2 on the southern elevation.
- ix. Prior to the renovation of Building 2 an appropriate licence must be obtained from Natural England. The site meets the criteria and qualifies to be registered under the Bat Low Impact Class Licence (BLICL). An appropriate mitigation strategy and details of how the proposals may proceed in accordance with the BLICL, Natural England guidance and best practice are provided at **Section 5.6**.
- x. An inspection at height has confirmed the absence of roosting bats at four trees to be removed as part of the development proposals which were identified during the habitat survey as supporting features suitable for roosting bats.
- xi. Activity surveys have identified the use of habitats within the site by foraging and commuting bats. Features identified as being of value to foraging and commuting bats will be retained and protected as part of the development proposals. Recommendations to minimise the impact of the proposals on commuting and foraging bats are provided at **Section 5.6**.

- xii. The buildings, trees and shrubs within the site are suitable for use by breeding passerine birds. Measures for the protection of breeding birds and enhancement of the site are presented at **Section 5.7**.
- xiii. The site supports favourable foraging and sheltering habitat for hedgehog. Measures to ensure habitat connectivity across the site and the wider area is maintained for use by hedgehog are presented at **Section 5.3**.
- xiv. No other protected or notable species have been detected.
- xv. The recommendations in **Section 5.0** address all the mandatory measures and ecological recommendations to be applied to ensure compliance with wildlife legislation, the National Planning Policy Framework (NPPF) and best practice.
- xvi. The proposals will secure an opportunity to implement beneficial measures such as habitat management and habitat creation that will safeguard habitats for wildlife such as birds and bats, with the aim of providing a net gain in biodiversity in accordance with the principles of the NPPF.

### Conclusions

- xvii. Two common pipistrelle day roosts have been detected at Building 2. Therefore, the renovation of Building 2 must be conducted under an appropriate Natural England licence granted under Regulation 53 of The Conservation of Habitats and Species Regulations 2010 (as amended). The site meets the criteria and qualifies to be registered under the Natural England Bat Low Impact Class Licence (BLICL).
- xviii. It is possible to implement reasonable actions for the protection and long-term conservation of fauna such as roosting bats, nesting birds and commuting / foraging bats associated with the site.
- xix. Following the comprehensive ecological surveys it is concluded that the proposals are feasible and acceptable in accordance with ecological considerations and relevant planning policy. Development at the site will provide an opportunity to secure ecological enhancement for fauna typically associated with residential areas such as breeding birds, roosting bats and hedgehog.

## 1.0 INTRODUCTION

### Background and Rationale

- 1.1 ERAP Ltd (Consultant Ecologists) was commissioned by Redrow Homes Limited to carry out an ecological appraisal of Harthill Depot, Calderstones Park, Liverpool, L18 3HU (hereafter referred to as the 'site'). The Ordnance Survey (OS) grid reference at the centre of the site is SJ 4023 8755.
- 1.2 The appraisal was requested in connection with a planning application to develop the site to housing.

### Scope of Survey

- 1.3 The scope of ecological surveys undertaken in December 2015 and March 2016 comprised:
  - a. Desktop study for known ecological information at the site and the local area;
  - b. Extended Phase 1 Habitat Survey and assessment;
  - c. Assessment of the ecological value of the habitats within the site with the use of the National Vegetation Classification (NVC) and the Ratcliffe criteria, as presented in *A Nature Conservation Review* (Ratcliffe, 1977);
  - d. Survey and assessment of all habitats for statutorily protected species and other wildlife including badger (*Meles meles*), bird species including barn owl (*Tyto alba*), great crested newt (*Triturus cristatus*), invertebrates, reptiles, otter (*Lutra lutra*) and water vole (*Arvicola amphibius*);
  - e. Licensed bat survey of the buildings;
  - f. Identification of any potential ecological constraints on the proposals and the specification of the scope of mitigation and ecological enhancement required in accordance with wildlife legislation, planning policy guidance and other relevant guidance; and
  - g. Identification of any further surveys or precautionary actions that may be required prior to the commencement of any development activities.
- 1.4 Two surveys to record all visible and audible birds were conducted by an experienced ornithologist in August and September 2015.
- 1.5 Dawn re-entry surveys to determine the presence or absence of roosting bats, determine any species present and to classify any roosts present at the buildings were undertaken between May and August 2016.
- 1.6 Bat activity surveys to determine the level of bat usage at the site and to determine the species composition of the bats which use the site were conducted between May and September 2016.
- 1.7 A licensed bat worker carried out an inspection of the trees at height in August 2016.

## 2.0 METHOD OF SURVEY

### 2.1 Desktop Study

- 2.1.1 The following sources of information and ecological records were consulted:
  - a. MAgiC: A web-based interactive map which brings together geographic information on key environmental schemes and designations, including details of statutory nature conservation sites;
  - b. Merseyside Biobank (MBB); and
  - c. The North Merseyside Biodiversity Action Plan (BAP).



## 2.2 Vegetation and Habitats

- 2.2.1 An Extended Phase 1 Habitat Survey of the site was carried out by Dr Nicola Wallbank on the 1<sup>st</sup> December 2015. The weather was dry with sunny intervals, calm (Beaufort Scale 0) with an air temperature of 8°C. The conditions and time of year were suitable for the scope of ecological survey carried out.
- 2.2.2 A vegetation and habitat map was produced for the site and the immediate surrounding area at a scale of 1:1500 (refer to **Figure 8.1**). The mapping is based on the Joint Nature Conservation Committee Phase 1 Habitat Survey methodology (JNCC, 2010) with minor adjustments to illustrate and examine the habitats with greater precision.
- 2.2.3 The plant species within the site boundary were determined with estimates of the distribution, ground cover, abundance and constancy of individual species. The estimation of abundance was based on the DAFOR system, where D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare, this being a widely used and accepted system employed by ecological surveyors. The terms L = Locally and V = Very were additionally used to describe the plant species distributions with greater precision.
- 2.2.4 Stands of vegetation and habitats were described and evaluated using the National Vegetation Classification (NVC). The NVC provides a systematic and comprehensive analysis of British vegetation and is a reliable framework for nature conservation and land-use planning.
- 2.2.5 Hedgerows were assessed in accordance with *The Hedgerows Regulations 1997* Wildlife and Landscape Criteria (H.M.S.O., 1997).
- 2.2.6 Searches were made for uncommon, rare and statutorily protected plant species, those species listed as protected in the *Wildlife and Countryside Act 1981* (as amended) and species which are indicators of important and uncommon plant communities. Plant nomenclature follows *New Flora of the British Isles 3<sup>rd</sup> Edition* (Stace, 2010).
- 2.2.7 Searches were carried out for the presence of invasive species, including those listed on Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended), including Japanese Knotweed (*Fallopia japonica*), Indian Balsam (*Impatiens glandulifera*) and Giant Hogweed (*Heracleum mantegazzianum*).

## 2.3 Animal Life

### Badger

- 2.3.1 A thorough search for badger activity was carried out. The survey area covered the site (as annotated on **Figure 8.1**) and extended to the accessible land within a radius of 50 metres from the site boundary. Private gardens were excluded from the survey.
- 2.3.2 Surveys were conducted in accordance with guidance presented with *Badgers and Development* (Natural England, 2007) and *Badgers: surveys and mitigation for development projects* (Natural England, 2015).
- 2.3.3 The following signs of badger activity were searched for:
  - a. Setts entrances, e.g. entrances that are normally 25 to 35cm in diameter and shaped like a 'D' on its side;
  - b. Large spoil heaps outside sett entrances;
  - c. Bedding outside sett entrances;
  - d. Badger footprints;
  - e. Badger paths;
  - f. Latrines;
  - g. Badger hairs on fences or bushes;



- h. Scratching posts; and
- i. Signs of digging for food.

2.3.4 All habitats within and surrounding the site were assessed in terms of their suitability for use by foraging and sheltering badger in accordance with their known habitat preferences as detailed in current guidance and *Badger* (Roper, 2010).

## Bat species

### Daylight Survey

#### Survey Personnel

- 2.3.5 The buildings were assessed for their suitability to support roosting bats by Mr Brian Robinson on the 3<sup>rd</sup> and 9<sup>th</sup> March 2016. Brian Robinson holds a Natural England Class Survey Licence WML CL18 (Bat Survey Level 2), Registration Number 2015-13161-CLS-CLS.
- 2.3.6 The surveyor's qualifications and experience meet the criteria as defined in the *Technical Guidance Series Competencies for Species Survey: Bats* (CIEEM, 2013).
- 2.3.7 The surveys were carried in accordance with standard methodology including the *Bat Mitigation Guidelines* (Mitchell-Jones, 2004), the *Bat Workers' Manual 3<sup>rd</sup> Edition* (Mitchell-Jones & Mcleish, 2004) and *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edn)* (Collins, 2016).

#### Buildings

- 2.3.8 An inspection of the external surfaces, walls and roofs of the buildings was carried out to find potential bat roosting habitat or accesses into internal areas where roosts may be present. Searches for evidence of bat presence in the form of droppings, urine stains, feeding signs, grease marks and other evidence were also carried out. The searches were assisted with the use of a powerful torch, binoculars and ladders.
- 2.3.9 The internal survey involved an examination of the accessible internal areas (including roof voids) to find roosting bats or evidence of past use of the buildings by bats such as droppings and prey remains.
- 2.3.10 A list of equipment used is detailed at **Table 2.1**, below:

**Table 2.1: Survey Equipment used during Daylight Bat Survey**

Ladders
LED Lenser P14 torch
Clulite CB2 hand lamps
Canon Ixus digital camera
8x20 binoculars
Video Borescope

- 2.3.11 The suitability of each building has been assessed in accordance with Table 4.1 of *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edn)*, (Collins, 2016), taking into account the presence of gaps suitable for access by bats, the presence of features suitable for use by roosting bats within the building (including crevice dwelling and species which can roost in the open in roof voids), and the suitability of the surrounding habitats for use by foraging and commuting bats.

#### Trees

- 2.3.12 A preliminary assessment of the trees within the site was conducted to assess their suitability for use by roosting bats, and to inform whether further surveys or precautionary measures were required at the site in respect of roosting bats.

- 2.3.13 Trees were assessed from the ground using binoculars and a high-powered torch. Each tree was searched for the presence of any of the following features:

*Woodpecker holes, rot holes, hazard beams, other vertical or horizontal cracks or splits in stems and branches, partially decayed platey bark, knot holes, man-made holes, tear-outs, cankers in which cavities have developed, other hollows or cavities, including butt-rots, double-leaders forming compression forks with included bark, gaps between overlapping stems or branches, partially detached Ivy (Hedera helix) with stem diameters in excess of 50mm and bat, bird or dormouse (Muscardinus avellanarius) boxes.*

- 2.3.14 Terms used to describe any features present follow (where possible) those outlined and described in *Bat Tree Habitat Key, 2<sup>nd</sup> Edition* (Andrews, H (ed), 2013).
- 2.3.15 Each feature was then examined by Mr Brian Robinson at height using (where suitable) ladders, a high-powered torch, rope access equipment and a video borescope.
- 2.3.16 Searches were carried out for bats, bat droppings (in, around or below the feature), odours emanating from the feature, audible squeaking at dusk, staining below the feature, and the presence of smoothed surfaces within the feature, indicative of regular passage by small mammals.
- 2.3.17 The requirement for further presence / absence surveys at each tree was then considered.

### **Habitat Assessment for Commuting / Foraging Bats**

- 2.3.18 Habitats within and adjacent to the site were assessed for their value and suitability for commuting and foraging bats in accordance with Table 4.1 of *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*, (Collins, 2016). Reference has been made using the following categories and descriptions / examples, presented at **Table 2.2**, below

**Table 2.2: Consideration of Suitability of Foraging and Commuting Habitat for Bats**

Suitability	Commuting Habitat	Foraging Habitat
Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats.	
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated 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 or patch of scrub.
Moderate	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 gardens.	Habitat that is linked to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Continuous, high-quality habitat that is well connected to the wider landscape and is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. Habitats close to and connected to known roosts.	High-quality habitat that is well-connected to the wider landscape and is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Habitats close to and connected to known roosts.

### **Roost Surveys: Dawn Re-entry Surveys**

- 2.3.19 Three dawn re-entry surveys were conducted at Buildings 1, 2 3 and 10, two surveys at Building 12, and one survey at 11. Surveyors, experienced in conducting bat surveys, were positioned at suitable locations to maximise the coverage of the buildings to determine any entry into the buildings by bats. Heterodyne detectors were used to determine any bat detected to species. Anabat SD2 and Anabat Express units were used to record and analyse echolocation calls after the survey using AnalookW Bat call analysis software.

- 2.3.20 Dawn surveys commenced approximately 1.5 hours before sunrise and ended at sunrise, provided all bat activity had ceased by this point. All surveys were conducted under suitable conditions. The dates of the surveys conducted to date, surveyors and equipment used and weather conditions present are appended at **Table 9.1**.

### ***Transect Activity Surveys***

- 2.3.21 Four transect surveys have been conducted at the site between May and September 2016. The survey dates, weather conditions, surveyors and equipment used are appended at **Table 9.6**.
- 2.3.22 Three transect routes were walked on each survey occasion. Transect routes, as shown on **Figure 9.5**, were plotted to encompass the variety of habitats within the site and its surrounds.
- 2.3.23 The walked transect surveys were conducted from dusk until around two hours after sunset.
- 2.3.24 Heterodyne detectors and recording detectors (Anabat SD2's and Anabat Express Units) were used to detect bats and identify them to species.
- 2.3.25 Point count surveys were conducted along each transect route. All bat activity was recorded at pre-determined and evenly spaced listening-points over five minute intervals. Bat counts were made by counting the number of bat passes by each species detected. In order to ensure consistence of recording, each five minute point count was split into ten second internals; a bat 'pass' has been defined as any bat activity detected within each ten second interval. Therefore the total number of bat passes which could be recorded during one point count location is 30<sup>1</sup>.

### ***Automated/Static Surveys***

- 2.3.26 Anabat Express Units were deployed at three locations to detect bat activity remotely four five nights in May, June, July and September 2016. The locations of the three remote detectors are presented in **Figure 9.5**. Anabat Express 1 was placed in the woodland in the south-western corner of the site, Anabat Express 2 was placed amongst the mature tree surrounding the miniature railway and Anabat Express 3 was positioned within the Harthill depot area.
- 2.3.27 The three Anabat Express units were placed at distinct points to provide a range of habitats within the site and surrounding area. It was considered that the placement of three units within the site provided sufficient information regarding bat usage of the site.
- 2.3.28 The aims of the survey were to determine the diversity of bat species which use the site and its surroundings, the frequency of that usage (i.e. each night, occasional usage, very occasional usage), and (as much as possible) determine the volume of usage (i.e. used by several bats all night; used by several bats over a short period; used by individual bats all night; used by individual bats occasionally).
- 2.3.29 Anabat files have been initially analysed using species-specific filters for common and soprano pipistrelle (*Pipistrellus pipistrellus* and *Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*) and *Myotis* species/brown long-eared bat (*Plecotus auritus*). The files have subsequently been checked individually to ensure the accuracy of the analysis.
- 2.3.30 The data collected by the Anabat Express units have been analysed as follows:
- Determining presence: i.e. to provide species list for the site and its surrounds. Recorded bat calls were identified to species level (where possible) to determine the range of species using the three locations; and
  - Measuring presence to give an activity index: bat call data was used to give an indication of the relative level of species presence at the three locations.

<sup>1</sup> (i.e. 5 mins = 300 (5 x 60) seconds. The total number of bat passes per species per point count is therefore 300 ÷ 10 = 30 passes.

- 2.3.31 In order to achieve point 'b', above, the frequency of Anabat recordings was counted by night, and the total amount of activity detected between the three locations compared.

### Bird species

- 2.3.32 Bird species observed and heard during the walkover survey conducted in December 2015 were recorded. In addition, Mr. Chris Swindells, an experienced ornithologist, recorded all visible and audible birds during two site visits conducted in August and September 2015 following the standard recording methodology and codes of the *British Trust for Ornithology (BTO) Common Bird Census* (Marchant, 1983).
- 2.3.33 Habitats throughout the site and immediate surrounding area were assessed for their value for roosting, feeding and nesting birds, as indicated by the amount of shelter, feeding value, woody vegetation structure and species diversity of tree and shrub species in the site.
- 2.3.34 The presence of any sign of barn owl within the buildings was searched for during the internal inspection of the buildings conducted on the 3<sup>rd</sup> and 9<sup>th</sup> March 2016. All buildings were searched for pellets, faecal splashes and feathers which may indicate use by roosting or nesting barn owl in accordance within *The Barn Owl Conservation Handbook* (Barn Owl Trust, 2012). In addition, the site was assessed in terms of its suitability to support barn owl as indicated by the presence of appropriate nest and/or roost sites in mature trees with large cavities or mounted nest boxes as well as Favourable foraging habitat in accordance with *Barn Owl Tyto alba Methodology and Techniques for use in Ecological Assessment* (Shawyer, 2011).

### Great Crested Newt

#### Initial Desktop Search for Ponds

- 2.3.35 In accordance with current Natural England guidance (English Nature, 2001) all ponds within an unobstructed 500 metres of a site should be considered for their suitability to support breeding great crested newts. The potential of the proposed development to impact upon any great crested newt population(s) whose breeding ponds are within 500 metres must be considered.
- 2.3.36 The search of habitats in the wider area up to a distance of 500 metres from the site boundary revealed the presence of six ponds, as detailed in **Table 2.3** and illustrated in **Figure 8.2**.

**Table 2.3: Ponds within 500 metres of the site**

Pond Reference	Grid Reference	Distance from Site Boundary	Location (refer to Figure 8.2)
1	SJ 40553 87602	120 metres	Within the Walled Garden to the east
2	SJ 40592 87599	170 metres	Within the Japanese Garden to the east
3	SJ 40763 87349	320 metres	Within Calderstones Park to the east
4	SJ 40910 87231	520 metres	Within Calderstones Park to the east
5	SJ 40358 87140	230 metres	South of Allerton Road
6	SJ 39563 87360	470 metres	North of The University of Liverpool Athletic Ground

## Consideration of Requirements for Further Survey

2.3.37 The requirement for further survey at each pond was then assessed using the following criteria:

- Presence of dispersal barriers to great crested newt movements between ponds and the site, as detected during the walkover survey;
- Distance of ponds from the site;
- Potential influence of the proposed development of the site on any populations of great crested newt (if present at ponds), using the Natural England rapid risk assessment tool; and
- Presence of other ponds which may form metapopulations and/or alter the influence of the site on ponds at greater distances.

### Presence of Dispersal Barriers

- 2.3.38 Ponds 1 and 2, within the Walled Garden and Japanese Garden respectively, are surrounded by a continuous wall. Any amphibian species within the Walled and Japanese Gardens are isolated and unlikely to be able to migrate towards the site. Furthermore, owing to the 0.6 metre high vertical pond bank, amphibians are unlikely to be able to access Pond 1 to breed.
- 2.3.39 Ponds 3 and 4 lie within Calderstones Park and are separated from the site by regularly mown grassland, and managed planting beds. Although it is considered unlikely that any newts would migrate through Calderstones Park due to the lack of favourable terrestrial habitat, there are no significant barriers to amphibian movement.
- 2.3.40 Pond 5 is located within the curtilage of a property south of Allerton Road which is bordered by a stone wall. It is considered unlikely that any newts would move between Pond 5 and the site due to the presence of the boundary wall around the pond and Allerton Road, which supports raised kerb stones.
- 2.3.41 Pond 6 is situated to the west of Mather Avenue, a busy dual carriageway that supports heavy traffic and raised kerb stones. Movement between Pond 6 and the site is considered highly unlikely due to the presence of Mather Avenue, a significant dispersal barrier.

### Consideration of Distance of Ponds from Site and Relative Size of Site

- 2.3.42 No pond is within 100 metres of the site. Three ponds, Ponds 1, 2 and 5, are located between 100 and 250 metres from the site, and the remaining ponds are between 250 and 500 metres from the site. **Table 2.4**, below, provides the results of the Natural England Rapid Risk Assessment tool from *Template for Method Statement to support application for licence under Regulation 53(2)(e) in respect of great crested newts Triturus cristatus. Form WML-A14-2* (Natural England, 2015).
- 2.3.43 The tool has been completed based on ponds at these distances, and the size of the development site. The rapid risk assessment tool assumes that great crested newt are present.

**Table 2.4: Rapid Risk Assessment Result**

Component	Likely effect	Notional offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	1 - 5 ha lost or damaged	0.4
Land >250m from any breeding pond(s)	5 – 10 ha lost or damaged	0.3
Individual great crested newts	No effect	0
	Maximum:	0.4
Rapid risk assessment result:	<b>AMBER: OFFENCE LIKELY</b>	

- 2.3.44 As such, given the proximity of Ponds 3 and 4 to the site and the lack of dispersal barriers between these ponds and the site, it has been considered necessary to further consider Ponds 3 and 4 in terms of their suitability for use by breeding great crested newt.

#### **Habitat Suitability Index Assessment**

- 2.3.45 Ponds 3 and 4 were assessed using the Habitat Suitability Index (HSI) (Oldham, et al., 2000). The ponds were examined with reference to the ten HSI scoring criteria, which are: **SI<sub>1</sub>**: Geographical location; **SI<sub>2</sub>**: Pond area; **SI<sub>3</sub>**: Pond drying; **SI<sub>4</sub>**: Water quality (as indicated by the diversity of aquatic plants and invertebrates); **SI<sub>5</sub>**: Shade; **SI<sub>6</sub>**: Waterfowl; **SI<sub>7</sub>**: Fish; **SI<sub>8</sub>**: Abundance of other ponds within a one kilometre radius; **SI<sub>9</sub>**: Quality of terrestrial habitat; and **SI<sub>10</sub>**: Macrophyte cover (i.e. aquatic and emergent plants). The survey was conducted in accordance with *ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom* (ARG UK, 2010).
- 2.3.46 The survey and assessment of ponds was carried out by Dr Nicola Wallbank. Nicola holds a Natural England Class Survey Licence WML-CL08 (Great Crested Newt Survey Level 1 ), Registration number 2015-17731-CLS-CLS.
- 2.3.47 The assessment followed guidance in relation to interpreting HSI scores, following the categorical scale shown at **Table 2.5**.

**Table 2.5: Pond Habitat Suitability Index Categories**

HSI Score	Pond Suitability for Great Crested Newt
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

#### **Assessment of Terrestrial Habitat**

- 2.3.48 An assessment of the terrestrial habitat within the site for great crested newts was also conducted, as informed by the *Great Crested Newt Mitigation Guidelines* (English Nature, 2001) and the *Great Crested Newt Conservation Handbook* (Langton, 2001).
- 2.3.49 Habitats present within the site were assessed for their value to support foraging, sheltering and hibernating great crested newt. Favourable habitats can comprise rough grassland, scrubland, woodland and sites with underground crevices or cracks, such as mammal holes, voids in tree stumps or banks, and refugia such as rock piles or dead wood.

#### **Invertebrates**

- 2.3.50 The site was assessed for its potential to support notable invertebrate assemblages as indicated by the presence of habitat features such as heathland, bogs, mire, ancient woodland, water bodies, floristic diversity and deadwood.

#### **Reptile species**

- 2.3.51 The site and its surroundings were assessed in terms of their suitability for use by reptile species using the important characteristics for reptiles outlined in the draft document '*Reptile Mitigation Guidelines*' (Natural England, 2011), and the *Reptile Habitat Management Handbook* (Edgar, et al., 2010). These habitat characteristics are outlined in **Table 2.6**.



**Table 2.6: Important Habitat Characteristics for Reptiles**

1. Location (in relation to species range)	7. Connectivity to nearby good quality habitat
2. Vegetation Structure	8. Prey abundance
3. Insolation	9. Refuge opportunity
4. Aspect	10. Hibernation habitat potential
5. Topography	11. Disturbance regime
6. Surface geology	12. Egg-laying site potential

### Riparian Mammals

- 2.3.52 There are no watercourses on site or within 500 metres of the site. In addition, there are no ditches on site or within the surrounding landscape that have connectivity with the sites. Therefore, the presence of riparian mammals is reasonably discounted.

### Other Wildlife

- 2.3.53 The site was assessed for its suitability for use by notable species (i.e. Priority Species) associated with suburban landscapes such as hedgehog (*Erinaceus europaeus*) and common toad (*Bufo bufo*).

## 2.4 Survey Limitations

- 2.4.1 The survey was conducted in December, outside the optimum Phase 1 Habitat Survey period (April to October inclusive) and, as a result, not all plant species were identifiable. However, the different Phase 1 Habitat types can be reliably determined at any time of year, and the habitats within the site are intensively managed. It is concluded that a suitable and reasonable assessment of the habitats within the site was possible in December 2015. In addition, examination of the site between May and September confirmed that all identified plant communities and assessment remain applicable and valid.
- 2.4.2 The initial daylight inspections were conducted when bats are typically inactive, and any signs field signs of bats would be likely to have weathered from the external elevations of the buildings. However, daylight inspections can be conducted at any time of year, and it is considered that a reasonable assessment of the buildings in terms of their suitability for use by roosting bats was possible.
- 2.4.3 Several of the buildings were inaccessible internally (i.e. Buildings 4, 5, 6, 7, 8, and areas of Building 11 and Building 12); this has been taken into consideration when assessing the need for further surveys at these buildings.
- 2.4.4 An area of Building 1 was inaccessible due to water damage, and several roof voids have no access hatch. Again, these access restrictions have been taken into consideration when planning the scope of the bat activity surveys.
- 2.4.5 The Anabat Express (AE) unit deployed at Location 1 (refer to **Figure 9.10**) failed to record on 1 night in May, at Location 2 the AE unit failed to record during second survey repetition in June and at Location 3 the AE failed to record during two nights in May and one night in September. However, data were collected during at least 15 nights at each location. It is considered that the data collected provides sufficient information relating to the species of bats present, the abundance of bats using the site, spatial distribution of bat activity on site, and presence / absence of important commuting / foraging routes during the peak bat activity period.

## 2.5 Evaluation Methodology

- 2.5.1 The habitats, vegetation and animal life were evaluated with reference to standard nature conservation criteria as described in *A Nature Conservation Review* (Ratcliffe, 1977) and *Guidelines for the Selection of Biological SSSIs* (Bainbridge, et al., 2013). These are size (extent), diversity, naturalness, rarity, fragility, typicality, recorded history, position in an ecological or geographical unit, potential value and intrinsic appeal.



- 2.5.2 Habitats have been assessed to determine whether they meet those described in *UK Biodiversity Action Plan: Priority Habitat Descriptions* (Maddock, A (ed), 2008); these lists are used to help draw up the statutory lists of Priority Habitats, as required under Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006*. Where suitable, the ecological value of the habitats present have been assessed using the terms outlined in *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition* (CIEEM, 2016).
- 2.5.3 Government advice on wildlife, as set out in the *National Planning Policy Framework* (Great Britain Department for Communities and Local Government, 2012) and associated government circulars has been taken into consideration. Legislation relating to protected species, such as those listed under Schedule 1 and Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and *The Conservation of Habitats and Species Regulations 2010* (as amended), is referenced where applicable, and any impacts to protected species are evaluated in accordance with current guidance.
- 2.5.4 The presence of any Priority Species, as listed under Section 41 of the *NERC Act 2006* is noted, and habitats are assessed in terms of their suitability and value for these species. The presence of habitats and/or species listed by the North Merseyside Biodiversity Action Plan has been taken into account in the evaluation of the site.

## 3.0 SURVEY RESULTS

### 3.1 Desktop Study

#### Site Designations

- 3.1.1 The site has no statutory designation for nature conservation and there are no statutory sites within one kilometre of the proposed development. Childwall Woods and Fields Local Nature Reserve and Allerton (Eric Hardy) Local Nature Reserve are within two kilometres of the site boundary. These sites have a diverse flora and support notable bird species such as linnet (*Carduelis cannabina*) and a range of butterfly species.
- 3.1.2 The site lies within the Site of Special Scientific Interest (SSSI) Impact Risk Zone for the Mersey Estuary SSSI, Special Protection Area (SPA), and Ramsar site which lie approximately 2.8 kilometres south-west of the site. These sites are designated for their sand and mudflats, large areas of saltmarsh and the importance for wildfowl.
- 3.1.3 Residential development within an already built up area is not listed as a category relevant to the impact zone of the SSSI/SPA/Ramsar sites. Therefore, consultation with Natural England in relation to this development proposal is not required.
- 3.1.4 The Calderstones Park Local Wildlife Site (LWS) (current) (refer to **Figure 8.2**) is immediately adjacent to the site's eastern boundary. The LWS is designated for its presence of one regionally important plant species, Bluebell (*Hyacinthoides non-scripta*), and four locally rare plant species, i.e. Dove's-foot Crane's-bill (*Geranium molle*), Hairy Brome (*Bromus ramosus*), Ivy-leaved Broomrape (*Orobancha hederaceae*), and Water Forget-me-not (*Myosotis scorpioides*) and the protected species great crested newt (*Triturus cristatus*) as well as its assemblages of breeding birds.
- 3.1.5 An additional three Local Wildlife sites are present within one kilometre of the site boundary. Details of each designated site are provided in **Table 3.1**.

**Table 3.1: Non-statutory Designated Sites within One Kilometre of the Site**

Name and Designation	OS Grid Reference	Distance From Site	Description
Land within Allerton Green Wedge	SJ 41239 86517	~600 metres to the south east	Comprises a mosaic of suburban habitats including deciduous woodland, a habitat of principal importance.
Childwall Woods and Fields and Black Wood LNR	SJ 41476 88470	~700 metres to the north east	The site comprises three priority habitats (lowland acid grassland, deciduous woodland, and unimproved neutral grassland) as well as Bluebell ( <i>Hyacinthoides non-scripta</i> ), a regionally rare species and additional 19 locally rare plant species.
Black Wood	SJ 41501 88016	~950 metres to the north east	Mature plantation woodland dominated by Beech ( <i>Fagus sylvatica</i> ) and Sycamore ( <i>Acer pseudoplatanus</i> ).

### Protected and Notable species

3.1.6 Details of protected species records within the one kilometre search are provided in **Table 3.2**.

**Table 3.2: Protected and Notable Species Records within One Kilometre of the Site**

Group	Species and Designation	Notes
Amphibians and Reptiles	Great crested newt ( <i>Triturus cristatus</i> ) WCAs5, S41	22 records between 1998 and 2008, the closest being ~450 metres south-east.
Terrestrial Mammals	Common pipistrelle ( <i>Pipistrellus pipistrellus</i> ) EPS, WCAs5, LBAP	10 records between 1980 and 2012, the closest being at Calderstones Park.
	Badger ( <i>Meles meles</i> ) PBA	16 records between 2010 and 2011, ~700m south.
	Brown hare ( <i>Lepus europaeus</i> ) S41	Two records between 1978 and 1980
	Daubenton's bat ( <i>Myotis daubentonii</i> ) EPS, WCAs5, LBAP	One record from 2002 at Calderstones Park.
	Hedgehog ( <i>Erinaceus europaeus</i> ) S41	Six field records between 1960 and 1982 the closest being a Calderstones Park.
	Noctule bat ( <i>Nyctalus noctula</i> ) EPS, WCAs5, S41, LBAP	Three records between 2007 and 2009 at Calderstones Park.
	Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> ) EPS, WCAs5, S41, LBAP	One record from 2009 Calderstones Park.
Birds	WCAs1 Barn owl ( <i>Tyto alba</i> ) one record from 1998 at Calderstones Park.  S41, LBAP Bulfinch ( <i>Pyrrhula pyrrhula</i> ), dunnoek ( <i>Prunella modularis</i> ), house sparrow ( <i>Passer domesticus</i> ), lesser spotted woodpecker ( <i>Dendrocopos minor</i> ), linnet ( <i>Linaria cannabina</i> ), reed bunting ( <i>Emberiza schoeniclus</i> ), skylark ( <i>Alauda arvensis</i> ), song thrush ( <i>Turdus philomelos</i> ), starling ( <i>Sturnus vulgaris</i> ), willow tit ( <i>Poecile montana</i> ).  LBAP House martin ( <i>Delichon urbicum</i> ), swift ( <i>Apus apus</i> ).	
Flowering Plants	Bluebell ( <i>Hyacinthoids non-scripta</i> ) (WCAs8, LBAP)	
Invertebrates	LBAP Azure damselfly ( <i>Coenagrion puella</i> ), blue-tailed damselfly ( <i>Ishnura elegans</i> ), common darter ( <i>Sympetrum striolatum</i> ), emperor dragonfly ( <i>Anax imperator</i> ), four-spotted chaser ( <i>Libellula quadrimaculata</i> ), southern hawker ( <i>Aeshna cyanea</i> ).	
<b>Key to Designation Codes:</b> EPS – European Protected Species under <i>The Conservation of Habitats and Species Regulations 2010</i> (as amended); LBAP – Priority species within the North Merseyside Biodiversity Action Plan PBA – Legally protected under the <i>Protection of Badgers Act 1992</i> S41 – Species of principal importance for conservation, as listed under Section 41 of the <i>NERC Act 2006</i> ; and WCAs5 – Legally protected under Schedule 1 of the <i>Wildlife and Countryside Act 1981</i> (as amended)		

## 3.2 Vegetation and Habitats

### General Description

- 3.2.1 The approximately 8.5 hectare site is located in a suburban area of Liverpool and comprises deciduous woodland, mature trees, hedgerows, scrub, tall ruderals, semi-improved, improved and amenity grassland, ornamental shrubs, hard standing and buildings.
- 3.2.2 The northern and eastern boundaries are undefined by fencing etc; beyond these boundaries lie further areas of parkland. Allerton Road and residential housing lie adjacent to the southern site boundary. Harthill Road defines the western boundary, beyond which lies Calderstones School.
- 3.2.3 A Phase 1 Habitat Survey map is appended at **Figure 8.1**. Photographs are appended at **Table 8.1**.

### Broadleaved Woodland

- 3.2.4 Broadleaved woodland surrounds the Beechley Riding school (**Photograph 8.1**). The canopy predominately comprises abundant Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus sylvatica*), frequent Lime (*Tilia* sp.) and Ash (*Fraxinus excelsior*), as well as locally frequent Hazel (*Corylus avellana*). The field layer comprises abundant Holly (*Ilex aquifolium*) and Elder (*Sambucus nigra*). The understory comprises dominant Ivy (*Hedera helix*), and frequent Common Nettle (*Urtica dioica*) and Pendulous Sedge (*Carex pendula*), locally frequent Bluebell (*Hyacinthoides non-scripta*) and Snowdrop (*Galanthus nivalis*) as well as occasional Wood Avens (*Geum urbanum*). A plant species list is appended at **Table 8.2**.

### Hedgerows

- 3.2.5 Three hedgerows are present within the site. Hedgerow survey data (plant species lists and assessment under *The Hedgerow Regulations 1997*) are appended at **Tables 8.3** and **8.4**.

#### Hedgerow 1

- 3.2.6 Hedgerow 1 is situated adjacent to the western fence line that borders the Harthill Depot (**Photograph 8.2**) and is approximately 130 metres long, 0.5 metres wide, and 1.5 metres high. The hedgerow comprises dominant Hawthorn (*Crataegus monogyna*), abundant Holly, occasional Elder as well as non-native species such as Garden Privet (*Ligustrum ovalifolium*). The understory consists of locally abundant Ivy.
- 3.2.7 This hedgerow is characteristic of the *W21 Crataegus monogyna-Hedera helix* scrub community of the NVC (Rodwell, 1991).

#### Hedgerow 2

- 3.2.8 Hedgerow 2 lies adjacent to part of the northern boundary between the Harthill allotment gardens and the site (**Photograph 8.3**). This hedgerow is approximately 60 metres long, one metre wide, and 1.5 metres high. The hedgerow comprises Garden Privet and has no understorey flora.
- 3.2.9 Hedgerow 2 is not representative of semi-natural habitat and therefore is not characteristic of any NVC community.

#### Hedgerow 3

- 3.2.10 Hedgerow 3 is situated on the western boundary of the Harthill Depot (**Photograph 8.4**) and is approximately 50 metres long, one metre wide, and 2 metres high. This hedgerow is comprised entirely of ornamental species.
- 3.2.11 Hedgerow 3 is not representative of semi-natural habitat and therefore is not characteristic of any NVC community.

### Scrub, Semi-improved grassland and Tall ruderals

- 3.2.12 Surrounding the Harthill Depot is a mosaic of dense scrub, grassland, and tall herbs (**Photograph 8.5**). These habitats are characterised by abundant Bramble (*Rubus fruticosus* agg.), frequent Common Ragwort (*Senecio jacobaea*), Common Nettle, and Broadleaved Dock (*Rumex obtusifolius*), as well as occasional Common Figwort (*Scrophularia nodosa*), Yarrow (*Achillea millefolium*), Butterfly-bush (*Buddleja davidii*), Spear Thistle (*Cirsium vulgare*), Dove's-foot Crane's-bill (*Geranium molle*), Vetch species (*Vicia* sp.) and Wild Teasel (*Dipsacus fullonum*). A plant species list is appended at **Table 8.5**.
- 3.2.13 The vegetation holds characteristic of the W24 *Rubus fruticosus* agg.– *Holcus lanatus* underscrub community of the NVC (Rodwell, 1991).

### Parkland and Scattered Trees

- 3.2.14 A large proportion of the site comprises parkland which contains a mixture of native and non-native tree species (**Photographs 8.6** and **8.7**). Native species include Beech (*Fagus sylvatica*), Ash, Horse-chestnut (*Aesculus hippocastanum*), Sweet Chestnut (*Castanea sativa*), Sycamore (*Acer pseudoplatanus*), Lime (*Tilia* sp.), Silver Birch (*Betula pendula*) and Pedunculate Oak (*Quercus robur*).
- 3.2.15 This habitat is not representative of semi-natural habitat and is therefore not characteristic of any NVC community.

### Semi-improved Grassland

- 3.2.16 Areas of neutral semi-improved grassland adjacent to Harthill Depot (**Photograph 8.8**), Beechley and Calderkids Adventure playground (**Photograph 8.9**) are characterised by frequent Perennial Rye-grass (*Lolium perenne*), Annual Meadow-grass (*Poa annua*), and White Clover (*Trifolium repens*), very locally abundant Common Vetch (*Vicia sativa*), locally frequent False Oat-grass (*Arrhenatherum elatius*), Red Fescue (*Festuca rubra*), Cock's-foot (*Dactylis glomerata*), Yorkshire-fog (*Holcus lanatus*), Ribwort Plantain (*Plantago lanceolata*), White Clover (*Trifolium repens*) Raspberry (*Rubus idaeus*), Red Bartsia (*Odontites vernus*), Red Clover (*Trifolium pratense*) and Common Bird's-foot-trefoil (*Lotus corniculatus*).
- 3.2.17 This grassland has affinities with the MG1 *Arrhenatherum elatius* and MG7 *Lolium perenne* ley grasslands of the NVC (Rodwell, 1992). A plant species list is appended at **Table 8.6**.

### Improved Grassland

- 3.2.18 Four horse paddocks are present within the site to the north and east of Beechley (**Photographs 8.10** to **12**). These improved grasslands are dominated by Perennial Rye-grass, with frequent White Clover, Dandelion (*Taraxacum officinale* agg.), and Creeping Buttercup (*Ranunculus repens*).
- 3.2.19 This grassland is characteristic of an MG7 *Lolium perenne* ley grassland of the NVC. A plant species list is appended at **Table 8.7**.

### Tall Ruderals

- 3.2.20 An area of tall ruderals is present to the west of Beechley Stables (**Photograph 8.13**) which comprises abundant Hogweed (*Heracleum sphondylium*) and Common Nettle, frequent Cleavers (*Galium aparine*), Ribwort Plantain and Rosebay Willowherb (*Chamerion angustifolium*), locally abundant Pendulous Sedge, locally frequent Butterfly-bush, as well as occasional Broad-leaved Dock.

This habitat is characteristic of the OV24 *Urtica dioica*-*Galium aparine* tall-herb community of the NVC (Rodwell, 2000). A plant species list is appended at **Table 8.8**.

## Amenity Grassland

- 3.2.21 Areas of amenity grassland are frequent across the site (**Photograph 8.14**). This habitat is characterised by dominant Perennial Rye-grass, frequent White Clover, locally frequent Daisy (*Bellis perennis*) and Red Fescue.
- 3.2.22 The amenity grassland is characteristic an *MG7 Lolium perenne* ley grassland community of the NVC (Rodwell, 1992). A plant species list is appended at **Table 8.9**.

## Invasive Species

- 3.2.23 As illustrated on **Figure 8.1** a small stand of Japanese Knotweed (*Fallopia japonica*) is present within the site adjacent to Calderkids Adventure Playground. In addition, very local stands of Rhododendron (*Rhododendron ponticum*) and Indian Balsam (*Impatiens glandulifera*) were detected within the Harthill Depot. All three species are listed on Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) which make it an offence to spread or cause the spread of these species in the wild.

## 3.3 Animal Life

### Badger

- 3.3.1 The entire site and all accessible areas within 50 metres of the site boundary were searched for evidence of badger activity; no setts or sign of badger were detected.
- 3.3.2 The areas of woodland and scrub in the southern half of the site is favourable habitat for foraging and sheltering badger, however, no evidence of this species was observed during the survey and the site has no direct habitat connectivity with the known records of badger to the south-east. The presence of this species has been reasonably discounted.

### Bat Species

#### Daylight Survey: Buildings

- 3.3.3 The findings of the daylight surveys conducted in March 2016 are summarised at **Table 3.3**. Detailed descriptions and photographs of each building are appended at **Tables 9.3** and **9.4**. A plan showing each building's location is presented at **Figure 9.1**.

**Table 3.3: Summary of Daylight Building Survey**

Building Reference	Brief Description	Field Signs of Bats Detected?	Suitable for use by Roosting Bats? <sup>1</sup>
1	Detached two-storey mansion building with extensive roof void and cellar.	Yes <sup>2</sup>	Yes; supports gaps suitable for access by bats and features suitable for use by roosting bats. The building appears to be of high suitability for use by roosting bats.
1a	Covered walkway with flat roof of bitumastic roofing felt.	No.	No; no gaps suitable for access and no suitable features for use by roosting bats.
1b	Single-storey annex with hipped roof of slate.	No.	Yes; gaps are present at the slate roofing, and lead to features suitable for use by roosting bats. The building section is of moderate suitability for use by roosting bats,
1c	Single-storey annex with hipped roof of slate.	No.	Yes; gaps are present at the slate roofing, and lead to features suitable for use by roosting bats. The building section is of moderate suitability for use by roosting bats,
2	Two-storey stables and office building with pitched	No.	Yes; gaps are present at the slate roofing, and lead to features suitable for use by

Building Reference	Brief Description	Field Signs of Bats Detected?	Suitable for use by Roosting Bats? <sup>1</sup>
	roof of slate. No void present.		roosting bats. The building is of high suitability for use by roosting bats.
3	Single-storey detached building used as an activity centre with tile roof (hipped and pitched sections) and two roof voids.	No.	Yes; gaps are present at the slate roofing, and lead to features suitable for use by roosting bats. The building is of high suitability for use by roosting bats.
4	Small, timber, pre-fabricated outbuilding with a flat roof of bitumastic roofing felt.	No.	No; the building is unsuitable for use by roosting bats.
5	Metal storage container.	No.	No; the building is unsuitable for use by roosting bats.
6	Outbuilding constructed from concrete panels with single-pitch roof of bitumastic roofing felt.	No.	No; the building is unsuitable for use by roosting bats.
7	Outbuilding constructed from mortared stone with flat roof of bitumastic roofing felt.	No.	No; the building is unsuitable for use by roosting bats.
8	Outbuilding constructed from mortared blockwork with a single-pitch roof of bitumastic roofing felt.	No.	No; the building is unsuitable for use by roosting bats.
9	Outbuilding constructed from mortared brickwork with a single-pitch roof of slate.	No.	No; the building is unsuitable for use by roosting bats.
10	Single-storey stable building of mortared stone and brickwork with single-pitch roof of bitumastic roofing felt.	No.	Yes; the building is of moderate suitability for use by roosting bats.
11	Canopy roof over manege with small office building at northern end	No.	Yes; the building is of low suitability for use by roosting bats.
12	Former activity hut constructed from concrete panels walls with a pitched roof of bitumastic roofing felt.	No.	Yes; the building is of moderate suitability for use by roosting bats.
<sup>1</sup> The suitability of each building has been assessed in accordance Table 4.1 of <i>Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)</i> , (Collins, 2016); and <sup>2</sup> One dropping detected in roof void (refer to <b>Figure 9.1</b> and <b>Photograph 9.15, Table 9.2</b> )			

- 3.3.4 In summary, one old dropping was detected at a roof void at Building 1. No other signs of bats were detected at any of the buildings. Features suitable for use by roosting bats were identified at Buildings 1, 2, 3, 10, 11 and 12.

### Trees

- 3.3.5 Twenty trees were identified during the Phase 1 Habitat Survey as having suitable features for roosting bats. Details and photographs of each tree are appended at **Table 9.5**, and their locations are annotated on **Figure 8.1**.



- 3.3.6 Four trees (**Tree 2, 15, 18 and 20**) will be removed as part of the proposed development. These four trees were investigated at height using a high-powered torch and video borescope.

*Tree 2 (Sweet Chestnut)*

- 3.3.7 A single Sweet Chestnut in the Harthill Depot (Tree 2 on **Figure 8.1** and **Table 9.5**) supports a crack on an upper lateral branch (Feature 1), a rot hole on the main stem (Feature 2), and a tear-out (Feature 3) which appeared from the ground to be suitable for use by roosting bats.
- 3.3.8 Feature 1 is at 3 metres from ground level on the southern elevation and is approximately 50 by 5 centimetres in size. Feature 2 is at 2.5 metres from ground level on the eastern elevation and is approximately 10 by 5 centimetres in size. Feature 3 is at 2 metres from ground level on the northern elevation and is approximately 50 by 20 centimetres.
- 3.3.9 No bats were identified within any of these features during the examination at height and all three were relatively shallow and extended less than 1 centimetre within the tree.

*Tree 15 (Yew)*

- 3.3.10 A Yew (Tree 15 on **Figure 8.1** and **Table 9.5**) in the south-west corner of the site supports a split on the main stem on the eastern elevation at 0.5 metres from ground level, is approximately 50 by 5 centimetres in size. No bats or signs of bat were detected at the feature. No droppings were present at the base of the tree or within the internal space. The entry/exit point of the split had not been smoothed by the regular passage of animals.

*Tree 18 (Sweet Chestnut)*

- 3.3.11 A Sweet Chestnut (Tree 18 on **Figure 8.1** and **Table 9.5**) in the children's playground supports a split on the main stem on the northern elevation at 2 metres from ground level which is approximately 1.5 by 0.05 metres in size. No bats or signs of bat were detected at the feature when examined at height and supports on a shallow space with extended less than 1 centimetre within the tree.

*Tree 20 (Beech)*

- 3.3.12 A Beech (Tree 20 on **Figure 8.1** and **Table 9.5**) adjacent to the western boundary supports one knot hole on the main stem on the south-western elevation at 4.5 metres which is approximately 5 by 5 centimetres in size. When examined at height this features was too shallow to support roosting bats.
- 3.3.13 The presence of roosting bats at Trees 2, 15, 18 and 20 is reasonably discounted. Best practice precautionary measures for the protection of wildlife during the removal of trees are described at **Section 5.0**.
- 3.3.14 The remaining 16 trees identified as having features suitable for roosting bats are being retained as part of the proposed development.

***Commuting / Foraging Bats***

- 3.3.15 Habitats within the site are considered to have moderate suitability for foraging and commuting bats in accordance with the criteria listed in **Table 2.2**, particularly the areas of woodland in the south-west and mature tree lines to the north-east.

***Dusk Emergence / Dawn Re-entry Surveys***

- 3.3.16 The results of the dawn re-entry surveys at Buildings 1, 2, 3, 10, 11 and 12 are summarised at **Table 3.4**, below.



**Table 3.4: Summary of Dawn Re-entry Surveys to Date**

Date	Repetition	Building Reference	Results of Survey
17 <sup>th</sup> May 2016	1	1	No re-entry activity detected
		2	No re-entry activity detected
		10	No re-entry activity detected
24 <sup>th</sup> May 2016	1	3	No re-entry activity detected
		11	No re-entry activity detected
3 <sup>rd</sup> June 2016	1	12	No re-entry activity detected
29 <sup>th</sup> June 2016	2	3	No re-entry activity detected
30 <sup>th</sup> June 2016	2	1	No re-entry activity detected
		2	A single common pipistrelle entering <b>Roost 2.1</b> (refer to <b>Figure 9.5</b> ) at 04.11
		10	No re-entry activity detected
6 <sup>th</sup> July 2016	2	12	No re-entry activity detected
29 <sup>th</sup> July 2016	3	3	No re-entry detected
18 <sup>th</sup> August 2016	3	1	No re-entry detected
		2	A single common pipistrelle entering <b>Roost 2.1</b> at 05.46 and Two common pipistrelle entering <b>Roost 2.2</b> (refer to <b>Figure 9.8</b> ) at 05.34
		10	No re-entry activity detected

- 3.3.17 A single common pipistrelle was observed re-entering Building 2 at its southern elevation during the second and third survey repetition, at a gap between the wall top and the soffit box (**Roost 2.1**, refer to **Figures 9.5** and **9.8** and **Photograph 9.61**)
- 3.3.18 Two common pipistrelle were observed re-entering Building 2 at its southern elevation during the third survey repetition, at a hole in the brick work (**Roost 2.2**, refer to **Figure 9.8** and **Photograph 9.62**).
- 3.3.19 Raw data are presented at **Section 9.4**, and **Figures 9.2** to **9.9** show all observed bat activity.

#### ***Transect Activity Surveys***

- 3.3.20 The following bat species/species groups were recorded foraging and commuting on-site during the transect activity surveys:
- a. Common pipistrelle (*Pipistrellus pipistrellus*);
  - b. Soprano pipistrelle (*Pipistrellus pygmaeus*);
  - c. *Myotis* species; and
  - d. Noctule (*Nyctalus noctula*)
- 3.3.21 The transect routes and position of the points count locations are illustrated on **Figure 9.10**.
- 3.3.22 The survey results from each transect survey conducted in May, June and July 2016 are summarised at **Tables 3.5, 3.6** and **3.7**.

**Table 3.5: Summary of Survey Results at Transects 1, 2 and 3, 1<sup>st</sup> Survey Repetition**

Transect Reference	Summary of Findings
Transect 1	<p><i>Refer to Table 9.7</i></p> <p>Common pipistrelle were recorded between 21:06 and 23:00, with activity detected at 29 of the 39 point counts made. The most abundant activity was detected at Point 1.A (109 passes), and least amount of activity was detected at Point 1.C (11 passes). A total of 169 common pipistrelle passes were recorded.</p> <p>Noctule recorded was once at 21:06 at 1.D.</p> <p><i>Myotis</i> species recorded once at 21:31 at 1.C.</p> <p>No other species were detected.</p>
Transect 2	<p>Common pipistrelle were recorded between 21:19 and 22:37, with activity detected at 10 of the 40 point counts made. The most abundant activity was detected at Points 2.C and 2.D (8 passes each) with the least activity at Point 2.E (absent). A total of 21 common pipistrelle passes were recorded.</p> <p>Soprano pipistrelle was recorded once at 21:50, at Point 2.D.</p> <p>No other species were detected.</p>
Transect 3	<p>Common pipistrelle were recorded between 21:11 and 22:48, with activity detected at 27 of the 33 counts made. The most abundant activity was detected at Point 3.D (30 passes on two counts) and the least at Point 3.B (1 common pipistrelle recorded). A total of 125 common pipistrelle passes were recorded.</p> <p>No other species were detected.</p>

**Table 3.6: Summary of Survey Results at Transects 1, 2, and 3, 2<sup>nd</sup> Survey Repetition**

Transect Reference	Summary of Findings
Transect 1	<p><i>Refer to Table 9.8</i></p> <p>Common pipistrelle were recorded between 21.45 and 23.42, with activity detected at 21 of the 40 point counts made. The most abundant activity was detected at Point 1.D (92 passes), and the least amount of activity was detected at Point 1. A (3 passes). A total of 188 common pipistrelle passes were recorded.</p> <p>A total of five soprano pipistrelle passes recorded detected: three at Point 1.D and two at Point 1.E.</p> <p><i>Myotis</i> species recorded once at 22.11 at Point 1.E.</p> <p>No other species were detected.</p>
Transect 2	<p>Common pipistrelle recorded between 22.14 and 23.14, with activity detected at 9 of the 20 counts made. The most abundant activity was detected at Point 2.A (62 passes), and the least amount of activity was detected at Point 2.C (absent). A total of 88 common pipistrelle passes were recorded.</p> <p>One soprano pipistrelle pass was detected at 22.50 at Point 2.B.</p> <p>No other species were detected.</p>
Transect 3	<p>Common pipistrelle recorded between 21.52 and 23.43, with activity detected at 20 of the 32 counts made. The most abundant activity was detected at Point 3.D (43 passes), and the least amount of activity was detected at Point 3.B (1 pass). A total of 144 common pipistrelle passes were recorded.</p> <p>Soprano pipistrelle was recorded between 22.13 and 23.43, with activity detected at 11 of the 32 counts made. The most abundant activity was detected at Point 3.G (17 passes), and the least amount of activity was detected at Points A and B (absent). A total of 37 soprano pipistrelle passes were recorded.</p> <p>One Noctule pass was recorded at 23.02 at Point 3.E and 22.23 at Point 3.B.</p> <p>No other species were detected.</p>

**Table 3.7: Summary of Survey Results at Transect 1, 2, and 3, 3<sup>rd</sup> Survey Repetition**

Transect Reference	Summary of Findings
Transect 1	<p><i>Refer to Table 9.9</i></p> <p>Common pipistrelle was recorded between 21.21 and 23.12, with activity detected at 30 of the 40 counts made. The most abundant activity was detected at Point 1.C (49 passes), and the least amount of activity was detected at Point 1.B (24 passes). A total of 211 common pipistrelle passes were recorded.</p> <p>Soprano pipistrelle was recorded between 21.33 and 22.43, with activity detected at five of the 40 counts made. The most abundant activity was detected at Points 1.C and E (2 passes), and the least amount of activity was detected at Point A (absent). A total of six soprano pipistrelle passes were recorded.</p> <p>One noctule pass was recorded at 21.42 at Point 1.E and one <i>Myotis</i> species pass was recorded at 22.02 at Point 1.C.</p> <p>No other species were detected.</p>
Transect 2	<p>Common pipistrelle was recorded between 22.02 and 22.37, with activity detected at two of the 15 counts made. One common pipistrelle pass was detected at Point 2.C and three common pipistrelle passes were recorded at Point 2.B.</p> <p>No other species were detected.</p>
Transect 3	<p>Common pipistrelle was recorded between 21.32 and 23.13, with activity detected at 25 of the 32 counts made. The most abundant activity was at Point 3.G (32 passes), and the least amount of activity was detected at Point 3.A (2 passes). A total of 133 common pipistrelle passes were recorded.</p> <p>Soprano pipistrelle was recorded between 22.04 and 22.46, with activity detected at four of the 32 counts made. The most abundant activity was detected at Point 3.G (3 passes), no activity was detected at Points 3.A, B, C, D or F. A total of six soprano pipistrelle passes were recorded.</p> <p>Two brown long eared passes were detected at 21.41 at Point 3.F and at 23.13 at Point 3.H.</p> <p>No other species were detected.</p>

**Table 3.8: Summary of Survey Results at Transect 1, 2, and 3, 4<sup>th</sup> Repetition**

Transect Reference	Summary of Findings
Transect 1	<p><i>Refer to Table 9.10</i></p> <p>Common pipistrelle were recorded between 20.05 and 21.49, with activity detected at 25 of the 30 counts made. The most abundant activity was detected at Point 1.D (69 passes), and the least amount of activity was detected at Point 1. A (6 passes). A total of 201 common pipistrelle passes were recorded.</p> <p>Two noctule passes were recorded at 21.29 at Point 1.A.</p> <p>No other species were detected.</p>
Transect 2	<p>Common pipistrelle were recorded between 20.24 and 21.47, with activity detected at 10 of the 28 counts made. The most abundant activity was detected at Point 2.B (11 passes), and the least amount of activity detected at Points 2.A, D and E (1 pass). A total of 17 common pipistrelle passes were recorded.</p> <p>No other species were detected.</p>
Transect 3	<p>Common pipistrelle were recorded between 20.13 and 21.55, with activity detected at 21 of the 32 counts made. The most abundant activity was detected at Point 3.F (60 passes), and the least amount of activity detected at Points 3.B and H (2 passes).</p> <p>Two soprano pipistrelle passes were recorded at Point 3.A at 21.50.</p> <p>No other species were detected.</p>

### Analysis

- 3.3.23 A total of 1508 bat passes were recorded at all three transects during all four survey repetitions. The number of passes recorded at Transect 1 account for 52% (786 passes) of the total, those at Transect 2 account for 9% (132 passes) and those recorded at Transect 3 account for 39% (590 passes).

- 3.3.24 At Transect 1 the most frequent activity during all survey repetitions was recorded at Point 1.D, the least amount of activity was detected at Point 1.B. At Transect 2 most frequent activity was recorded at Point 2.A and the least amount activity was detected at Point 2.D and E. At Transect 3 the most frequent activity was recorded at Point 3.D and the least amount of activity at Point 3.B.
- 3.3.25 These results suggest activity is predominately associated with the woodland in the south-west corner of the site, the mature trees to the north of the Harthill depot as well as the tree line adjacent to the eastern boundary.

#### ***Automated/Static Surveys***

- 3.3.26 During the 18<sup>2</sup> nights of automated recording at Location 1, common pipistrelle were detected on every night (total of 3428 recordings), soprano pipistrelle were detected on seven nights (total of 48 recordings), Noctule and *Myotis* species were detected on five nights (total of 60 and 5 recordings respectively); and brown long-eared (*Plecotus auritus*) were detected on four nights (total of 7 recordings).
- 3.3.27 During the 15<sup>3</sup> nights of automated recording at Location 2, common pipistrelle were detected on six nights (total of 55 recordings) and noctule were detected on four nights (total of 37 recordings).
- 3.3.28 During the 17<sup>4</sup> nights of automated recording at location 3, common pipistrelle were recorded on all nights (total of 1313); noctule were detected on five nights (total of 27); one soprano pipistrelle pass was recorded on two nights, and a single brown long-eared contact was detected on one night.
- 3.3.29 The mean number of contacts detected at each location during each 15 minute interval across all sampling nights is appended at **Graphs 9.1, 9.2 and 9.3**.

#### ***Analysis***

- 3.3.30 Common pipistrelle accounted for the most frequent activity (detected on every survey night). Noctule, soprano pipistrelle, and *Myotis* species occurred occasionally (detected 9, 8 and 6 nights respectively). Brown long-eared were recorded on two nights.
- 3.3.31 The volume of usages at Location 1 in May and September remained fairly constant throughout the night (refer to **Graphs 9.1 and 9.4**). In June and July bat activity peaked just after sunset and before sunrise (refer to **Graphs 9.2 and 9.3**). The results suggest that the area is used as part of a regularly-used feeding territory and may form part of a commuting route for nearby roosts.
- 3.3.32 At Location 2 the volume of usage peaked two hours after sunset and before sunrise in July and September but remained very low during the remainder of the night (refer to **Graphs 9.3 and 9.4**). The sharp spike in activity just after sunset and before sunrise indicates that the area may form part of a commuting route to and from nearby roosts but is not used as a regular feeding territory.
- 3.3.33 At Location 3 during all survey repetitions bat activity peaked just after sunset and before sunrise (refer to **Graphs 9.1 and 9.4**). The results suggest that the area may form part of a commuting route to and from nearby roosts but is not used as a regular feeding territory.
- 3.3.34 Of the bat recordings detected at Location 1 during the 18 nights of recording, 97% were common pipistrelle, 2% were noctule, 1% were soprano pipistrelle and <1% were *Myotis* species and brown long-eared. Of those detected at Location 2, 60% were common pipistrelle and 40% were noctule. Of the bat recordings detected at Location 3, 98% were common pipistrelle, 2% were noctule, and <1% were soprano pipistrelle and brown long-eared.

<sup>2</sup> The batteries within the Anabat Express lost charge following the third night of recording on the second repetition

<sup>3</sup> The Anabat Express failed to record during the second repetition

<sup>4</sup> The batteries within the Anabat Express lost charge following the third night of recording on the first repetition and following the fourth nights on the fourth repetition

## Bird species

3.3.35 Birds detected in the site on 28<sup>th</sup> August, 26<sup>th</sup> September and 1<sup>st</sup> December 2015 are listed in **Table 3.9**.

**Table 3.9: Bird species Detected on 28<sup>th</sup> August, 26<sup>th</sup> September, and 1<sup>st</sup> December 2015**

Scientific Name	Common Name (number seen)	BOCC Status <sup>1</sup>	Priority Species?
<i>Accipiter nisus</i>	Sparrowhawk	Green	
<i>Carduelis carduelis</i>	Goldfinch	Green	
<i>Carduelis chloris</i>	Greenfinch	Green	
<i>Certhia familiaris</i>	Treecreeper	Green	
<i>Columba palumbus</i>	Wood pigeon	Green	
<i>Corvus corone</i>	Carrion crow	Green	
<i>Corvus monedula</i>	Jackdaw	Green	
<i>Cyanistes caeruleus</i>	Blue tit	Green	
<i>Dendrocopos major</i>	Great spotted woodpecker	Green	
<i>Erithacus rubecula</i>	Robin	Green	
<i>Fringilla coelebs</i>	Chaffinch	Green	
<i>Garrulus glandarius</i>	Jay	Green	
<i>Motacilla alba</i>	Pied wagtail	Green	
<i>Parus ater</i>	Coal tit	Green	
<i>Parus major</i>	Great tit	Green	
<i>Passer domesticus</i>	House sparrow	Red	Yes
<i>Pica pica</i>	Magpie	Green	
<i>Prunella modularis</i>	Dunnock	Amber	Yes
<i>Regulus regulus</i>	Goldcrest	Green	
<i>Sitta europaea</i>	Nuthatch	Green	
<i>Troglodytes troglodytes</i>	Wren	Green	
<i>Turdus merula</i>	Blackbird	Green	

1BOCC: Birds of Conservation Concern (Eaton, et al., 2015)

- 3.3.36 Birds associated with the tall-herb vegetation and ruderal herbs within the site were limited to feeding magpie, wren and robin. The trees and shrubs the site are suitable for nesting passerine birds and this is where the majority of the bird species listed above were observed and / or heard.
- 3.3.37 The site is subject to intense management and comprises parkland, woodland and scrub and, as a result, it does not contain habitats deemed suitable for use by ground nesting or wintering birds. In addition, the site does not contain any favourable foraging habitats for barn owl, such as rough grassland or suitable roosting features.
- 3.3.38 No signs of barn owl were detected anywhere within any of the buildings within the site and none of the trees on site support features suitable for roosting barn owl. The presence of roosting or nesting barn owl is reasonably discounted.
- 3.3.39 In summary, the habitats within the site provide moderate suitability for foraging and nesting passerine bird species and negligible suitability for ground nesting species.

## Great Crested Newt and other Amphibians

### Assessment of Ponds Within the Wider Area

- 3.3.40 There are no significant barriers to newt dispersal between Ponds 3 and 4 and the site. A Habitat Suitability Index (HSI) assessment of the ponds was conducted and the results are presented in **Table 3.10**.

**Table 3.10: Habitat Suitability Index Assessment for Ponds 3 and 4**

Criteria	Description	Pond 3	Score <sup>2</sup>	Pond 4	Score <sup>1</sup>
SI <sub>1</sub>	Location	Optimal	1.00	Optimal	1.00
SI <sub>2</sub>	Pond Area	>2000m <sup>2</sup>	N/A	200m <sup>2</sup>	0.40
SI <sub>3</sub>	Permanence	Never dries	0.90	Dries annually	0.10
SI <sub>4</sub>	Water Quality	Moderate	0.67	Moderate	0.67
SI <sub>5</sub>	Shade	5%	1.00	20%	1.00
SI <sub>6</sub>	Waterfowl	Major impact	0.01	Absent	1.00
SI <sub>7</sub>	Fish	Major impact	0.01	Absent	1.00
SI <sub>8</sub>	Pond count <sup>3</sup>	2/km <sup>2</sup>	0.80	2/km <sup>2</sup>	0.80
SI <sub>9</sub>	Terrestrial habitat	Poor	0.33	Poor	0.33
SI <sub>10</sub>	Macrophyte cover	5%	0.30	70%	1.00
<b>Assessment Result:</b>		<b>Poor</b>	<b>0.26</b>	<b>Average</b>	<b>0.61</b>
<sup>1</sup> Calculated by $(SI_1 \times SI_2 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/10}$					
<sup>2</sup> Calculated by $(SI_1 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/9}$					
<sup>3</sup> Ponds within an unobstructed one kilometre radius					

- 3.3.41 The assessment of Pond 3 is 'poor'. The score for the pond is most affected by the presence of fish and waterfowl as well as lack of macrophyte cover and favourable terrestrial habitat associated with the waterbody. The poor suitability of the pond is such that the presence of great crested newt is reasonably discounted.
- 3.3.42 The assessment of Pond 4 is 'average'. The suitability of this waterbody is most affected by its lack of shade, fish and waterfowl as well as its high macrophyte cover.
- 3.3.43 It is recognised that great crested newt records are reported at Pond 4. However, the presence of great crested newt and adverse effects on individual newts and their habitats as a result of the development proposals are reasonably discounted. Statements to support this conclusion are:
- There are no ponds on the site;
  - Pond 4 is located over 621 metres from the site. Therefore, the site lies outside the core/immediate habitat (habitat within 50 metres of a pond) and intermediate (habitat between 50 metres and 250 metres of a pond) associated with any ponds;
  - There are no ponds to the immediate west of the site, therefore there is a reduced likelihood that newts from ponds to the east of the site will traverse the site to access land to the west;
  - The intervening habitats between Pond 4 and the site comprise close, regularly mown grassland. There are no corridors of ponds or favourable terrestrial habitat to direct great crested newts from the ponds, particularly Pond 4, towards the site;
  - A continuous wall associated with the gallery buildings and Mansion House is present on the direct route between Pond 4 and the site. This wall acts as a barrier to amphibian movements;
  - Works at the operational depot comprise the stock piling but regular removal of stacked logs and mulch; none of these operations are conducive to sheltering amphibians; and
  - If the presence of great crested newts at Pond 4 was assumed and the Natural England Rapid Risk Assessment tool was applied, see **Table 3.11** below, an outcome of 'green: offence highly unlikely' occurs.

**Table 3.11: Rapid Risk Assessment for Pond 4**

Component	Likely effect	Notional offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	No effect	0
Land >250m from any breeding pond(s)	1 – 5 ha lost or damaged	0.04
Individual great crested newts	No effect	0
Maximum:		0.04
Rapid risk assessment result:	<b>GREEN: OFFENCE HIGHLY UNLIKELY</b>	

### Invertebrates

- 3.3.44 The mature trees within the site and its surrounds which contain dead wood have the potential to support a diversity of saproxylic fauna. In addition, the tall ruderal and scrub mosaic within the Harthill Depot is likely to act as a key source of nectar for various invertebrate species.

### Reptiles

- 3.3.45 All debris suitable for sheltering and basking reptiles was examined during the survey; no reptile species were detected. A description of the site in relation to the listed important habitats characteristics for reptiles is given below at **Table 3.12**.

**Table 3.12: Habitat Assessment of the Site for Reptiles**

Characteristic	Site Description
1. Location (in relation to species range)	No records of reptile species are present for the wider area.
2. Vegetation Structure	Varied. The site contains a mixture of trees, shrubs and grassland.
3. Insolation	The site is not shaded by its boundaries and is open.
4. Aspect	The site is more-or-less level.
5. Topography	The site has a more-or-less level topography.
6. Surface geology	The site has a varied surface geology, with areas of hardstanding, asphalt, and brown earth soils.
7. Connectivity to nearby good quality habitat	The site does not connect to areas of good quality habitat for reptiles as the site is surrounded by parkland and residential properties.
8. Prey abundance	The site contains suitable habitats for a variety of invertebrates including spiders, grasshoppers, crickets, bugs, flies, slugs and worms.
9. Refuge opportunity	The woodland and shrubs provide suitable refuges for sheltering reptiles.
10. Hibernation habitat potential	The root systems of mature trees provide suitable habitats for hibernating reptiles.
11. Disturbance regime	The majority of the site comprises intensively managed amenity habitats which are subject to regular disturbance.
12. Egg-laying site potential <sup>1</sup>	None
<sup>1</sup> Characteristic 12 is relevant to Grass snake and Sand lizard only	

- 3.3.46 In summary, the heavily managed habitats within the site provide poor quality habitat for sheltering, basking and hibernating reptiles. The site is not adjacent or linked to any areas of favourable habitat for reptile species. Furthermore, there are no records of reptile for the site or the wider area; the presence of reptiles within the site is reasonably discounted.



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## Other Wildlife

- 3.3.47 The woodland, shrubs and grassland within the site and its surrounds are suitable for foraging and sheltering hedgehog. In addition, this species has been recorded in the wider area.
- 3.3.48 The habitats on site are also suitable for supporting foraging and sheltering common toad. However, it is not deemed likely that the site is of significant conservation value to this species due to the due to the intense management of the amenity areas and lack of common toad records within the wider landscape.

## 4.0 EVALUATION AND ASSESSMENT

### 4.1 Description of Proposals

- 4.1.1 It is proposed to develop the site to housing, associated roads, hard standing and gardens, while retaining areas of woodland and parkland. To accommodate the new housing it is proposed to demolish Buildings 3, 4, 5, 6, 7, 8, 9, and 11. In addition, Buildings 1, 2, 10 and 12 will be converted to residential apartments.

### 4.2 Designated Sites

- 4.2.1 Calderstones Park LWS (current) lies immediately adjacent to the sites eastern boundary. This LWS is primarily designated for the presence of great crested newt and notable plant as well as bird species. As discussed in **Section 3.3** of this report the presence of great crested newt and their habitats within the site are reasonably discounted. The habitats within the Harthill depot area are not considered notable in regards to their plant species composition. Similarly, the birds associated with these habitats were limited to feeding magpie, wren and robin. The habitats at the sites eastern boundary will be retained and protected. In addition, potential adverse effects on the LWS can be further minimised through the implementation of an appropriate management plan for retained habitats to ensure longevity is conserved for wildlife.
- 4.2.2 As such, it is concluded that, provided the recommendations presented at **Section 5.0** of this report are adhered to, the proposals will have no negative impact upon the conservation status of the LWS.

### 4.3 Vegetation and Habitats

- 4.3.1 The grasslands within the site contain only common and widespread plant species. The NVC communities present are typical of the geographical area and conditions present.
- 4.3.2 The woodland present within the site contains Bluebell, a North Merseyside Local BAP Priority Species listed on Schedule 8 of the *Wildlife and Countryside Act 1981* (as amended).
- 4.3.3 The woodlands are Priority Habitats in accordance with Section 41 of the *NERC Act 2006*, and are of significant local value to wildlife such as bats and breeding birds. In addition, the mature trees and shrubs within the site are of value at site level as they add structural diversity and are suitable for use by breeding birds.

- 4.3.4 The site contains three hedgerows, one native (Hedgerow 1) and two ornamental (Hedgerow 2 and 3). The native hedgerow is a Priority Habitat. None of the hedgerows are 'important' in accordance with *The Hedgerow Regulations 1997*.
- 4.3.5 The areas of parkland within the site are Priority Habitat.
- 4.3.6 It is concluded that, provided the recommendations presented at **Section 5.0** of this report are adhered to, the proposals will have no negative impact upon Priority Habitats or features greater than site value.

#### 4.4 Protected Species and Other Wildlife

##### Bats

##### *Buildings*

- 4.4.1 Re-entry surveys at the buildings have detected one common pipistrelle entering a gap between the wall top and soffit box and two common pipistrelle entering a hole in the brick work at Building 2 on its southern elevation. These locations only lead to crevices limited in size therefore, based on the number of bats present at each roost and the time of year the surveys were carried out it is concluded that these two roosts are summer day roosts. No evidence of a maternity roost has been detected.
- 4.4.2 No evidence of rare or locally distributed bat species have been recorded at this site. All bat species recorded roosting and foraging at this site are typical to the local area. Common pipistrelle is described as 'common' throughout the UK as confirmed by the National Bat Monitoring Programme surveys carried out by the Bat Conservation Trust (BCT).
- 4.4.3 Based on the structure of the buildings and conditions present, use of the site by hibernating bats is not reasonably likely.
- 4.4.4 No bats were observed entering Building 1, surveys were conducted in suitable conditions at optimal times throughout the bat active season. Conditions at Building 1 are thought to have changed significantly over the past three years as the building was once an active care home but has been derelict since 2013. As no bat activity was detected at Building 1 and the conditions at the building have altered in recent years, it is concluded that the single old dropping detected in the loft of Building 1 is indicative of a historic day roost or of a bat simply entering the building to forage. From the survey evidence it is reasonable to conclude a bat roost is not present at Building 1.
- 4.4.5 The detection of two bat day roosts of a common species at Building 2 does not preclude the development proposals.
- 4.4.6 In the absence of mitigation, the predicted scale of impact is assessed to be low at a local scale as a result of the loss of two small Common Pipistrelle summer day roosts.
- 4.4.7 In the presence of mitigation (appropriate timing, application of careful procedures during the works and provision of suitable compensatory roost provisions) the impact on the bat species status at the site in the short-term is assessed to be low.
- 4.4.8 In the long-term, the impact at the local level is assessed to be neutral as all bat species and roosting opportunities will be conserved at the site.

##### *Trees*

- 4.4.9 A licensed daylight inspection at height of trees scheduled for removal as part of the development proposals has confirmed the absence of suitable roosting features at Trees 2, 18 and 20. Although Tree 15 supports a cavity suitable for roosting bats no bats or signs of bats were observed.
- 4.4.10 An additional 16 trees which support features suitable for use by roosting bat are present within the site (refer to **Figure 8.1**). At the time of writing there are no proposals to affect these 16 trees.

### **Commuting / Foraging Bats**

- 4.4.11 The results of the transect and automated surveys confirm the site is utilised by commuting and foraging bats but is not significant in terms of volume of bat activity or species composition. The woodland in the south-west corner of the site and the mature tree line on the northern and eastern boundaries demonstrated the highest volume and frequency of bat activity. These features have been incorporated into layout of the development and will be retained and protected as part of the proposals. Therefore, it is considered that the proposals will have no negative impact upon commuting and foraging bats.

### **Birds**

- 4.4.12 The breeding bird surveys have identified the use of trees and shrubs within the site by passerine bird species including two Priority Species (house sparrow and dunnock). The proposed development will not result in the significant loss of trees or shrubs and suitable habitat will remain available within the site and its surrounding areas. Therefore, development at the site will not adversely affect the local bird population.

### **Hedgehog**

- 4.4.13 The site supports favourable foraging and sheltering habitat for hedgehog. The proposed development will retain the features considered to be of value to hedgehog such as the woodland in the south-west corner of the site. However, without consideration for hedgehog movement, the proposed development could create a barrier between the woodland and the wider area of Calderstones Park.

## **5.0 RECOMMENDATIONS AND ECOLOGICAL ENHANCEMENT**

### **5.1 Introduction**

- 5.1.1 The recommendations in this section aim to ensure that the development is implemented in accordance with all wildlife legislation, Natural England guidance, the principles of the National Planning Policy Framework (NPPF), local planning policy and best practice.
- 5.1.2 Where possible, opportunities to enhance the ecological interest and habitat connectivity and seek biodiversity gain through appropriate landscape planting and habitat creation have been identified and recommended below, as required by the NPPF and other relevant planning documents.
- 5.1.3 Recommendations are appropriate to the geographical area, the habitats in the wider area, the wildlife present in the local area (and likely to use the site post-construction) and take into consideration the end use of the site as a residential development.

### **5.2 Protection of Existing Vegetation and Recommendations in Relation to Site Layout**

- 5.2.1 The site layout has been designed to ensure the new buildings lie on the footprint of the existing depot, buildings and improved grassland only. This has minimised the number of trees scheduled for removal.
- 5.2.2 Hedgerow 1 should be retained and protected where possible. Where a section of hedgerow must be removed to facilitate the development, an equal or greater length of compensatory native hedgerow planting should be provided within the site boundary. Recommended species for compensatory hedgerow planting are presented at **Section 5.9**.
- 5.2.3 During the construction phase, temporary protective demarcation fencing will be used to protect the trees and shrubs that are to be retained. The fencing must extend outside the canopy of the retained trees and must remain in position until all plots have been developed to ensure protection is provided throughout the construction phase.

- 5.2.4 The fencing will be in accordance with BS5837:2012 *Trees in Relation to Design, Demolition and Construction: Recommendations* (BSI, 2012).

### 5.3 Habitat Connectivity

- 5.3.1 In addition to the landscape planting described in **Section 5.9**, it is recommended that the opportunities for continued movement of animal life such as Hedgehog (a Priority Species) through the site and between the site and the parkland are maximised. This can be achieved by ensuring that plot boundary fences are not installed flush to ground level but are raised to leave a gap of 0.1 to 0.15 metres beneath the fence panels.

### 5.4 Invasive Species

- 5.4.1 It is an offence under the *Wildlife and Countryside Act 1981* (as amended) to cause the spread of Japanese Knotweed, Rhododendron, and Indian Balsam in the wild. An Invasive Species Management Plan is required to prevent the spread of these species.

### 5.5 Amphibians

- 5.1 As described in **Section 3.3**, the risk of great crested newts at the site is negligible. However, in accordance with best practice the following Reasonable Avoidance Measures (RAMs) should be observed during the construction period: -
- a. All site personnel must be made aware of these RAMs and the possible (but very unlikely) presence of great crested newt and other wildlife such as Common Toad at the site;
  - b. A copy of this report must be held on site and be available for consultation as required;
  - c. All site personnel must be trained in the identification of great crested newt and made aware of the protection which is afforded to them;
  - d. During construction, bricks etc. must be stored on the hard-standing car park area or stored on pallets to avoid the creation of suitable habitat for amphibians;
  - e. During construction, any holes, trenches or other pits which amphibians could fall into must be covered overnight, or have sloped banks or ramps suitable for their escape;
  - f. The use of chemicals (such as fertilisers and herbicides) harmful to great crested newt and other amphibians should be avoided wherever possible;
  - g. If a great crested newt is found whilst any site clearance or building operations are in progress then all works in the area must cease and ERAP Ltd. (01772 750502) or Natural England (0300 060 3900) must be contacted immediately for further guidance;
  - h. No site contractors must handle a great crested newt; and
  - i. If any other amphibian species (such as smooth newt, common toad or common frog) is detected on site, it must be carefully picked up, placed in a clean bucket and moved to an area of suitable habitat beyond the construction working area.

### 5.6 Bats

#### Buildings

#### Licensing

- 5.6.1 Renovation of Building 2 must only be carried out under an appropriate Natural England licence granted under Regulation 53 of *The Conservation of Habitats and Species Regulations 2010* (as amended). The licence permits the destruction of a bat roost(s) which would otherwise be an offence.

5.6.2 Based on the results of the 2016 re-entry bat surveys it is concluded that the site meets the criteria and qualifies to be registered under the Natural England Bat Low Impact Class Licence (BLICL). ERAP Ltd (Consultant Ecologists) is registered to use this class licence.

5.6.3 Registration of the site under the BLICL can only be carried out once the proposals received full planning consent and all ecology-related conditions have been discharged.

#### ***Works to be Carried Out Prior to Construction***

##### *Toolbox Talk*

- 5.6.4 Prior to the commencement of works the Registered Consultant will inform contractors of the following: -
- That bat(s) and bat roost(s) are present;
  - The wildlife legislation and protection afforded to bats and their roosts;
  - Outline of the licensable activities;
  - The presence of the licence and method statement and the need to abide by the content (i.e. measures that will be used to protect bats);
  - Good working practices (i.e. roof tiles and ridge copings to be lifted, rather than slid);
  - The protocol to be followed if a bat is discovered when the Registered Consultant is not on site; and
  - An outline of the proposals and timescales.

#### ***Actions to be Applied During the Construction Period***

##### *Roost 2.1 and 2.2*

- 5.6.5 At Roost 2.1 it is proposed that the Registered Consultant is present on site during the careful removal / replacement, by hand, of the soffit boards and any other renovation works in the vicinity of the roost.
- 5.6.6 At Roost 2.2 it is proposed that the Registered Consultant inspects the hole in the brick work at height with the use of a high-powered torch and a video borescope for roosting bats immediately prior to the hole being sealed.
- 5.6.7 If a single (or a low number of) common pipistrelle bat(s) is present the Registered Consultant will carefully collect the bat (using a hand held static net or by direct handling), place the bat in an appropriate container and release the bat at the site later the same day or place the bat in a compensatory roost provision. As the buildings have been assessed to be unsuitable for use by hibernating bats this action assumes that works can be carried out at any time of year and the bat will not be in torpor. If a torpid bat is found during the pre-work inspections the Registered Consultant will issue further advice in accordance with Natural England guidance.
- 5.6.8 If any other species of bat is present or a large number of bats are present it is essential under the terms and conditions of the BLICL that the Registered Consultant contacts Natural England immediately for advice.

##### *Building 1*

- 5.6.9 As Building 1 contains historical evidence of a day bat roost it is recommended that any works to the roofing slates and fascias are carried out carefully and by hand.

### ***Timing***

- 5.6.10 Based on the results of the surveys and the types of roosts present there is no timing restriction on the commencement of works. However, September and October are an optimal time to avoid the most sensitive periods in the bat seasonal calendar.

### ***Discovery of a Bat***

- 5.6.11 If bats are discovered during the works when the Registered Consultant is not present, all workers must withdraw from the area and the Registered Consultant must be contacted for guidance (Victoria Burrows at ERAP Ltd on 01772 750502).

### ***Creation of New Roost Opportunities***

- 5.6.12 As the habitats around the site will continue to be favourable for the attraction of foraging bats at the completion of construction, in accordance with good practice, it is recommended that compensatory and enhancement provisions for use by crevice roosting bats (pipistrelle species) are installed at the redeveloped site.
- 5.6.13 This aims to ensure a net gain for biodiversity and compliance with the principles of the National Planning Policy Framework (NPPF).
- 5.6.14 It is recommended that two Schwegler 1FF bat boxes are installed at suitable retained mature trees within the site as compensation for the loss of the two day roosts. These boxes should be installed no later than six months prior to commencement of the renovation of Building 2. An ecologist will advise on the siting of the bat boxes while on site. The Schwegler 1FF bat box is illustrated in **Insert 1**.



**Insert 1:** Schwegler 1FF available from

- 5.6.15 In addition, it is recommended that the development incorporates the installation of six commercially available bat access panel at the new housing.
- 5.6.16 The bat access panels should be sited at least four metres above ground level, ideally facing or close to areas of landscape planting or existing linear features. The access panels should not be positioned over windows or doorways where bat droppings may become a nuisance. Once the development layout has been finalised, an Ecologist should advise on appropriate positions for the bat access panels. Suitable bat access panels are available from NHBS Ecology ([www.nhbs.com](http://www.nhbs.com)) or Wild Care Shop ([www.wildcareshop.com](http://www.wildcareshop.com)) and are presented at **Insert 2**:



**Insert 2:** Example of commercially available bat access panels.

### ***Mechanism for Ensuring Implementation/Success***

- 5.6.17 If the licensed bat surveyor / Registered Consultant has any concerns regarding the quality of workmanship or there is non-compliance with the terms and conditions of the BLICL and the mitigation strategy and / or guidance provided by the licensed bat worker then this will result in additional site visits to make inspections.
- 5.6.18 It is always the intention to ensure all parties are aware of the importance of the Natural England licence and compliance with the mitigation strategy and this is achieved through good communication. However in extreme / significant cases of non-compliance the licensed bat surveyor will report the issue to Natural England and further action may be taken.

### ***Population Monitoring***

- 5.6.19 As stated on Figure 4 in the *Bat Mitigation Guidelines* (2004) and under the conditions of the BLICL, the post-development monitoring requirements for a summer roost of a common species<sup>1</sup> are minimal.

<sup>1</sup> 'Common species' =

*Common Pipistrelle is described as 'widely distributed throughout the UK.' A population of 2,430,000 is reported in the National Bat Monitoring Programme (NBMP) 2013 Data (Bat Conservation Trust website).*

- 5.6.20 There is no requirement, under the licence, for any post-development monitoring of the population of bats at the site.

### **Trees**

#### ***Retention of Trees***

- 5.6.21 At the time of writing Trees 1, 3 to 14, 16, 17 and 19 (refer to **Figure 8.1**) are to be retained as part of the development proposals. If works to these trees are required it is recommended that further surveys are conducted to determine the presence / absence of roosting bats.

### **Lighting**

- 5.6.22 Paragraph 125 in Chapter 11 (conserving and enhancing the natural environment) of the National Planning Policy Framework (NPPF) states:

*"By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation".*



## **Construction Phase**

- 5.6.23 Any lighting to be used at the site during construction should be directional and screened where possible, this specification should be included within a Construction Environment Management Plan (CEMP), or similar.

## **Development Lighting Design**

- 5.6.24 The lighting scheme to be implemented at the developed site must involve the use of appropriate products and screening, where necessary, to ensure no excessive artificial lighting shines over the woodland and parkland as lighting overspill may deter use by wildlife such as foraging bats.
- 5.6.25 The lighting scheme will be designed with reference to current guidance, namely:
- Artificial lighting and wildlife. Interim Guidance: Recommendations to help minimise the impact of artificial lighting.* (Bat Conservation Trust, 2014); and
  - Bats and lighting: Overview of current evidence and mitigation guidance* (Stone, 2014).

## **5.7 Birds**

### **Protection**

- 5.7.1 All wild birds are protected under the *Wildlife and Countryside Act 1981* (as amended) while they are breeding. It is mandatory that the buildings, trees, shrubs, Bramble scrub or other suitable breeding bird habitat which are to be removed as part of the proposals are only removed outside the bird breeding season. The bird breeding season typically extends between March to August inclusive.
- 5.7.2 If any of the above habitats are scheduled for removal in the bird breeding season it is advised that advice from an Ecologist is sought. It may be necessary to carry out a walkover survey to demonstrate satisfactorily that no nesting birds, active nests, eggs or fledglings are present in the area to be cleared.
- 5.7.3 If nesting birds are detected the Ecologist will issue guidance in relation to the protection of the nesting birds in conjunction with the scheduled works. This may involve cordoning off an area of the site until the young birds have fledged.

### **Enhancing Habitats for Nesting Birds**

#### **House Sparrow**

- 5.7.4 House sparrows are associated with suburban areas. Monitoring suggests a severe decline in the UK house sparrow population, recently estimated as dropping by 71 per cent between 1977 and 2008 with substantial declines in both rural and urban populations (RSPB).
- 5.7.5 The installation of four house sparrow terrace nest boxes is recommended at the proposed new housing, avoiding areas such as directly above any windows or doors, will create further suitable habitat for nesting birds at the site. RSPB advice states that boxes should ideally be sited facing north to east, to avoid exposure to direct sunlight, which may cause overheating of chicks in the nest. An example of a suitable House Sparrow bird box is given below, in **Insert 3**:



**Insert 3:** House Sparrow Nesting Terrace

5.7.6 Such bird boxes are available from the NHBS ([www.nhbs.com](http://www.nhbs.com)) or Wild Care Shop ([www.wildcareshop.com](http://www.wildcareshop.com)). ERAP Ltd will advise on the siting of bird boxes.

### **Woodland Birds**

5.7.7 Five bird boxes associated with woodland bird species are recommended at the retained mature trees at the site boundaries. RSPB advice states that boxes should ideally be sited facing north to east, to avoid exposure to direct sunlight, which may cause overheating of chicks in the nest. The boxes should be at least four metres from ground level.

5.7.8 Suitable boxes presented at **Insert 4**, below.



**Insert 4:** Schwegler 3SF, Schwegler 1N, Schwegler 2M and Schwegler 2H bird boxes, suitable for a variety of woodland birds.

## **5.8 Enhancement and Management of Retained Habitats**

5.8.1 It is recommended that the retained belts of trees and shrubs are brought into active management for biodiversity and to promote the longevity of the habitat. A Habitat Management Plan would be prepared to include the following:

- a. Specification of the removal/control and safe disposal of invasive species such as Rhododendron etc.
- b. Maintenance of bird and bat boxes;
- c. Creation of dead wood habitat piles for colonisation by invertebrates, fungi and small mammals including hedgehog (a Priority Species); and
- d. Plug planting of woodland herbs such as native Bluebell (*Hyacinthoides non-scripta*).

## 5.9 Landscape Planting

- 5.9.1 It is recommended that the landscape planting within the residential site is composed from native species and species known to be of value for the attraction of wildlife
- 5.9.2 It is recommended that trees which support blossom and fruit which will attract insects are incorporated into the landscape planting. Suitable species are presented at **Table 5.1**.

**Table 5.1: Suitable Native Species for Tree and Shrub Planting**

Scientific Name	Common Name	Scientific Name	Common Name
<i>Acer campestre</i>	Field Maple	<i>Prunus spinosa</i>	Blackthorn
<i>Corylus avellana</i>	Hazel	<i>Rosa arvensis</i>	Field Rose
<i>Crataegus monogyna</i>	Hawthorn	<i>Rosa canina</i>	Dog-rose
<i>Ilex aquifolium</i>	Holly	<i>Sambucus nigra</i>	Elder
<i>Malus sylvestris</i>	Crab Apple	<i>Sorbus aucuparia</i>	Rowan
<i>Prunus avium</i>	Wild Cherry	<i>Ulmus glabra</i>	Wych Elm
<i>Prunus padus</i>	Bird Cherry	<i>Viburnum opulus</i>	Gelder Rose

- 5.9.3 The understorey and ground cover planting design should be prepared to optimise the attraction of invertebrates such as feeding bumblebees and butterflies. Where possible the use of native species should be maximised but where necessary non-native species known to be attractive to invertebrates should be used.
- 5.9.4 Planting schemes that include flowering species such as *Calluna*, *Ceanothus*, *Hebe*, *Lavendula*, *Lonicera*, *Potentilla*, *Rosemarinus* and *Vinca* can maximise opportunities for feeding invertebrates and for the attraction of foraging bats and birds.
- 5.9.5 For further plants suitable for the attraction of pollinators please refer to the *Perfect for Pollinators Plant List* (Royal Horticultural Society, 2012). It is recommended that the selection of plant species at the site ensures that a variety of flowering species are available throughout the year.

### **Understorey and Ground Cover Planting**

- 5.9.6 The understorey and ground cover planting design should be prepared to optimise the attraction of invertebrates such as feeding bumblebees and butterflies. Where possible the use of native species should be maximised but where necessary non-native species known to be attractive to invertebrates could be used.
- 5.9.7 Planting schemes that include flowering species such as Lavender, Rosemary, Hebe, *Potentilla*, *Calluna*, *Ceanothus* and *Vinca* can maximise opportunities for feeding invertebrates. In addition night-scented flowers can attract insects and prey for the attraction of foraging bats, refer to **Table 5.2**.

**Table 5.2: Recommended plants for use in gardens to attract bats (Bat Conservation Trust, 2013)**

Flowers for Borders		Herbs
Aubretia	Mexican aster	Angelica
Candytuft	Michaelmas daisy	Bergamot
Cherry pie	Night-scented stock	Borage
Corncockle	Ox-eye daisy	Coriander
Cornflower	Phacelia	English marigolds
Corn marigold	Poached egg plant	Fennel
Corn poppy	Primrose	Feverfew
Echinacea	Red campion	Hyssop
English Bluebell	Red valerian	Lavenders
Evening primrose	Scabious	Lemon balm
Field poppies	St John's wort	Marjoram
Honesty	Sweet William	Rosemary

Ice plant 'Pink lady'	Tobacco plant	Sweet Cicely
Knapweed	Verbena	Thyme
Mallow	Wallflowers	

## 6.0 CONCLUSION

- 6.1 This ecological appraisal has demonstrated that the proposed residential development at the site is feasible and acceptable in accordance with ecological considerations and the National Planning Policy Framework.
- 6.2 Two common pipistrelle day roosts have been detected at Building 2. Therefore, the renovation of Building 2 must be conducted under an appropriate Natural England licence granted under Regulation 53 of *The Conservation of Habitats and Species Regulations 2010* (as amended). The site meets the criteria and qualifies to be registered under the Natural England Bat Low Impact Class Licence (BLICL).
- 6.3 No works at the site which may impact a bat roost will be undertaken at the site prior to the receipt of the BLICL.
- 6.4 It is possible to implement reasonable actions for the protection and long-term conservation of fauna such as roosting bats, nesting birds and commuting/foraging bats associated with the site.
- 6.5 Measures to conserve the habitat connectivity through the site are entirely feasible.
- 6.6 Development at the site will provide an opportunity to secure ecological enhancement for fauna typically associated with residential areas such as breeding birds, roosting bats and hedgehog.

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## 8.0 APPENDIX 1: TABLES AND FIGURES

### 8.1 Photographs of the Site

**Table 8.1:** Table of Photographs

 <p><b>Photograph 8.1:</b> Broadleaved Woodland</p>	 <p><b>Photograph 8.2:</b> Hedgerow 1</p>
 <p><b>Photograph 8.3:</b> Hedgerow 2</p>	 <p><b>Photograph 8.4:</b> Hedgerow 3</p>
 <p><b>Photograph 8.5:</b> Scrub, Grassland and Tall Ruderals</p>	 <p><b>Photograph 8.6:</b> Parkland</p>





**Photograph 8.7:** Parkland



**Photograph 8.8:** Semi-improved Grassland



**Photograph 8.9** Semi-improved Grassland



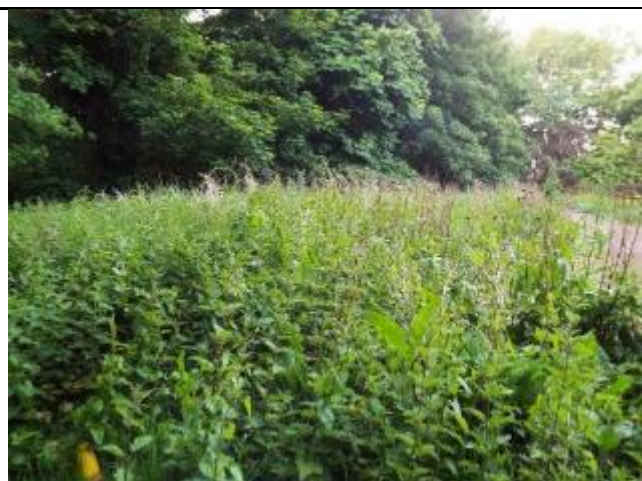
**Photograph 8.10:** Improved Grassland



**Photograph 8.11:** Improved Grassland



**Photograph 8.12:** Improved Grassland



**Photograph 8.13:** Tall Ruderals



**Photograph 8.14:** Amenity Grassland

## 8.2 Plant Species Lists and Hedgerow Assessments

**Table 8.2:** Plant Species Composition, Frequent, and Abundance for Broadleaved Woodland

Scientific Name	Common Name	DAFOR <sup>1</sup>	Cover
<b>Woody species</b>			
<i>Acer pseudoplatanus</i>	Sycamore	A	40%
<i>Corylus avellana</i>	Hazel	LF	10%
<i>Fagus sylvatica</i>	Beech	A	40%
<i>Fraxinus excelsior</i>	Ash	F	10%
<i>Ilex aquifolium</i>	Holly	A	60%
<i>Sambucus nigra</i>	Elder	A	40%
<i>Tilia</i> sp.	Lime	F	10%
<b>Herb Species</b>			
<i>Allium ursinum</i>	Ramsons	VLF	1%
<i>Carex pendula</i>	Pendulous Sedge	F	10%
<i>Galanthus nivalis</i>	Snowdrop	LF	1%
<i>Geum urbanum</i>	Wood Avens	O	2%
<i>Hedera helix</i>	Ivy	D	70%
<i>Hyacinthoides non-scripta</i>	Bluebell	LF	5%
<i>Urtica dioica</i>	Common Nettle	F	20%
<sup>1</sup> <b>Key to DAFOR:</b> D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species			

**Table 8.3: Plant Species Composition, Frequency, and Abundance for Hedgerows 1 to 3**

Scientific Name	Common Name	Hedgerow 1		Hedgerow 2		Hedgerow 3	
		DAFOR <sup>1</sup>	Cover	DAFOR <sup>1</sup>	Cover	DAFOR <sup>1</sup>	Cover
<b>Woody Species</b>							
<i>Crataegus monogyna</i>	Hawthorn	D*	60%				
<i>Ilex aquifolium</i>	Holly	A	40%				
<i>Ligustrum ovalifolium</i>	Garden Privet	R	<1%	D	100%		
<i>Sambucus nigra</i>	Elder	O	2%				
	Exotics	R	<1%			D	100%
<b>Understorey</b>							
<i>Hedera helix</i>	Ivy	LA	30%				

<sup>1</sup>**Key to DAFOR:** D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, L=Local and \*denotes a constant species  
Species shaded grey are those listed as either woody or woodland species in *The Hedgerows Regulations 1997*.

**Table 8.4: The Hedgerow Regulations 1997 Assessment of Hedgerow 1**

Hedgerow Reference	Hedgerow 1	
Height x width (metres)	1.5 x 0.5	
Length	130m	
Continuity	90%	
Management	Cut	
Total Number of woody species	3	
<b>Average Number of Qualifying Woody Species:</b>		
Section number	1	2
Qualifying woody species	2	2
Average number	2	
<b>Number of Features Present:</b>		
(a) Bank or wall along at least ½ length	No	
(b) Gaps which in agg. do not exceed 10%	Yes	
(c)-(e) 1 standard tree per 50m	No	
(f) At least 3 woodland species within 1 metre	No	
(g) Ditch along at least ½ its length	No	
(h) Connections scoring 4 points or more	No	
(i) Parallel hedge within 15m	No	
Total Features	1	
<b>Criteria for Hedgerow Importance 1:</b> Hedgerow contains species listed as:		
(1) Part 1 of Schedule 1, Schedule 5 or Schedule 8 of W&C Act 1981	No	
(2) Declining breeders in 'Red Data Birds of Britain'	No	
(3) Categorised as 'endangered', 'extinct' or 'vulnerable'	No	
<b>Criteria for Hedgerow Importance 2:</b> Hedgerow Includes (all woody species mentioned in (i)-(iv) reduced by one Lancashire for this criteria only):		
(i) At least 7 woody species	No	
(ii) At least 6 woody species and at least 3 features	No	
(iii) At least 6 woody species, inc. one of: Black Poplar, L-leaved Lime, S-leaved Lime or Wild Service Tree	No	
(iv) At least 5 woody species, and has 4 features	No	
<b>Criteria for Hedgerow Importance 3:</b> Is adjacent to is adjacent to a bridleway, footpath or byway <i>and</i> includes at least 4 woody species on average and 2 features from (a) to (g):		
Qualifies:	No	
Hedgerow Classed as Important?	No	



**Table 8.5: Plant Species Composition, Frequency and Abundance for Scrub, Semi-improved grassland and Tall Ruderal Mosaic**

Scientific Name	Common Name	DAFOR <sup>1</sup>	Cover
<i>Achillea millefolium</i>	Yarrow	O	2%
<i>Agrostis capillaris</i>	Common Bent	LF	1%
<i>Artemisia vulgaris</i>	Mugwort	LF	1%
<i>Buddleja davidii</i>	buddleia	O	5%
<i>Calystegia sepium</i>	Hedge Bindweed	R	<1%
<i>Cirsium arvense</i>	Creeping Thistle	LF	2%
<i>Cirsium vulgare</i>	Spear Thistle	O	1%
<i>Dactylis glomerata</i>	Cock's-foot	LF	10%
<i>Dipsacus fullonum</i>	Wild Teasel	O	10%
<i>Elytrigia repens</i>	Common Couch	LF	1%
<i>Epilobium hirsutum</i>	Great Willowherb	LF	1%
<i>Epilobium montanum</i>	Broad-leaved Willowherb	LF	1%
<i>Geranium molle</i>	Dove's-foot Crane's-bill	VLF	1%
<i>Geranium pratense</i>	Meadow Crane's-bill	R	1%
<i>Geranium robertianum</i>	Herb-Robert	R	<1%
<i>Juncus effusus</i>	Soft-rush	R	<1%
<i>Lolium perenne</i>	Perennial Rye-grass	LF	1%
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	R	<1%
<i>Petasites hybridus</i>	Butterbur	LF	1%
<i>Plantago lanceolata</i>	Ribwort Plantain	LF	1%
<i>Poa annua</i>	Annual Meadow-grass	LF	1%
<i>Prunella vulgaris</i>	Selfheal	LF	1%
<i>Ranunculus repens</i>	Creeping Buttercup	LF	2%
<i>Rubus fruticosus</i> agg.	Bramble	A	35%
<i>Rumex obtusifolius</i>	Broad-leaved Dock	F	5%
<i>Scrophularia nodosa</i>	Common Figwort	O	2%
<i>Senecio jacobaea</i>	Common Ragwort	F	5%
<i>Silene dioica</i>	Red Campion	R	<1%
<i>Symphytum officinale</i>	Common Comfrey	LF	2%
<i>Taraxacum officinale</i> agg.	Dandelion	R	<1%
<i>Trifolium repens</i>	White Clover	LF	2%
<i>Urtica dioica</i>	Common Nettle	F	5%

<sup>1</sup>**Key to DAFOR:** D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and \*denotes a constant species

**Table 8.6: Plant Species Composition, Frequency and Abundance for Semi-improved Grassland**

Scientific Name	Common Name	DAFOR <sup>1</sup>	Cover
<i>Arrhenatherum elatius</i>	False Oat-grass	LF	10%
<i>Artemisia vulgaris</i>	Mugwort	R	<1%
<i>Carex pendula</i>	Pendulous Sedge	R	<1%
<i>Centaurea nigra</i>	Common Knapweed	O	2%
<i>Cerastium fontanum</i>	Common Mouse-ear	O	2%
<i>Cirsium vulgare</i>	Spear Thistle	R	<1%
<i>Conopodium majus</i>	Pignut	R	<1%
<i>Dactylis glomerata</i>	Cock's-foot	LF	10%
<i>Festuca rubra</i>	Red Fescue	LF	10%
<i>Geranium molle</i>	Dove's-foot Crane's-bill	O	2%
<i>Hieracium</i> sp.	Hawkweed species	R	<1%
<i>Holcus lanatus</i>	Yorkshire-fog	LF	10%
<i>Lathyrus pratensis</i>	Meadow Vetchling	R	<1%
<i>Lolium perenne</i>	Perennial Rye-grass	F	10%
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	LF	5%
<i>Odontites vernus</i>	Red Bartsia	LF	5%
<i>Plantago lanceolata</i>	Ribwort Plantain	LF	5%
<i>Poa annua</i>	Annual Meadow-grass	F	10%
<i>Ranunculus repens</i>	Creeping Buttercup	O	2%
<i>Rubus fruticosus</i> agg.	Bramble	O	2%
<i>Rubus idaeus</i>	Raspberry	O	2%
<i>Rumex obtusifolius</i>	Broad-leaved Dock	R	<1%
<i>Senecio jacobaea</i>	Common Ragwort	O	2%
<i>Stachys sylvatica</i>	Hedge Woundwort	O	2%
<i>Trifolium pratense</i>	Red Clover	LF	5%
<i>Trifolium repens</i>	White Clover	F	10%
<i>Vicia sativa</i> .	Common Vetch	VLA	1%
<sup>1</sup> <b>Key to DAFOR:</b> D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species			

**Table 8.7: Plant Species Composition, Frequency and Abundance for Improved Grassland**

Scientific Name	Common Name	DAFOR <sup>1</sup>	Cover
<i>Allium ursinum</i>		VLA	1%
<i>Bellis perennis</i>	Daisy	F	2%
<i>Cirsium vulgare</i>	Spear Thistle	R	<1%
<i>Lolium perenne</i>	Perennial Rye-grass	D*	90%
<i>Ranunculus repens</i>	Creeping Buttercup	F	2%
<i>Rumex obtusifolius</i>	Broad-leaved Dock	R	<1%
<i>Senecio jacobaea</i>	Common Ragwort	R	<1%
<i>Taraxacum officinale</i> agg.	Dandelion	F	2%
<i>Trifolium repens</i>	White Clover	F	2%
<sup>1</sup> <b>Key to DAFOR:</b> D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species			



**Table 8.8: Plant Species Composition, Frequency and Abundance for Tall Ruderals**

Scientific Name	Common Name	DAFOR <sup>1</sup>	Cover
<i>Buddleja davidii</i>	Buddleia	LF	5%
<i>Carex pendula</i>	Pendulous Sedge	LA	10%
<i>Galium aparine</i>	Cleavers	F	2%
<i>Heracleum sphondylium</i>	Hogweed	A	40%
<i>Plantago lanceolata</i>	Ribwort Plantain	F	2%
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O	5%
<i>Senecio jacobaea</i>	Common Ragwort	R	<1%
<i>Urtica dioica</i>	Common Nettle	A	40%
<i>Chamerion angustifolium</i>	Rosebay Willowherb	F	2%
<sup>1</sup> Key to DAFOR: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species			

**Table 8.9: Plant Species Composition, Frequency and Abundance for Amenity Grassland**

Scientific Name	Common Name	DAFOR <sup>1</sup>	Cover
<i>Bellis perennis</i>	Daisy	LF	5%
<i>Festuca rubra</i>	Red Fescue	LF	25%
<i>Lolium perenne</i>	Perennial Rye-grass	D	90%
<i>Plantago lanceolata</i>	Ribwort Plantain	O	2%
<i>Ranunculus repens</i>	Creeping Buttercup	O	2%
<i>Senecio jacobaea</i>	Common Ragwort	O	1%
<i>Trifolium repens</i>	White Clover	F	5%
<i>Veronica serpyllifolia</i>	Thyme-leaved Speedwell	R	<1%
<sup>1</sup> Key to DAFOR: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species			

### 8.3 Figures

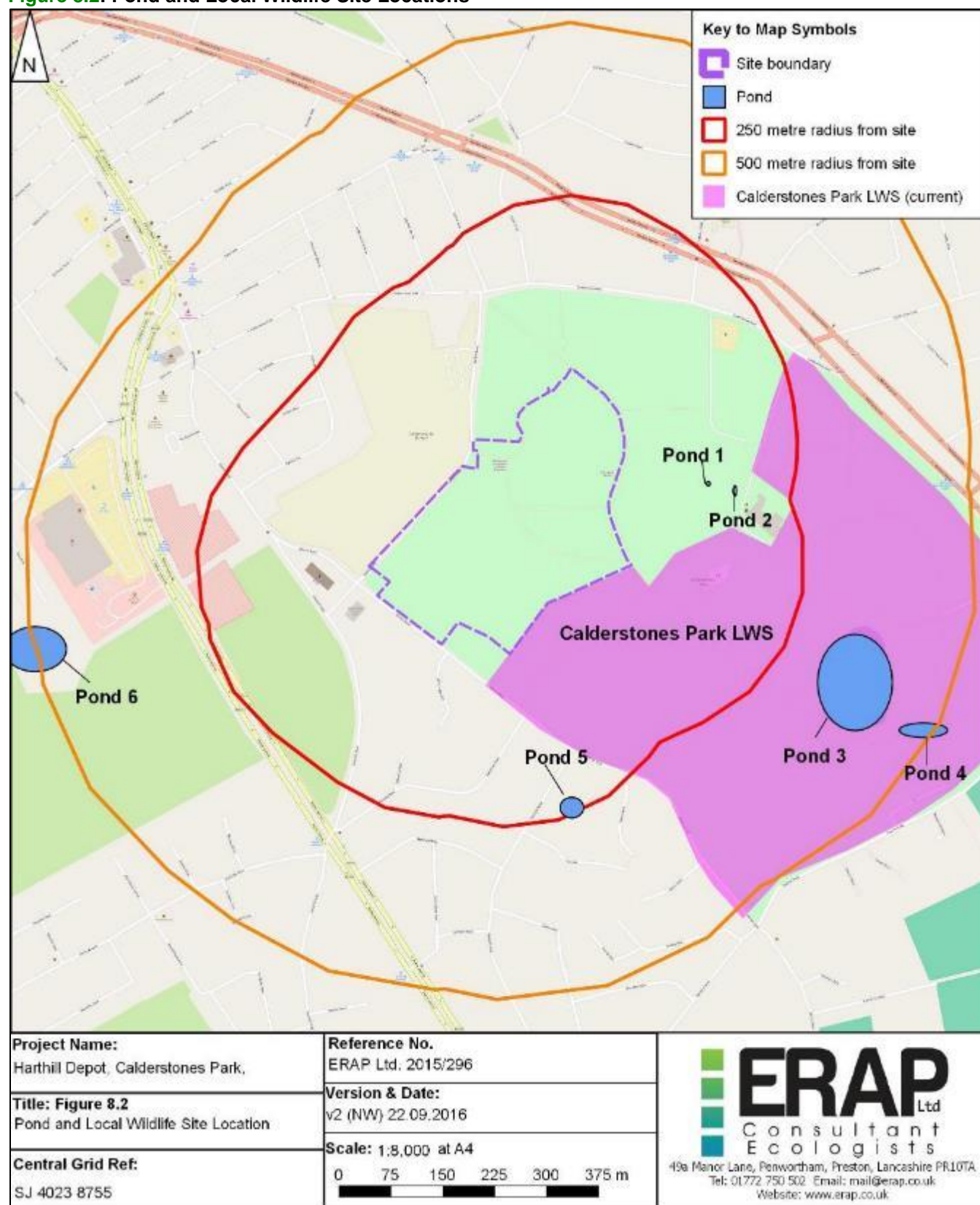


Figure 8.1: Phase 1 Habitat Map





**Figure 8.2: Pond and Local Wildlife Site Locations**



## 9.0 APPENDIX 2: BAT SURVEY DATA

### 9.1 Survey Dates and Personnel

**Table 9.1: Dawn Re-entry Survey Dates, Weather Conditions and Surveyors**

#### Buildings 1, 2 and 10

Date	17 <sup>th</sup> May 2016	30 <sup>th</sup> June 2016	18 <sup>th</sup> August 2016
Sunrise	05.10	04.48	05.57
Start time	03.30	03.18	04.25
End time	05:10	04.50	06.00
Wind	Bft 0 (calm)	Bft 0 (calm)	Bft 0 (calm)
Precipitation	Dry	Dry	Dry
Air temps	7°C	11°C	16°C
Survey Position	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>
Position 1.1	Aidan Pickering Batbox Duet & AE	Aidan Pickering Batbox Duet & AE	Tracy Cumberbatch Batbox Duet
Position 1.2	Marie Pickering Batbox Duet & AE	Marie Pickering Batbox Duet & AE	Amy Sharples Batbox III & AE
Position 1.3	Tracy Cumberbatch Pettersson Ultrasound & AE	Tracy Cumberbatch Pettersson Ultrasound	Charlotte Harrison-Bryant Anabat Walkabout
Position 1.4	Amy Sharples Batbox III & AE	Amy Sharples Batbox III & SD2	Nicola Wallbank Batbox Duet & SD2
Position 1.5	Nicola Wallbank Batbox Duet & SD2	Nicola Wallbank Batbox Duet & AE	N/A
Position 2.1	Brian Robinson Batbox Duet & SD2	Chris Schofield Batbox Duet	Chris Schofield Batbox Duet & SD2
Position 2.2	Chris Schofield Batbox Duet & AE	Jordan Prendergast Batscanner & AE	Jordan Prendergast Batscanner

Refer to **Figures 9.2, 9.5 and 9.8** for surveyor locations.  
<sup>1</sup>AE = Anabat Express Unit, SD2 = Anabat SD2 unit.

#### Buildings 3, 10 & 11

Date	24 <sup>th</sup> May 2016	29 <sup>th</sup> June 2016	29 <sup>th</sup> July 2016
Sunrise	04.58	04.47	05.24
Start time	03.10	03.15	03.50
End time	05.00	04.50	05.30
Wind	Bft 0 (calm)	Bft 0 (calm)	Bft 0 (calm)
Precipitation	Dry	Dry	Dry
Air temps	12°C	10°C	15°C
Survey Position	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>	
Position 10.1	Aidan Pickering Batbox Duet & AE	N/A	N/A
Position 3.1	Tracey Cumberbatch Batbox III & AE	Tracey Cumberbatch Batbox III & AE	Aidan Pickering Batbox Duet & AE
Position 3.2	Marie Pickering Batbox Duet & AE	Jordan Prendergast Batscanner & AE	Marie Pickering Batbox Duet & AE
Position 3.3	Amy Sharples Batbox III & AE	Amy Sharples Batbox III & AE	Chris Schofield Batbox Duet & AE
Position 3.4	Nicola Wallbank Batbox Duet & SD2	Nicola Wallbank Batbox Duet	Nicola Wallbank Batbox Duet

Refer to **Figures 9.3, 9.6 and 9.9** for surveyor locations.  
<sup>1</sup>AE = Anabat Express Unit, SD2 = Anabat SD2 unit.

## Building 12

Date	3 <sup>rd</sup> June 2016	6 <sup>th</sup> July 2016
Sunrise	04.48	04.53
Start time	03.00	03.25
End time	04.50	04.55
Wind	Bft 0 (calm)	Bft 0 (calm)
Precipitation	Dry	Dry
Air temps	11°C	12°C
Survey Position	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>
Position 12.1	Amy Sharples Batbox III & AE	Jordan Prendergast Batscanner & AE
Building 12.2	Nicola Wallbank Batbox Duet & AE	Nicola Wallbank Batbox Duet
Refer to <b>Figures 9.4 and 9.7</b> for surveyor locations. <sup>1</sup> AE = Anabat Express Unit, SD2 = Anabat SD2 unit.		

**Table 9.2: Transect Survey Dates, Weather Conditions and Surveyors (see Figure 9.5)**

Date	11 <sup>th</sup> May 2016	21 <sup>st</sup> June 2016	
Sunset	21.00	21.44	
Start time	21.00	21.40	
End time	23.00	23.45	
Wind	Bft 0 (calm)	Bft 0 (calm)	
Precipitation	Dry	Dry	
Air temps	15.2°C	16°C	
Transect Route	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>	
1	Amy Sharples <i>Batbox III &amp; AE</i> Tracy Cumberbatch <i>Batbox Duet &amp; SD2</i>	Amy Sharples <i>Batbox III &amp; AE</i> Tracy Cumberbatch <i>Batbox Duet &amp; SD2</i>	
2	Brian Robinson <i>Batbox Duet &amp; AE</i> Chris Schofield <i>Batbox Duet</i>	Brian Robinson <i>Batbox Duet &amp; SD2</i>	
3	Nicola Wallbank <i>Batbox Duet &amp; AE</i> Gareth Harrison <i>Batbox Duet &amp; SD2</i>	Nicola Wallbank <i>Batbox Duet &amp; AE</i> Jordan Prendergast Batscanner & AE	
<sup>1</sup> AE = Anabat Express Unit, SD2 = Anabat SD2 Unit			

## 9.2 Descriptions and Photographs of Buildings

**Table 9.3: Descriptions of Buildings**

<p><b>Building 1</b></p> <p><i>General description and location</i> Building 1 (SJ 40154 87519) is a detached two storey former mansion building constructed in the 19<sup>th</sup> century to a Georgian style, with more recent extensions at its north-western and north-eastern elevations (described below as Buildings 1a, 1b and 1c). The building has been most recently used as a care home, although it is not in current use.</p> <p><i>Description of exterior</i> Refer to <b>Photographs 9.1 to 9.7</b>. The building is constructed from mortared brick walls with an external render. The building support a complex roof of slate with lead flashing. The southern end of the building supports a hipped roof with a central skylight and a dormer window at the south-western elevation. A large semi-circular bay window is present at the south-eastern elevation. A pitched roof (north-west / south-east ridge alignment) is present at the northern end of the south-western elevation, and a complex of hipped roofs is present at the north-eastern end of the building.</p> <p><i>Presence of gaps suitable for access by bats</i> Gaps suitable for access by bats are present throughout, at lifted slates and gaps in the slate roofing, under the lead flashing which lines each ridge, and at gaps in the soffits. Access into the internal areas is limited to the locations shown at <b>Figure 9.1</b>; water damage has rendered internal areas of the building inaccessible.</p> <p><i>Description of roof void</i> Refer to <b>Photographs 9.8 to 9.14</b>. Internally the building supports a large void separated into sections by plasterboard and mortared brick walls. The structure of the voids is similar throughout; they are approximately three metres in height. The roofing is largely unlined (with degraded horse-hair parging present), and fibreglass insulation is present at the roof void floor. The roof is supported on traditional timber trusses, purlins and rafters. The exceptions to this general description are as follows:</p> <ul style="list-style-type: none"> <li>• The roof pitches at the internal sides of the hipped roof at the southern end of the building, leading to the central skylight; these areas of roof are lined with a grey, modern breathable roofing membrane; and,</li> <li>• The void under the pitched section of roof at the north-western elevation is approximately 1.5 metres tall.</li> </ul> <p><i>Description of cellar</i> Refer to <b>Photographs 9.16 to 9.18</b>. The building supports an extensive cellar which is composed of sections used for storage with rooms supports walls which are plastered and painted white, and sections with walls of brick painted white. The cellar also supports an area formerly used for storage and to house piping etc.; this area was not accessed due to the suspected presence of asbestos. No bats or signs of bats were detected in the accessible areas of the cellar.</p> <p><i>Description of Section 1a</i> Refer to Photos <b>9.19</b> and <b>9.20</b>. Section 1a is a covered walkway which links the main building with Sections 1b and 1c. It is composed of mortared brick walls with an external render and support a flat roof of bitumastic roofing felt. It supports no gaps suitable for access by bats, and is open to the ceiling internally; it supports no features suitable for use by roosting bats. The presence of roosting bats is reasonably discounted at Building section 1a.</p> <p><i>Description of Section 1b</i> Refer to <b>Photographs 9.6</b> and <b>9.19</b>. Building section 1b is a single-storey annex constructed from mortared brick walls supporting a pitched roof of slate with lead at the ridges. Gaps suitable for access by bats are present at the lead flashing and at lifted roofing slates. Internally the building supports a single, inaccessible void.</p> <p><i>Description of Section 1c</i> Refer to <b>Photographs 9.21 to 9.25</b>. Building section 1c is a single-storey annex of mortared brick which supports a hipped roof of slate with ridge tiles. Gaps suitable for access by bats are present at the roofing slates and behind a plastic barge board at the northern elevation. Internally the building supports a suspended ceiling, above which lies a vaulted ceiling of timber planks; the void above the timber planks was not accessible.</p>
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<p><i>Presence of roosting bats / signs of roosting bats / suitability for use by roosting bats</i></p> <p>Refer to <b>Photograph 9.15</b> and <b>Figure 9.1</b>. One old dropping was located at the north-western elevation of the building. Otherwise, no bats or signs of bats were detected at the accessible areas of the building.</p> <p>The building is suitable for use by both crevice dwelling and void dwelling species of bats.</p>
<p><b>Building 2</b></p> <p><i>General description and location</i></p> <p>Building 2 (SJ 40152 87557) is a detached two-storey occupied stable with offices at its south-eastern end. It is considered likely that the stables were constructed at the same time as Building 1.</p> <p><i>Description of exterior</i></p> <p>Refer to <b>Photographs 9.26 to 9.30</b>. The building is constructed from mortared brick walls which support a hipped roof of slate with two gable ends extending from the south-western elevation (and a dormer window at the south-western elevation) and a further section of pitched roof, parallel to the north-west / south-east aligned main ridge at the south-eastern corner. The building's roof is composed of slate with ridge tiles.</p> <p><i>Presence of gaps suitable for access by bats</i></p> <p>Gaps suitable for access by bats are present at the timber-boarded second-storey windows, at lifted roofing slates and at the eaves, behind timber barge boards.</p> <p><i>Description of interior</i></p> <p>Refer to <b>Photograph 9.31</b>. No void is present at the building; the upper floor is used as storage, and the area under the roofing slates is boarded and rendered. The roof is supported on traditional timber trusses.</p> <p><i>Presence of roosting bats / signs of roosting bats / suitability for use by roosting bats</i></p> <p>No bats or signs of bats were detected anywhere within the building.</p> <p>The building supports features suitable for use by crevice dwelling species of bats. Whilst the second storey is somewhat suitable for use by void dwelling species, it is regularly disturbed (as this area is used for storage) and largely well-lit due to the presence of windows.</p>
<p><b>Building 3</b></p> <p><i>General description and location</i></p> <p>Building 3 (SJ 40176 87576) is a detached single-storey building used as an activity centre. The building is of a modern construction type, indicative of construction in the 1980's or 1990's.</p> <p><i>Description of exterior</i></p> <p>Refer to <b>Photographs 9.32 to 9.35</b>. The building is constructed from mortared brick walls which support a roof of concrete tiles with concrete ridge tiles. The building is cross-pitched, with a hipped end at the north-western elevation. A section of canopy roofing is present at the south-western elevation.</p> <p><i>Presence of gaps suitable for access by bats</i></p> <p>Gaps suitable for access by bats are present at the south-eastern and north-eastern gable ends, and under the concrete roofing tiles.</p> <p><i>Description of interior</i></p> <p>Refer to <b>Photographs 9.36 to 9.38</b>. A single void is located above the main north-west / south-east aligned ridgeline, split into two different sections. The northern section (<b>Photograph 9.36</b>) is approximately six metres in height. The roof is supported on modern pre-fabricated trusses and the roofing slates are lined by bitumastic roofing felt. Fibreglass insulation is present at the floor of the void. No bats or signs of bats were detected; mouse droppings were detected throughout. The interconnected section of roof void which occupies the southern-most 12 metres of the void (<b>Photograph 9.37</b>) is located above the vaulted ceiling of the hall below, and is 1.5 metres high. No fibreglass insulation is present at this section of the void.</p> <p>A separate roof void (<b>Photograph 9.38</b>) is located at the north-eastern end of the building, under the north-east / south-west pitch. This void is approximately 1.3 metres in height. The roof is again supported on modern pre-fabricated trusses and the roofing slates are lined with bitumastic roofing felt. The floor of the void is lined by fibreglass insulation. Mouse droppings are scattered throughout the void.</p> <p><i>Presence of roosting bats / signs of roosting bats / suitability for use by roosting bats</i></p> <p>No bats or signs of bats were detected anywhere within the building.</p>

#### Building 4

Building 4 (SJ 40184 87605), refer to **Photograph 9.39**, is a detached outbuilding constructed from prefabricated timber boards with a flat roof of bitumastic roofing felt.

No gaps suitable for access by bats are present at the building, and the building does not support any features suitable for use by roosting bats.

No signs of bats were detected at the external elevations of the building; the building could not be accessed internally.

Notwithstanding the access restrictions, due to its construction type, the presence of roosting bats is reasonably discounted at Building 4.

#### Building 5

Building 5 (SJ 40186 87607) refer to **Photograph 9.40**, is a storage container constructed from metal sheeting.

No signs of bats were detected at the external elevations of the building; the building could not be accessed internally.

Notwithstanding the access restrictions, due to its construction type, the presence of roosting bats is reasonably discounted at Building 5.

#### Building 6

Building 6 (SJ 40189 87605) refer to **Photographs 9.41 to 9.43**, is a detached outbuilding constructed from prefabricated concrete panels with a single-pitch roof of bitumastic roofing felt.

No gaps suitable for access by bats are present at the building, and the building does not support any features suitable for use by roosting bats.

No signs of bats were detected at the external elevations of the building; the building could not be accessed internally.

Notwithstanding the access restrictions, due to its construction type, the presence of roosting bats is reasonably discounted at Building 6.

#### Building 7

Building 7 (SJ 40192 87608) refer to **Photographs 9.44 and 9.45**, is a detached outbuilding constructed from mortared stone with a flat roof of bitumastic roofing felt.

No gaps suitable for access by bats are present at the building, and the building does not support any features suitable for use by roosting bats.

No signs of bats were detected at the external elevations of the building; the building could not be accessed internally.

Notwithstanding the access restrictions, due to its construction type, the presence of roosting bats is reasonably discounted at Building 7.

#### Building 8

Building 8 (SJ 40179 87543), refer to **Photographs 9.46 to 9.47**, is a detached outbuilding constructed from mortared blockwork with a single-pitch roof of bitumastic roofing felt.

No gaps suitable for access by bats are present at the building, and the building does not support any features suitable for use by roosting bats.

No signs of bats were detected at the external elevations of the building; the building could not be accessed internally.

Notwithstanding the access restrictions, due to its construction type, the presence of roosting bats is reasonably discounted at Building 8.

#### Building 9

Building 9 (SJ 40131 87566), refer to **Photographs 9.48**, is a detached single-storey store building constructed from mortared brick walls with a single-pitch roof of slate.

Gaps suitable for access by bats are present at the doorway and open windows at the southern elevation.

The small (three metres long by 1.5 metres wide) building does not support any suitable features for use by roosting bats, however; internally the building is open to the unlined roof, and is exposed and draughty throughout.

No bats or signs of bats were detected within the building.

The presence of roosting bats is reasonably discounted at Building 9.

#### Building 10

Building 10 (SJ 40130 87544), refer to **Photographs 9.49 to 9.52**, is a detached single-storey stable building in current use. It is composed of mortared stone and brick walls which support a single-pitch roof of bitumastic roofing felt. A parapet wall is present at the north-eastern elevation.

Gaps suitable for access by bats are present behind the timber barge board at the south-western elevation. No further gaps suitable for access by bats are present.

Internally the building is open to the roof, which is boarded underneath.

The boarded area between the roofing felt and the ceiling may be suitable for use by crevice-dwelling species of bats.

No bats or signs of bats were detected at the building.

#### Building 11

Building 11 (SJ 40108 87525), refer to **Photos 9.54 to 9.56**, is an open-sided canopy roof over a horse riding arena / menage. The roof is supported on a metal frame and composed of corrugated metal with plastic skylights; no features suitable for use by roosting bats are present at the canopy roof.

A small (2 metre to by 2 metre) office building is present at the building's northern end, constructed from mortared

blockwork walls with a hipped roof of corrugated metal. Timber barge boards are present at each elevation. Gaps suitable for access by bats are present at behind the timber barge boards and under the raised sections of corrugated roofing.

No bats or signs of bats were detected anywhere at the building's external elevations (the internal area was inaccessible).

#### **Building 12**

Building 12 (SJ 40089 87457), refer to **Photos 9.57 to 9.60**, is a detached former activity hut constructed from walls of concrete panels supported by concrete posts which support a pitched roof of bitumastic roofing felt.

Gaps suitable for access by bats are present behind the timber soffits and at a hole in the south-western elevation's fascia.

No bats or signs of bats were detected anywhere at the building's external elevations (the internal area was inaccessible).

**Table 9.4: Photographs of the Buildings**



**Photograph 9.1:** Building 1, south-western elevation.



**Photograph 9.2:** Building 1, south-eastern elevation.



**Photograph 9.3:** Building north-eastern elevation.



**Photograph 9.4:** Building 1, north-western elevation (from western corner).



**Photograph 9.5:** Building 1, north-western elevation (from eastern corner).



**Photograph 9.6:** Building 1 rooftop from east (north-eastern elevation of Building 1, section 1b in the foreground)





**Photograph 9.7:** Building 1 rooftop area.



**Photograph 9.8:** Building 1, roof void, north-eastern end.



**Photograph 9.9:** Building 1, roof void, north-eastern end.



**Photograph 9.10:** Building 1, roof void, eastern corner.



**Photograph 9.11:** Building 1, roof void, middle of eastern elevation.



**Photograph 9.12:** Building 1, roof void, southern corner.



**Photograph 9.13:** Building 1, roof void, over western elevation.



**Photograph 9.14:** Building 1, roof void, western elevation near northern end (orange arrow indicates location of single dropping).



**Photograph 9.15:** Building 1, showing close up of up dropping.



**Photograph 9.16:** Building 1, cellar.



**Photograph 9.17:** Building 1, cellar (asbestos was suspected within this area of the cellar and was not investigated further).



**Photograph 9.18:** Building 1, cellar, former storage area.





**Photograph 9.19:** Building 1, covered walkway (1a) with Section 1b to rear.



**Photograph 9.20:** Building 1, section 1a from south-east.



**Photograph 9.21:** Building 1, section 1c, south-western elevation.



**Photograph 9.22:** Building 1, section 1c, eastern elevation.



**Photograph 9.23:** Building 1, section 1c, northern elevation.



**Photograph 9.24:** Building 1, section 1c, internal area.





**Photograph 9.25:** Building 1, section 1c showing vaulted ceiling above suspended ceiling.



**Photograph 9.26:** Building 2, south-eastern elevation.



**Photograph 9.27:** Building 2, north-eastern elevation.



**Photograph 9.28:** Building 2, north-eastern elevation.



**Photograph 9.29:** Building 2, north-western elevation.



**Photograph 9.30:** Building 2, south-western elevation.





**Photograph 9.31:** Building 2, showing upper floor (second storey), used for storage (no void is present).



**Photograph 9.32:** Building 3, north-western elevation



**Photograph 9.33:** Building 3, south-western elevation



**Photograph 9.34:** Building 3, south-eastern elevation



**Photograph 9.35:** Building 3, north-eastern elevation



**Photograph 9.36:** Building 3, large void at north-western end of the building





**Photograph 9.37:** Building 3, smaller void at south-eastern end



**Photograph 9.38:** Building 3, small, separate void over north-eastern end



**Photograph 9.39:** Building 4



**Photograph 9.40:** Building 5



**Photograph 9.41:** Building 6, south western and south-eastern elevations



**Photograph 9.42:** Building 6, north-eastern elevation





**Photograph 9.43:** Building 6, north-western elevation



**Photograph 9.44:** Building 7, south-western and south-eastern elevations



**Photograph 9.45:** Building 7, north-eastern and north-western elevations



**Photograph 9.46:** Building 8, north-western and north-eastern elevations



**Photograph 9.47:** Building 4, south-eastern elevation



**Photograph 9.48:** Building 9, south-western and south-eastern elevations





**Photograph 9.49:** Building 10, south-western elevation



**Photograph 9.50:** Building 10, north-western elevation



**Photograph 9.51:** Building 10, north-eastern elevation



**Photograph 9.52:** Building 10, internal area



**Photograph 9.53:** Building 10, roof



**Photograph 9.54:** Building 11, north-western elevation





**Photograph 9.55:** Building 11, internal area



**Photograph 9.56:** Building 11, office inside Building 11



**Photograph 9.57:** Building 12, south-western elevation



**Photograph 9.58:** Building 12, south-eastern elevation



**Photograph 9.59:** Building 12, north-eastern elevation



**Photograph 9.60:** Building 12, north-western elevation



**Photograph 9.61:** Roost 2.1





**Photograph 9.62:** Roost 2.2







### 9.3 Descriptions and Photographs of Trees

**Table 9.5: Details of Trees with Potential Bat Roosting Features**

			
<b>ERAP Ltd Tree Reference</b>	Tree 1	<b>ERAP Ltd Tree Reference</b>	Tree 2
<b>TBA Associates Tree Reference</b>	5T (August 2015)	<b>TBA Associates Tree Reference</b>	88T (August 2015)
<b>Species</b>	Oak	<b>Species</b>	Sweet Chestnut
<b>Features suitable for use by roosting bats</b>	Cavity at lateral branch on south side	<b>Features suitable for use by roosting bats</b>	Deadwood present in the upper lateral branches. Wounds present on trunk but do not appear to lead to a cavity yet.



  

			
<b>ERAP Ltd Tree Reference</b>	Tree 3	<b>ERAP Ltd Tree Reference</b>	Tree 4
<b>TBA Associates Tree Reference</b>	91T (August 2015)	<b>TBA Associates Tree Reference</b>	15T(August 2015)
<b>Species</b>	Oak	<b>Species</b>	Ivy covered Ash
<b>Features suitable for use by roosting bats</b>	Mature Oak. No features on trunk but developing holes around lateral branches, particularly at 5-7 metres from ground on west side.	<b>Features suitable for use by roosting bats</b>	Mature Ivy covered Ash with dead wood at the top. No cavities noted but Tree Survey Report has class tree as 'U' and therefore unsuitable for retention.



			
<b>ERAP Ltd Tree Reference</b>	Tree 5	<b>ERAP Ltd Tree Reference</b>	Tree 6
<b>TBA Associates Tree Reference</b>	16T (August 2015)	<b>TBA Associates Tree Reference</b>	19T (August 2015)
<b>Species</b>	Beech	<b>Species</b>	Sycamore
<b>Features Suitable for use by roosting bats</b>	Large (30cm high by 10cm wide) hole approximately 4 metres from ground on north side of trunk. No bats, staining or droppings present. Lateral branches to west with dead wood but blind. Damaged bird box present.	<b>Features Suitable for use by roosting bats</b>	Semi-mature tree in centre of path. Two knot holes on the west side. One with moss at entrance (4 metres from ground) and one at 5 metres from ground. One knot hole 6 metres from ground on east side. One knot hole 6 metres from ground on north side.

			
<b>ERAP Ltd Tree Reference</b>	Tree 7	<b>ERAP Ltd Tree Reference</b>	Tree 8
<b>TBA Associates Tree Reference</b>	49G	<b>TBA Associates Tree Reference</b>	49G
<b>Species</b>	Sweet Chestnut	<b>Species</b>	Sweet Chestnut
<b>Features Suitable for use by roosting bats</b>	Damaged limb containing possible crevice (20 cm x 2 cm) at 3 metres on the western elevation	<b>Features Suitable for use by roosting bats</b>	Missing limb with rot hole (5cm x 5cm) at 2.5 metres.




			
<b>ERAP Ltd Tree Reference</b>	Tree 9	<b>ERAP Ltd Tree Reference</b>	Tree 10
<b>TBA Associates Tree Reference</b>	49G	<b>TBA Associates Tree Reference</b>	50T (August 2015)
<b>Species</b>	Sweet Chestnut	<b>Species</b>	Horse Chestnut
<b>Features Suitable for use by roosting bats</b>	Two woodpecker holes (3cm x 3cm) at four metres on western elevation and one hole (3cm x 3cm) the eastern elevation at 6 metres.	<b>Features Suitable for use by roosting bats</b>	Missing limb at two metres on southern elevation with a hole (30cm x 10cm) and lifted bark throughout trunk.



			
<b>ERAP Ltd Tree Reference</b>	Tree 11	<b>ERAP Ltd Tree Reference</b>	Tree 12
<b>TBA Associates Tree Reference</b>	63G (August 2015)	<b>TBA Associates Tree Reference</b>	157T (January 2016)
<b>Species</b>	Beech	<b>Species</b>	Beech
<b>Features Suitable for use by roosting bats</b>	Missing limb at two metres with hole (30cm x 30cm) on southern elevation.	<b>Features Suitable for use by roosting bats</b>	Small knot hole (4cm x 4cm) on eastern elevation at 6 metres.



			
<b>ERAP Ltd Tree Reference</b>	Tree 13	<b>ERAP Ltd Tree Reference</b>	Tree 14
<b>TBA Associates Tree Reference</b>	77T (January 2016)	<b>TBA Associates Tree Reference</b>	83T (January 2016)
<b>Species</b>	Weeping Ash	<b>Species</b>	Oak
<b>Features Suitable for use by roosting bats</b>	Two holes (5cm x 5cm) on southern elevation at two metres .	<b>Features Suitable for use by roosting bats</b>	Missing limb at three metres on eastern elevation with small hole

			
<b>ERAP Ltd Tree Reference</b>	T15	<b>ERAP Ltd Tree Reference</b>	T16
<b>TBA Associates Tree Reference</b>	91T (January 2016)	<b>TBA Associates Tree Reference</b>	166T (January 2016)
<b>Species</b>	Yew	<b>Species</b>	Beech
<b>Features Suitable for use by roosting bats</b>	Large split (50cm x 5cm) with internal cavity at 0.5 metres on southern elevation.	<b>Features Suitable for use by roosting bats</b>	Three knot holes on southern elevation at between 5 and 6 metres.

			
<b>ERAP Ltd Tree Reference</b>	T17	<b>ERAP Ltd Tree Reference</b>	T18
<b>TBA Associates Tree Reference</b>	190T (January 2016)	<b>TBA Associates Tree Reference</b>	192T (January 2016)
<b>Species</b>	Beech	<b>Species</b>	Sweet Chestnut
<b>Features Suitable for use by roosting bats</b>	Hole (5cm x 5cm) at point of missing limb at 6 metres on eastern elevation.	<b>Features Suitable for use by roosting bats</b>	Large split (1.5 metres x 5cm) at 2 metres on northern elevation.

			
<b>ERAP Ltd Tree Reference</b>	T19	<b>ERAP Ltd Tree Reference</b>	T20
<b>TBA Associates Tree Reference</b>	177T (January 2016)	<b>TBA Associates Tree Reference</b>	184T (January 2016)
<b>Species</b>	Beech	<b>Species</b>	Beech
<b>Features Suitable for use by roosting bats</b>	Three knot holes (3cm x 3cm) on southern elevation at between 5 and 6 metres.	<b>Features Suitable for use by roosting bats</b>	One knot hole (5cm x 5cm) on western elevation at 5 metres.

## 9.4 Dawn Re-entry Surveys, Raw Survey Data

### Buildings 1, 2 and 10

#### 1<sup>st</sup> Repetition, 11<sup>th</sup> May 2016 (Sunrise 05.10)

##### Surveyor 1.1: Aidan Pickering

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 2 common pipistrelle passes at 03.31 and 03.32

##### Surveyor 1.2: Marie Pickering

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 8 common pipistrelle passes between 03.31 and 04.37.

##### Surveyor 1.3: Tracy Cumberbatch

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 9 common pipistrelle passes between 03.43 and 04.29.

##### Surveyor 1.4: Amy Sharples

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 7 common pipistrelle passes between 03.54 and 04.19.

##### Surveyor 1.5: Nicola Wallbank

No bat activity or re-entry observed.
<i>Anabat SD detected:</i> 3 common pipistrelle passes between 03.54 and 04.16.

##### Surveyor 2.1: Brian Robinson

Time	Species	Notes
03:54	Common pipistrelle	Flew north to south between Buildings 1 and 2

##### Surveyor 2.2: Chris Schofield

Time	Species	Notes
03:54	Common pipistrelle	Flew north to south to west of Building 10

#### 2<sup>nd</sup> Repetition, 30<sup>th</sup> June 2016 (Sunrise 04.48)

##### Surveyor 1.1: Aidan Pickering

No bat activity or emergence detected
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##### Surveyor 1.2: Marie Pickering

Time	Species	Notes
03.34	Common pipistrelle	Distant pass, heard not seen
03.42	Common pipistrelle	Flew over Building 1 south west to north east
03.52	Common pipistrelle	Distant pass, heard not seen
04.02	Common pipistrelle	Flew adjacent to Building 1 south east to north west
<i>Anabat Express detected:</i> 2 common pipistrelle passes at 03.54 and 04.08.		



### Surveyor 1.3: Tracy Cumberbatch

Time	Species	Notes
No bat activity or re-entry detected		

### Surveyor 1.4: Amy Sharples

Time	Species	Notes
No bat activity or re-entry observed		
<i>Anabat SD detected:</i> 5 common pipistrelle passes between 03.36 and 04.01		

### Surveyor 1.5: Nicola Wallbank

Time	Species	Notes
03.53	Common pipistrelle	Flew north west to south east across Building 1
04.04 to 04.06	Common pipistrelle	Circled around eastern and southern elevation of Building 2
04.07	Common pipistrelle	Flew up to wall-top just below soffit on southern elevation of Building 2 and landed before flying off again
04.08	Common pipistrelle	Circled around southern elevation of Building 2
04.09	Common pipistrelle	Flew up to wall-top just below soffit on southern elevation of Building 2 and landed before flying off again
04.10	Common pipistrelle	Flew up to wall-top just below soffit on southern elevation of Building 2 and landed before flying off again
04.11	Common pipistrelle	<b>One bat re-entered between wall top and soffit box at the southern elevation (Roost 2.1).</b>
<i>Anabat Express detected:</i> 13 common pipistrelle passes between 04.04 and 04.10.		

### Surveyor 2.1: Chris Schofield

Time	Species	Notes
03.54	Common pipistrelle	Flew between Building 1 and 2 north west to south east
04.08	Common pipistrelle	Flew around southern elevation of Building 2

### Surveyor 2.2: Jordan Prendergast

Time	Species	Notes
03.54	Common pipistrelle	Distant pass, heard not seen
04.08	Common pipistrelle	Flew between Buildings 2 and 10 south east to north west
04.09	Common pipistrelle	Flew between Buildings 2 and 10 north west to south east
<i>Anabat Express detected:</i> 6 common pipistrelle passes between 03.16 and 04.01.		

### 3<sup>rd</sup> Repetition, 18<sup>th</sup> August 2016 (Sunrise 05.57)

### Surveyor 1.1: Tracy Cumberbatch

No bat activity or re-entry observed.		
<i>Anabat Express detected:</i> 12 common pipistrelle passes between 04.30 and 05.08; and 2 soprano pipistrelle passes at 04.34.		

### Surveyor 1.2: Amy Sharples

Time	Species	Notes
04.30 to 04.49	Common pipistrelle	7 Distant passes, heard not seen
04.53	Common pipistrelle	Commuting south-west to north-east passed Building 1
04.57 to 05.00	Common pipistrelle	4 distance passes, heard not seen
05.03	Common pipistrelle	Circled in front of Building 1 before travelling south
05.08 to 05.22	Common pipistrelle	5 distant passes, heard not seen

### Surveyor 1.3: Charlotte Harrison-Bryant

Time	Species	Notes
04.40	Common pipistrelle	Flew passed Building 1 south to north east
04.47	Common pipistrelle	Distant pass, heard not seen
04.53	Common pipistrelle	Flew passed Building 1 south to north east
05.08	Common pipistrelle	Distant pass, heard not seen
<i>Anabat Express detected:</i> 7 common pipistrelle passes between 04.33 and 05.33		

### Surveyor 1.3: Nicola Wallbank

Time	Species	Notes
04.44	Common pipistrelle	Flew east to north-west over Building 2
04.47	Common pipistrelle	Distant pass, heard not seen
04.48	Common pipistrelle	Circled in front of Building 2 and flew north-west
04.57	Common pipistrelle	Circled above Building 1 and flew south-west
05.32	Common pipistrelle	Flew south-east to north-west over Building 2
05.39	Common pipistrelle	Flew north-west to south-east over Building 2
05.42 to 05.46	Common pipistrelle	Circled around Building 2
05.46	Common pipistrelle	<b>One bat re-entered between wall top and soffit box at the southern elevation of Building 2 (Roost 2.1)</b>

### Surveyor 2.1: Chris Schofield

Time	Species	Notes
04.47	Common pipistrelle	Distant pass, heard not seen
04.51	Common pipistrelle	Distant pass, heard not seen
04.57	Common pipistrelle	Flew east to west across Building 1 and 10
05.05	Common pipistrelle	Flew west to east across Building 2
05.32 to 05.34	Common pipistrelle	2 bats circling Building 2
05.34	Common pipistrelle	<b>2 bats re-entered a hole in brick work at the southern elevation of Building 2 (Roost 2.2)</b>
05.43	Common pipistrelle	Flew south west to north-east over Building 2
<i>Anabat SD detected:</i> 10 common pipistrelle passes between 04.33 and 05.46		

### Surveyor 2.2: Jordan Prendergast

Time	Species	Notes
04.42	Soprano pipistrelle	Flew south-east to north-west in front on Building 10
04.49	Common pipistrelle	Flew south-east to north-west in front on Building 10
04.52	Common pipistrelle	Flew south-west to north-east over Building 10 and 2
05.33	Common pipistrelle	Flew south-east to north-west in front on Building 10
05.44	Common pipistrelle	Flew south-east to north-west in front on Building 10



## Buildings 3 and 10

### 1<sup>st</sup> Repetition, 24<sup>th</sup> May 2016 (Sunrise 04.58)

#### Surveyor 10.1: Aidan Pickering

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 19 common pipistrelle passes between 03.49 and 04.34; and 4 noctule passes between 03.59 and 04.41.

#### Surveyor 3.1: Tracy Cumberbatch

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 11 common pipistrelle passes between 03.30 and 04.24; and 2 noctule passes at 04.12 and 04.41.

#### Surveyor 3.2: Marie Pickering

Time	Species	Notes
03:42	Noctule	Distant pass, heard not seen
03:52	Common pipistrelle	Distant pass, heard not seen
03:58	Common pipistrelle	Distant pass, heard not seen
04:04	Common pipistrelle	Distant pass, heard not seen
04:18	Common pipistrelle	Distant pass, heard not seen
04:35	Common pipistrelle	Distant pass, heard not seen
04:40	Common pipistrelle	Distant pass, heard not seen
<i>Anabat Express detected:</i> 9 common pipistrelle passes between 03.42 and 04.44; and 3 noctule passes between 04.12 and 04.41.		

#### Surveyor 3.3: Amy Sharples

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 2 common pipistrelle passes at 03.49 and 04.05; and 1 noctule pass at 04.41.

#### Surveyor 3.4: Nicola Wallbank

Time	Species	Notes
03:49	Common pipistrelle	Commuting north to south to west of Building 3
04:05	Common pipistrelle	Foraging at trees to south of Building 3
04:19	Common pipistrelle	Commuting north to south to west of Building 3
04:41	Noctule	Commuting above Building 3, south-east to north-west
<i>Anabat SD detected:</i> 10 common pipistrelle passes between 03.44 and 04.23; and 1 noctule pass at 04.41.		

### 2<sup>nd</sup> Repetition, 29<sup>th</sup> June 2016 (Sunrise 04.47)

#### Surveyor 3.1: Tracy Cumberbatch

No bat activity or re-entry observed.
<i>Anabat Express detected:</i> 1 common pipistrelle pass at 03.31.

#### Surveyor 3.2: Jordan Prendergast

Time	Species	Notes
03.28	Common pipistrelle	Distant pass, heard not seen
03.44	Common pipistrelle	Distant pass, heard not seen
04.02	Common pipistrelle	Distant pass, heard not seen

### Surveyor 3.3: Amy Sharples

No bat activity or re-entry observed.

*Anabat Express detected:*

2 common pipistrelle passes at 03.52 and 04.03.

### Surveyor 3.4: Nicola Wallbank

Time	Species	Notes
03.51	Common pipistrelle	Distant pass, heard not seen
04.02	Common pipistrelle	Flew over Building 3 south east to north west

### *Repetition 3, 29<sup>th</sup> July 2016 (Sunrise 05.24)*

### Surveyor 3.1: Aidan Pickering

Time	Species	Notes
04.08 to 04.38	Common pipistrelle	6 distant passes, heard not seen
04.42	Common pipistrelle	Circled in front of Building 3
05.03	Common pipistrelle	Flew north to south over Building 3
<i>Anabat Express detected:</i>		
16 common pipistrelle passes between 04.06 and 04.44		

### Surveyor 3.2: Marie Pickering

Time	Species	Notes
04.06	Common pipistrelle	Circled above Building 3 and flew north-east
04.17 to 04.41	Common pipistrelle	4 distant passes, heard not seen
<i>Anabat Express detected:</i>		
13 common pipistrelle passes between 04.06 and 04.41		

### Surveyor 3.3: Chris Schofield

Time	Species	Notes
04.04 to 04.40	Common pipistrelle	7 distant passes, heard not seen

### Surveyor 3.4: Nicola Wallbank

Time	Species	Notes
04.05	Common pipistrelle	Distant pass, heard not seen
04.22	Common pipistrelle	Flew across front of Building 3 north-west to south-east
04.25	Common pipistrelle	Distant pass, heard not seen
04.28	Common pipistrelle	Distant pass, heard not seen
04.41	Common pipistrelle	Foraging around trees in front of Building 3 before flying south

### Building 12

### *1<sup>st</sup> Repetition, 3<sup>rd</sup> June 2016 (Sunrise 04.48)*

### Surveyor 12.1: Amy Sharples

Time	Species	Notes
03:07 to 03:06	Common pipistrelle	Foraging in woodland surrounding building
<i>Anabat Express detected:</i>		
38 common pipistrelle passes between 03.09 and 04.13; and 4 soprano pipistrelle passes between 03.16 and 03.54.		

### Surveyor 12.2: Nicola Wallbank

Time	Species	Notes
03:10 to 04.15	Common pipistrelle	Foraging in adjacent woodland, not constant activity but

	frequent passes.
<i>Anabat SD detected:</i> 36 common pipistrelle passes between 03.19 and 04.04; and 3 soprano pipistrelle passes between 03.16 and 03.54.	

**2<sup>nd</sup> Repetition, 6<sup>th</sup> July 2016 (Sunrise 04.53)**

**Surveyor 12.1: Jordan Prendergast**

Time	Species	Notes
03.24	Common pipistrelle	Distant pass, heard not seen
03.31	Common pipistrelle	Distant pass, heard not seen
03.33	Common pipistrelle	Distant pass, heard not seen
03.38	Common pipistrelle	Distant pass, heard not seen
03.43	Common pipistrelle	Foraging among adjacent trees
03.48	Common pipistrelle	Foraging among adjacent trees
03.58	Common pipistrelle	Foraging among adjacent trees
04.00	Common pipistrelle	Distant pass, heard not seen
04.02	Common pipistrelle	Distant pass, heard not seen
04.08	Common pipistrelle	Foraging among adjacent trees
04.13	Common pipistrelle	Foraging among adjacent trees
<i>Anabat Express detected:</i> 28 common pipistrelle passes between 03.25 and 04.21.		

**Surveyor 12.2: Nicola Wallbank**

Time	Species	Notes
03.31 to 04.00	Common pipistrelle	7 distant passes in adjacent woodland.
04.00	Noctule	Distant pass, heard not seen
04.02 to 04.20	Common pipistrelle	6 distant passes in adjacent woodland.

## 9.5 Transect Surveys, Raw Survey Data

**Table 9.6: Transect Survey Dates, Weather Conditions and Surveyors**

Date	11 <sup>th</sup> May 2016	21 <sup>st</sup> June 2016	27 <sup>th</sup> July 2016	1 <sup>st</sup> September 2016
Sunset	21.00	21.44	21.15	20.01
Start time	21.00	21.44	21.15	20.01
End time	23.00	23.45	23.15	22.05
Wind	Bft scale 1 (light air)	Bft scale 0 (calm)	Bft scale 0 (calm)	Bft scale 0 (calm)
Precipitation	Dry	Dry	Dry	Dry
Air temperature	14°C	15°C	17°C	18°C
Transect Route	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>	Surveyor and Detector <sup>1</sup>
1	Amy Sharples Batbox III & AE Tracey Cumberbatch Batbox Duet & SD	Amy Sharples Batbox III & AE Tracey Cumberbatch Batbox Duet & SD	Amy Sharples Batbox III & AE Marie Pickering Batbox Duet & AE	Amy Sharples Batbox III & AE Charlotte Harrison-Bryant Batbox Duet
2	Brian Robinson Batbox Duet Chris Schofield Batbox Duet & AE	Brian Robinson Batbox Duet & AE	Nicola Wallbank Batbox Duet & AE	Chris Schofield Batbox Duet & AE Darren Graham Batbox III
3	Nicola Wallbank Batbox Duet & AE Gareth Harrison Batbox Duet & SD	Nicola Wallbank Batbox Duet & AE Jordan Prendergast Bat Scanner & AE	Aidan Pickering Batbox Duet & AE Jordan Prendergast Bat Scanner & AE	Nicola Wallbank Batbox Duet & AE Jordan Prendergast Bat Scanner
<sup>1</sup> AE = Anabat Express Unit SD = Anabat SD 2				

**Table 9.7: Activity by Point Count Location, 1<sup>st</sup> Repetition, 11<sup>th</sup> May 2016 (Sunset 21.00)**

### Transect 1

Point Count Location Ref.	Data Recorded by Species	
1.A	Common pipistrelle recorded during all 8 counts made. Continuous (i.e. 30 passes) activity recorded on 3 counts. No other species recorded.	
1.B	No activity recorded on 2 of the 7 counts made. Common pipistrelle recorded on the remaining 5, with a maximum of four passes. No other species recorded.	
1.C	No activity recorded on 3 of the 8 counts made. Common pipistrelle recorded during 5 counts. Maximum five passes of common pipistrelle on any one count. No other bats detected.	
1.D	No activity recorded on 2 of the 8 counts made. Common pipistrelle recorded during 5 counts. Maximum 12 passes of common pipistrelle on any one count. Noctule pass recorded once at 21:06. One <i>Myotis</i> pass recorded once at 22:37. No other bats detected.	
1.E	No activity recorded on 3 of the 8 counts made. Common pipistrelle recorded during 5 counts. Maximum count of 5 passes of common pipistrelle on any one count. No other bats recorded.	
Totals for Transect 1	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	169 (total). Highest count at Point 1.A (109 passes), Lowest count at Point 1.C (11 passes)
	Noctule	1 pass recorded, at Point 1.D
	<i>Myotis</i>	1 pass recorded, at Point 1.C

## Transect 2

Point Count Location Ref.	Data Recorded by Species	
2.A	No activity recorded during 5 of the 8 counts. 1 common pipistrelle recorded on each of the remaining 3 counts. No other bat species recorded.	
2.B	No activity recorded during 7 of the 8 counts. 1 common pipistrelle recorded on the remaining counts. No other bat species recorded.	
2.C	No activity recorded during 6 of the 8 counts. Common pipistrelle recorded during 2 counts. Maximum of 7 common pipistrelle passes recorded on any one count. No other bat species recorded.	
2.D	No activity recorded during 4 of the 8 counts. Common pipistrelle recorded during 4 counts. Maximum count of 6 common pipistrelle recorded on any one count. 1 soprano pipistrelle pass recorded at 21:50. No other bat species recorded.	
2.E	No activity recorded during any of the 8 counts.	
Totals for Transect 2	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	21 (total). Highest count at Points 2.C and 2.D (8 passes), Lowest count at Point 2.E (absent)
	Soprano pipistrelle	1 pass recorded, at Point 2.D

## Transect 3

Point Count Location Ref.	Data Recorded by Species	
3.A	Activity recorded during each of the 4 counts made. Common pipistrelle recorded during 4 counts. Maximum of 4 passes recorded on any one count. No other bat species recorded.	
3.B	1 common pipistrelle pass recorded at 22:25. No other bat species recorded.	
3.C	Activity recorded during 3 of the 4 counts made. Common pipistrelle recorded during 3 counts. Maximum of 1 pass recorded during any one count. No other bat species recorded.	
3.D	Activity recorded during each of the 4 count made. Common pipistrelle recorded during 4 counts. Maximum of 2 passes recorded during any one count. No other bat species recorded.	
3.E	Activity recorded during each of the 4 counts made. Common pipistrelle recorded during 4 counts. Maximum of 7 passes recorded during any one count. No other bat species recorded.	
3.F	Activity recorded during each of the 4 counts made. Common pipistrelle recorded during 4 counts. Continuous activity recorded during 1 count. No other bat species recorded.	
3.G	Activity recorded during each of the 5 counts made. Common pipistrelle recorded during 5 counts. Continuous activity recorded during 2 counts. No other bat species recorded.	
3.H	Activity recorded during 2 of the 4 counts made. Common pipistrelle recorded during 2 counts. Maximum of 4 passes recorded during any one count. No other bat species recorded.	
Totals for Transect 3	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	125 (total). Highest count at Point 3.D. Lowest count at Point 3.B (1).



**Table 9.8: Activity by Point Count Location, 2<sup>nd</sup> Repetition, 21<sup>st</sup> June 2016 (Sunset 21.44)**

**Transect 1**

Point Count Location Ref.	Data Recorded by Species	
1.A	No activity recorded on 6 of the 8 counts made. Common pipistrelle was detected during 2 counts. Maximum of 2 passes recorded on any one count. No other bats detected.	
1.B	No activity was recorded on 5 of the 8 counts made. Common pipistrelle was recorded 3 counts. Continuous (i.e. 30 passes) activity recorded on 1 count. No other bat species recorded.	
1.C	No activity was recorded on 5 of the 8 counts made. Common pipistrelle was recorded during 3 counts. Maximum of 15 passes recorded on any one count. No other bat species recorded.	
1.D	No activity recorded on 1 of the 8 counts made. Common pipistrelle was recorded during 7 counts. Continuous (i.e. 30 passes) activity was recorded during 2 counts. Soprano pipistrelle was recorded during 3 counts. No other bat species recorded.	
1.E	No activity recorded on 2 of the 8 counts made. Common pipistrelle recorded during 6 counts. Maximum of 23 passes recorded on any one count. Soprano pipistrelle was recorded during 2 counts and <i>Myotis</i> species was recorded at 22.11. No other species recorded.	
Totals for Transect 1	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	188 (total). Highest count at Point 1.D (95 passes), Lowest count at Point 1.A (3 passes)
	Soprano pipistrelle	5 (total). Highest count at Point 1.D (3 passes), Lowest count at 1.A, B, and C (absent)
	<i>Myotis</i> species	1 pass at Point 1.E

**Transect 2**

Point Count Location Ref.	Data Recorded by Species	
2.A	No activity was recorded on 2 of the 4 counts made. Common pipistrelle was recorded during 3 counts. Continuous (i.e. 30 passes) activity was recorded during 2 counts. No other bat species recorded.	
2.B	No activity was recorded on 1 of the 4 counts made. Common pipistrelle was recorded during 3 counts. Maximum of 11 passes recorded on any one count. 1 soprano pipistrelle pass was recorded at 22.50. No other bat species recorded.	
2.C	No bat activity was recorded on any of the 4 counts made.	
2.D	No activity was recorded on 3 of the 4 counts made. One common pipistrelle pass was recorded. No other bat species recorded.	
2.E	No activity was recorded on 2 of the 4 counts made. Common pipistrelle was recorded during 2 counts. Maximum of 9 passes recorded on any one count. No other bat species recorded.	
Totals for Transect 2	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	88 (total). Highest count at Point 2.A (62 passes), Lowest count at Point 2.C (absent)
	Soprano pipistrelle	1 pass recorded, at Point 2.B

### Transect 3

Point Count Location Ref.	Data Recorded by Species	
3.A	No activity was recorded during 2 of the 4 counts made. All three bat passes recorded during 2 of the 4 counts were distant and could not be identified to species. No other bat species recorded.	
3.B	No activity was recorded during 3 of the 4 counts made. 1 noctule pass was recorded at 22.23. No other bat species recorded.	
3.C	No activity was recorded during 1 of the 4 counts made. Common pipistrelle was recorded during 3 counts and soprano pipistrelle was recorded during 2 counts. Maximum of 1 pass was recorded for both species during any one count. No other bat species recorded.	
3.D	Activity recorded during all 4 counts made. Common pipistrelle was recorded during 3 counts, and soprano pipistrelle was recorded during 1 count. Continuous common pipistrelle activity was recorded during 1 count. Maximum of 4 soprano pipistrelle passes were recorded during any one count. No other bat species recorded.	
3.E	No activity was recorded on 1 of the 4 counts made. Common pipistrelle was recorded during 3 counts. Continuous common pipistrelle activity was recorded during 1 count. 5 soprano pipistrelle passes were recorded during 1 count. No other species recorded.	
3.F	Activity recorded during all 4 counts made. Common pipistrelle was recorded during all 4 counts. Maximum of 13 common pipistrelle passes were recorded during any one count. 1 soprano pipistrelle pass was recorded on 1 count. No other bat species recorded.	
3.G	No activity was recorded on 1 of the 4 counts made. Common pipistrelle was recorded during 3 counts. Continuous common pipistrelle and soprano pipistrelle activity was recorded during 1 count. No other bat species recorded.	
3.H	No activity was recorded on 1 of the 4 counts made. Common pipistrelle recorded during 3 counts. Maximum of 5 common pipistrelle passes in any one count. Soprano pipistrelle recorded during 2 counts. Maximum of 2 soprano pipistrelle passes in any one count. No other bat species recorded.	
Totals for Transect 3	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	144 (total). Highest count at Point 3D (43 passes). Lowest count at Point 3.C (3 passes).
	Soprano pipistrelle	37 (total). Highest count at Point 3.G (17 passes). Lowest count at Point 3.F (1 pass).
	Noctule	1 pass recorded at Point 3.B.

**Table 9.9: Activity by Point Count Location, 3<sup>rd</sup> Repetition, 27<sup>th</sup> July 2016 (Sunset 21.15)**

**Transect 1**

Point Count Location Ref.	Data Recorded by Species	
1.A	No activity was recorded on 2 of the 8 counts made. Common pipistrelle was detected during 6 counts. Maximum of 8 passes recorded on any one count. No other bats detected.	
1.B	No activity was recorded on 2 of the 8 counts made. Common pipistrelle was recorded during 6 counts. Maximum of 10 passes recorded on any one count. One soprano pipistrelle pass was recorded at 21.33. No other bats detected.	
1.C	No activity was recorded on 2 of the 8 counts made. Common pipistrelle was recorded during 7 counts. Maximum of 12 passes recorded on any one count. Two soprano pipistrelle passes were recorded during 1 count. One <i>Myotis</i> species pass was recorded at 22.02. No other bat species recorded.	
1.D	No activity recorded on 2 of the 8 counts made. Common pipistrelle was recorded during 6 counts. Continuous (i.e. 30 passes) activity was recorded during 1 count. One soprano pipistrelle pass was recorded at 22.17. No other bats recorded.	
1.E	No activity recorded on 2 of the 8 counts made. Common pipistrelle was detected during 6 counts. Maximum of 15 passes recorded during any one count. One soprano pipistrelle pass recorded during 2 counts at 22.17 and 22.35. One noctule pass recorded at 21.42. No other bats detected.	
Totals for Transect 1	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	211 (total). Highest count at Point 1.C (49 passes), Lowest count at Point 1.B (24 passes)
	Soprano pipistrelle	6 (total). Highest count at Points 1.C and E (2 passes), Lowest count at 1.A (absent)
	<i>Myotis</i> species	1 pass at Point 1.C
	Noctule	1 pass at Point 1.E

**Transect 2**

Point Count Location Ref.	Data Recorded by Species	
2.A	No activity recorded during all 3 counts made.	
2.B	No activity recorded during 2 of the 3 counts made. Three common pipistrelle passes recorded during 1 count. No other bats detected.	
2.C	No activity recorded during 2 of the 3 counts made. One common pipistrelle pass recorded during 1 count. No other bats detected.	
2.D	No activity recorded during all 3 counts made.	
2.E	No activity recorded during all 3 counts made.	
Totals for Transect 2	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	4 (total). Highest count at Point 2.B (3 passes), Lowest count at Points 2.A, D and E (absent)

### Transect 3

Point Count Location Ref.	Data Recorded by Species	
3.A	No activity was recorded during 2 of the 4 counts made. One common pipistrelle pass was recorded during 2 counts. No other bats were detected.	
3.B	No activity was recorded during 1 of the 3 counts made. Common pipistrelle was recorded during 2 counts. Maximum of 2 passes recorded during any 1 count. No other bats detected.	
3.C	Activity was recorded during all 4 counts made. Common pipistrelle was recorded during 4 counts. Maximum of 9 passes during any one count. No other bat species recorded.	
3.D	No activity recorded during 1 of the 4 counts made. Common pipistrelle recorded during 3 counts. Maximum of 4 passes recorded during any one count. No other bat species recorded.	
3.E	No activity recorded on 1 of the 4 counts made. One common pipistrelle pass recorded during 3 counts. One soprano pipistrelle pass recorded at 22.46. No other bats detected.	
3.F	No activity recorded during 1 count made. Common pipistrelle recorded during 3 counts. Continuous activity recorded during 1 count. One brown long-eared pass recorded during 1 count. No other bats detected.	
3.G	Activity was recorded during all 4 counts made. Common pipistrelle was recorded during 4 counts. Continuous activity was recorded during 1 count. Soprano pipistrelle was recorded during 2 counts. Maximum of 3 passes during any one count. No other bats were detected.	
3.H	No activity was recorded during 1 of the 4 counts made. One common pipistrelle pass was recorded during 3 counts. One soprano pipistrelle pass was recorded at 22.14. One brown long-eared passes was recorded during 2 counts at 21.41 and 23.13. No other bats were detected.	
Totals for Transect 3	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	133 (total). Highest count at Point 3.G (32 passes). Lowest count at Point 3.A (2 passes).
	Soprano pipistrelle	6 (total). Highest count at Point 3.G (3 passes). Lowest count at Points 3.A, B, C, D or F (absent).
	Brown long-eared	2 (total) 1 pass recorded at Point 3.F and 1 pass at Point 3.H



**Table 9.10: Activity by Point Count Location, 4<sup>th</sup> Repetition, 1<sup>st</sup> September 2016 (Sunset 20.01)**

**Transect 1**

Point Count Location Ref.	Data Recorded by Species	
1.A	No activity was recorded on 4 of the 6 counts made. Common pipistrelle was detected during 2 counts. Maximum of 6 passes recorded on any one count. Two Noctule passes detected during 1 count. No other bats detected.	
1.B	Activity recorded during all 6 counts made. Common pipistrelle was detected during all 6 counts made. Maximum of 15 passes recorded on any one count. No other bats detected.	
1.C	Activity recorded during all 7 counts made. Common pipistrelle was detected during all 7 counts made. Maximum of 14 passes recorded on any one count. No other bat species recorded.	
1.D	No activity recorded on 1 of the 7 counts made. Common pipistrelle was detected during 6 counts. Maximum of 20 passes recorded on any one count. No other bats recorded.	
1.E	Activity recorded during all 4 counts made. Common pipistrelle was detected during 4 counts. Maximum of 17 passes recorded on any one count. No other bats detected.	
Totals for Transect 1	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	201 (total). Highest count at Point 1.D (69 passes), Lowest count at Point 1.A (6 passes)
	Noctule	2 passes at Point 1.A

**Transect 2**

Point Count Location Ref.	Data Recorded by Species	
2.A	No activity recorded during 5 of the 6 counts made. One common pipistrelle pass recorded during 1 count. No other bats detected.	
2.B	Activity recorded during all 5 counts made. Common pipistrelle detected during 5 counts. Maximum of 4 passes recorded on any one count. No other bats detected.	
2.C	No activity recorded during 4 of the 6 counts made. Common pipistrelle detected during 2 counts. Maximum of 2 passes recorded on any one count. No other bats detected.	
2.D	No activity recorded during 5 of the 6 counts made. One common pipistrelle pass recorded during 1 count. No other bats detected.	
2.E	No activity recorded during 4 of the 5 counts made. One common pipistrelle pass recorded during 1 count.	
Totals for Transect 2	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	17 (total). Highest count at Point 2.B (11 passes), Lowest count at Points 2.A, D and E (1 pass)

### **Transect 3**

<b>Point Count Location Ref.</b>	<b>Data Recorded by Species</b>	
3.A	No activity was recorded during 1 of the 4 counts made. Common pipistrelle was recorded during 2 counts. Maximum of 2 passes recorded during any 1 count. Two soprano pipistrelle passes recorded during 1 count. No other bats were detected.	
3.B	No activity was recorded during 3 of the 4 counts made. Two common pipistrelle passes recorded during 1 count. No other bats detected.	
3.C	No activity was recorded during 1 of the 4 counts made. Common pipistrelle was recorded during 3 counts. Maximum of 2 passes during any one count. No other bat species recorded.	
3.D	No activity recorded during 1 of the 4 counts made. Common pipistrelle recorded during 3 counts. Maximum of 8 passes recorded during any one count. No other bat species recorded.	
3.E	No activity recorded during 2 of the 4 counts made. Common pipistrelle recorded during 2 counts. Maximum of 7 passes recorded during any one count. No other bats detected.	
3.F	Activity was recorded during all 4 counts made. Common pipistrelle recorded during 4 counts. Continuous activity recorded during 1 count. No other bats detected.	
3.G	Activity was recorded during all 4 counts made. Common pipistrelle was recorded during 4 counts. Continuous activity was recorded during 1 count. No other bats were detected.	
3.H	No activity was recorded during 2 of the 4 counts made. One common pipistrelle pass was recorded during 2 counts. No other bats were detected.	
Totals for Transect 3	<i>Species:</i>	<i>Total no. passes for transect and highest / lowest point counts:</i>
	Common pipistrelle	140 (total). Highest count at Point 3.F (60 passes). Lowest count at Point 3.B and H (2 passes).
	Soprano pipistrelle	2 passes recorded at Point 3.A.

## 9.6 Automatic/ Static Survey Results, Raw Survey Data and Analysis

1<sup>st</sup> Repetition, 11<sup>th</sup> to 15 May 2016

### Location 1

**Table 9.11:** Total Number of Anabat Recordings at Location 1, between 11<sup>th</sup> and 15<sup>th</sup> May

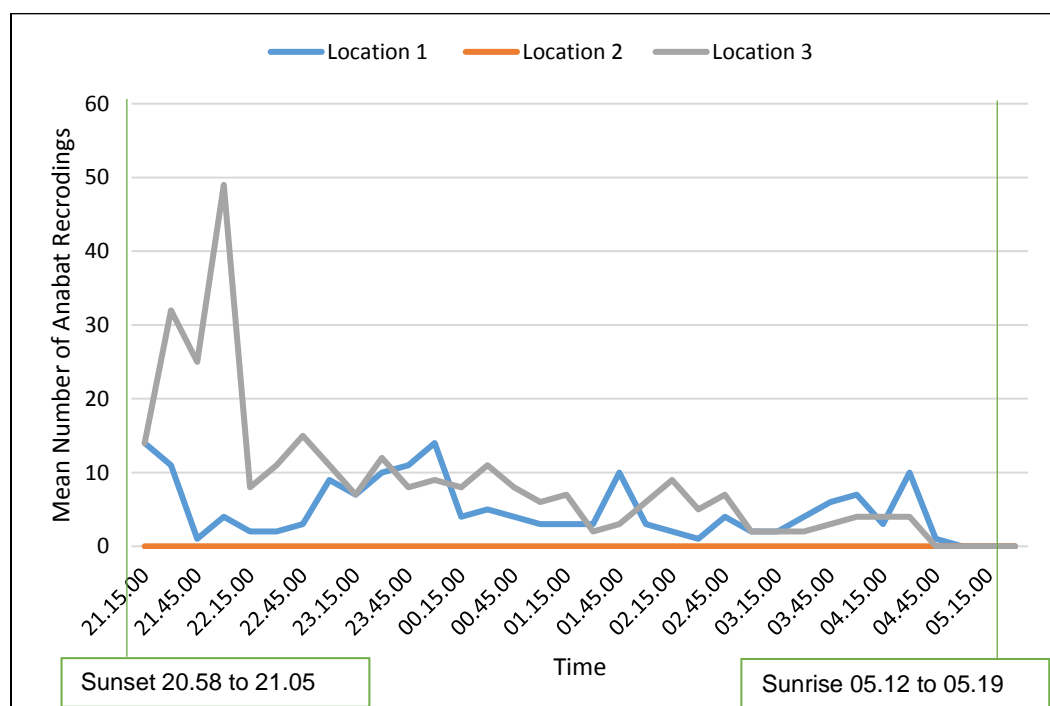
Date	Common pipistrelle	Soprano pipistrelle	Brown long-eared bat	Myotis species	Total
11 <sup>th</sup> May 2016	198	1	1	0	200
12 <sup>th</sup> May 2016	237	0	0	1	238
13 <sup>th</sup> May 2016	93	0	1	1	95
14 <sup>th</sup> May 2016	57	0	0	1	58
15 <sup>th</sup> May 2016	131	0	1	0	132
Total	716	1	3	3	723

### Location 3

**Table 9.12:** Total Number of Anabat Recordings at Location 3, between 11<sup>th</sup> and 15<sup>th</sup> May

Date	Common pipistrelle	Brown long-eared bat	Total
11 <sup>th</sup> May 2016	119	1	120
12 <sup>th</sup> May 2016	381	0	381
13 <sup>th</sup> May 2016	41	0	41
Total	541	1	542

**Graph 9.1:** Mean Number of Anabat Recordings at Each Location between 11<sup>th</sup> and 15<sup>th</sup> May



9.6.1 Note: The Anabat Express unit was recording noise files throughout this period at Location 2, and gave no error messages within its log files. It can be reasonably assumed that the lack of recordings is due to a lack of bat passes at this location.

**2<sup>nd</sup> Repetition, 21<sup>st</sup> to 26<sup>th</sup> June 2016**

**Location 1**

**Table 9.13: Total Number of Anabat Recordings at Location 1, between 21<sup>st</sup> and 26<sup>th</sup> June**

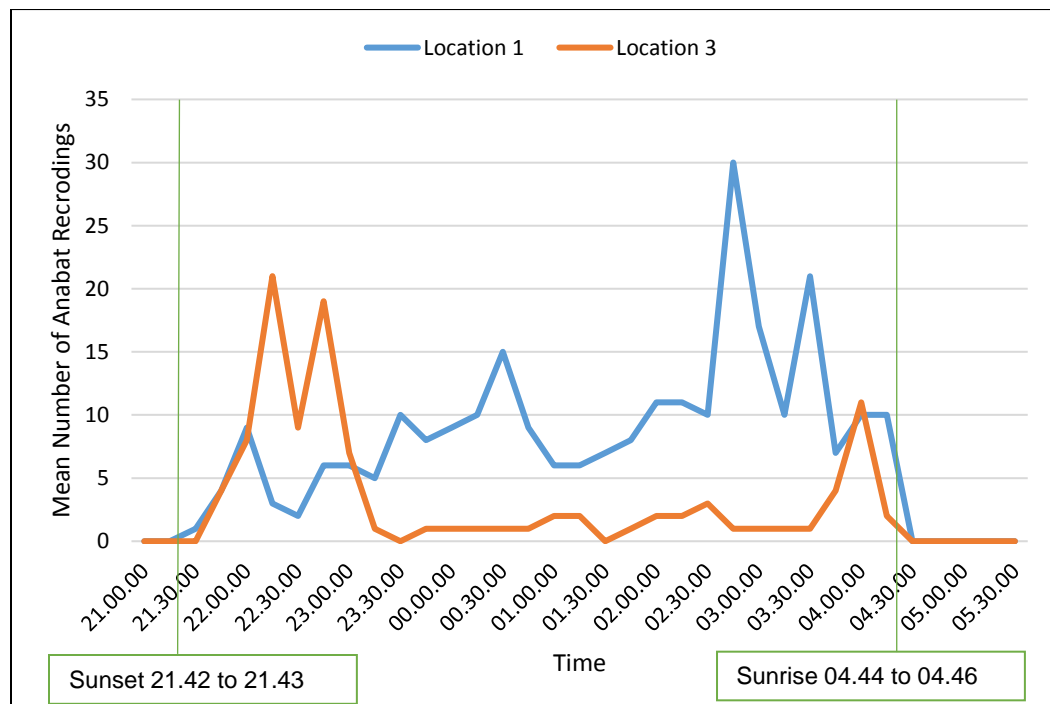
Date	Common pipistrelle	Soprano pipistrelle	Noctule	Total
21 <sup>st</sup> June 2016	250	0	13	263
22 <sup>nd</sup> June 2016	400	6	0	406
23 <sup>rd</sup> June 2016	132	0	0	132
24 <sup>th</sup> June 2016	203	0	1	204
25 <sup>th</sup> June 2016	174	1	0	175
26 <sup>th</sup> June 2016	44	0	0	44
<b>Total</b>	<b>1203</b>	<b>7</b>	<b>14</b>	<b>1224</b>

**Location 3**

**Table 9.14: Total Number of Anabat Recordings at Location 3, between 21<sup>st</sup> and 26<sup>th</sup> June**

Date	Common pipistrelle	Soprano pipistrelle	Noctule	Total
21 <sup>st</sup> June 2016	145	1	5	156
22 <sup>nd</sup> June 2016	69	0	1	70
23 <sup>rd</sup> June 2016	106	0	0	106
24 <sup>th</sup> June 2016	46	0	0	46
25 <sup>th</sup> June 2016	9	0	1	10
26 <sup>th</sup> June 2016	4	0	0	4
<b>Total</b>	<b>379</b>	<b>1</b>	<b>7</b>	<b>392</b>

**Graph 9.2: Mean Number of Anabat Recordings at Each Location between 21<sup>st</sup> and 26<sup>th</sup> June**





### 3<sup>rd</sup> Repetition, 27<sup>th</sup> to 31<sup>st</sup> July 2016

#### Location 1

**Table 9.15:** Total Number of Anabat Recordings at Location 1, between 27<sup>th</sup> and 31<sup>st</sup> July

Date	Common pipistrelle	Soprano pipistrelle	Noctule	Total
27 <sup>th</sup> July 2016	188	6	22	216
28 <sup>th</sup> July 2016	81	0	0	81
29 <sup>th</sup> July 2016	104	0	0	104
30 <sup>th</sup> July 2016	208	0	0	208
31 <sup>st</sup> July 2016	139	0	0	139
<i>Total</i>	720	6	22	748

#### Location 2

**Table 9.16:** Total Number of Anabat Recordings at Location 2, between 27<sup>th</sup> and 31<sup>st</sup> July

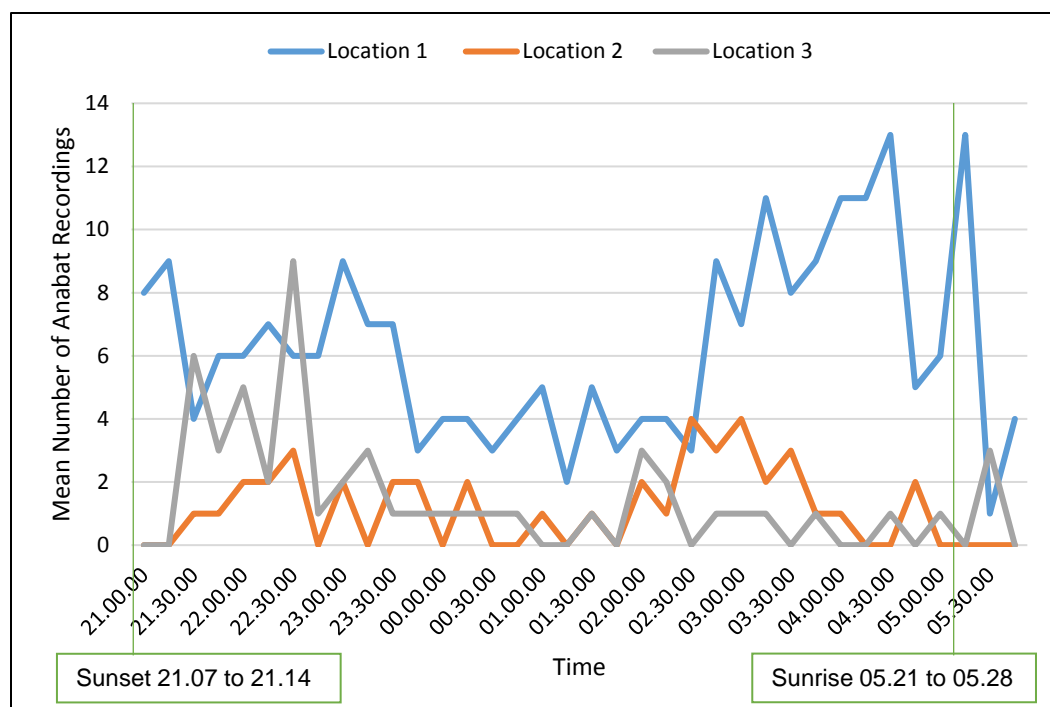
Date	Common pipistrelle	Noctule	Total
27 <sup>th</sup> July 2016	15	3	18
28 <sup>th</sup> July 2016	3	0	3
29 <sup>th</sup> July 2016	5	0	5
30 <sup>th</sup> July 2016	25	0	25
31 <sup>st</sup> July 2016	4	0	4
<i>Total</i>	52	3	55

#### Location 3

**Table 9.17:** Total Number of Anabat Recordings at Location 3, between 27<sup>th</sup> and 31<sup>st</sup> July

Date	Common pipistrelle	Soprano pipistrelle	Noctule	Myotis species	Total
27 <sup>th</sup> July 2016	52	1	0	0	53
28 <sup>th</sup> July 2016	4	0	8	0	12
29 <sup>th</sup> July 2016	14	0	0	0	14
30 <sup>th</sup> July 2016	23	0	0	1	24
31 <sup>st</sup> July 2016	12	0	0	0	12
<i>Total</i>	105	1	8	1	115

**Graph 9.3: Mean Number of Anabat Recordings at Each Location between 27<sup>th</sup> and 31<sup>st</sup> July**



**4<sup>th</sup> Repetition, 1<sup>st</sup> to 5<sup>th</sup> September 2016**

**Location 1**

**Table 9.18: Total Number of Anabat Recordings at Location 1, between 1<sup>st</sup> and 5<sup>th</sup> September 2016**

Date	Common pipistrelle	Soprano pipistrelle	Brown Long Eared	Noctule	Myotis Species	Total
1 <sup>st</sup> September 2016	200	3	0	22	0	225
2 <sup>nd</sup> September 2016	151	0	0	0	0	151
3 <sup>rd</sup> September 2016	226	0	0	2	1	229
4 <sup>th</sup> September 2016	40	17	0	0	1	58
5 <sup>th</sup> September 2016	172	14	4	0	0	190
Total	789	34	4	24	2	853

**Location 2**

**Table 9.19: Total Number of Anabat Recordings at Location 2, between 1<sup>st</sup> and 5<sup>th</sup> September 2016**

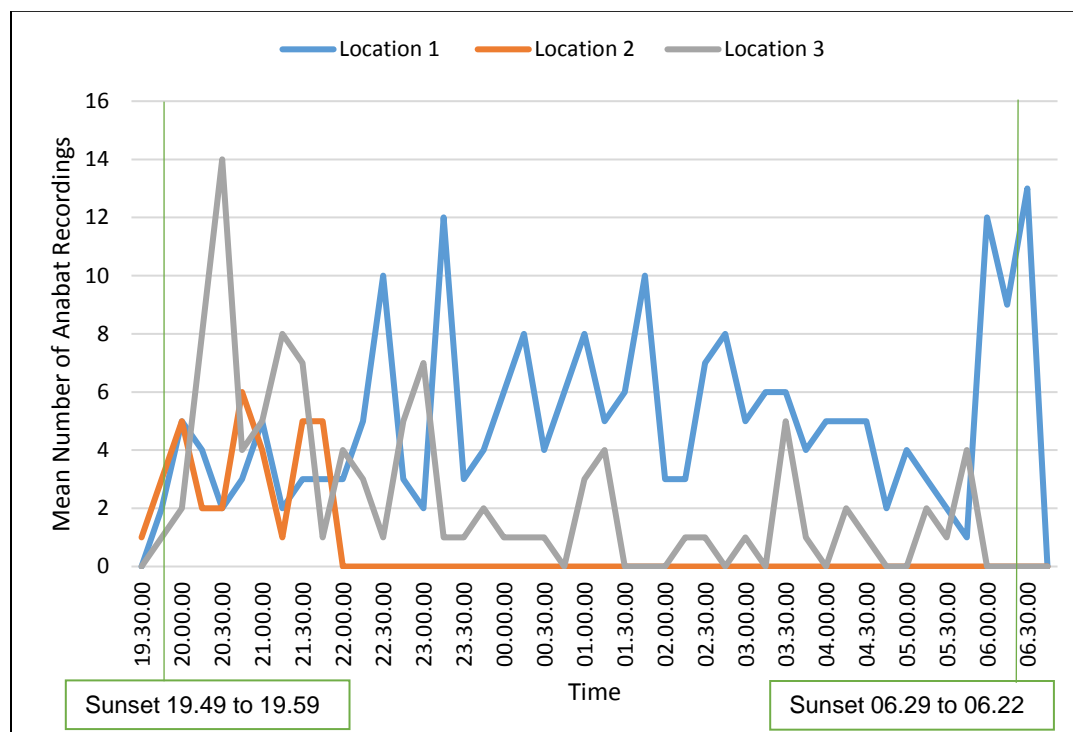
Date	Common pipistrelle	Noctule	Total
1 <sup>st</sup> September 2016	3	29	32
2 <sup>nd</sup> September 2016	0	1	1
3 <sup>rd</sup> September 2016	0	1	1
4 <sup>th</sup> September 2016	0	0	0
5 <sup>th</sup> September 2016	0	0	0
Total	3	31	34

### Location 3

**Table 9.20: Total Number of Recording by Species by Night at Location 3, between 1<sup>st</sup> and 5<sup>th</sup> September**

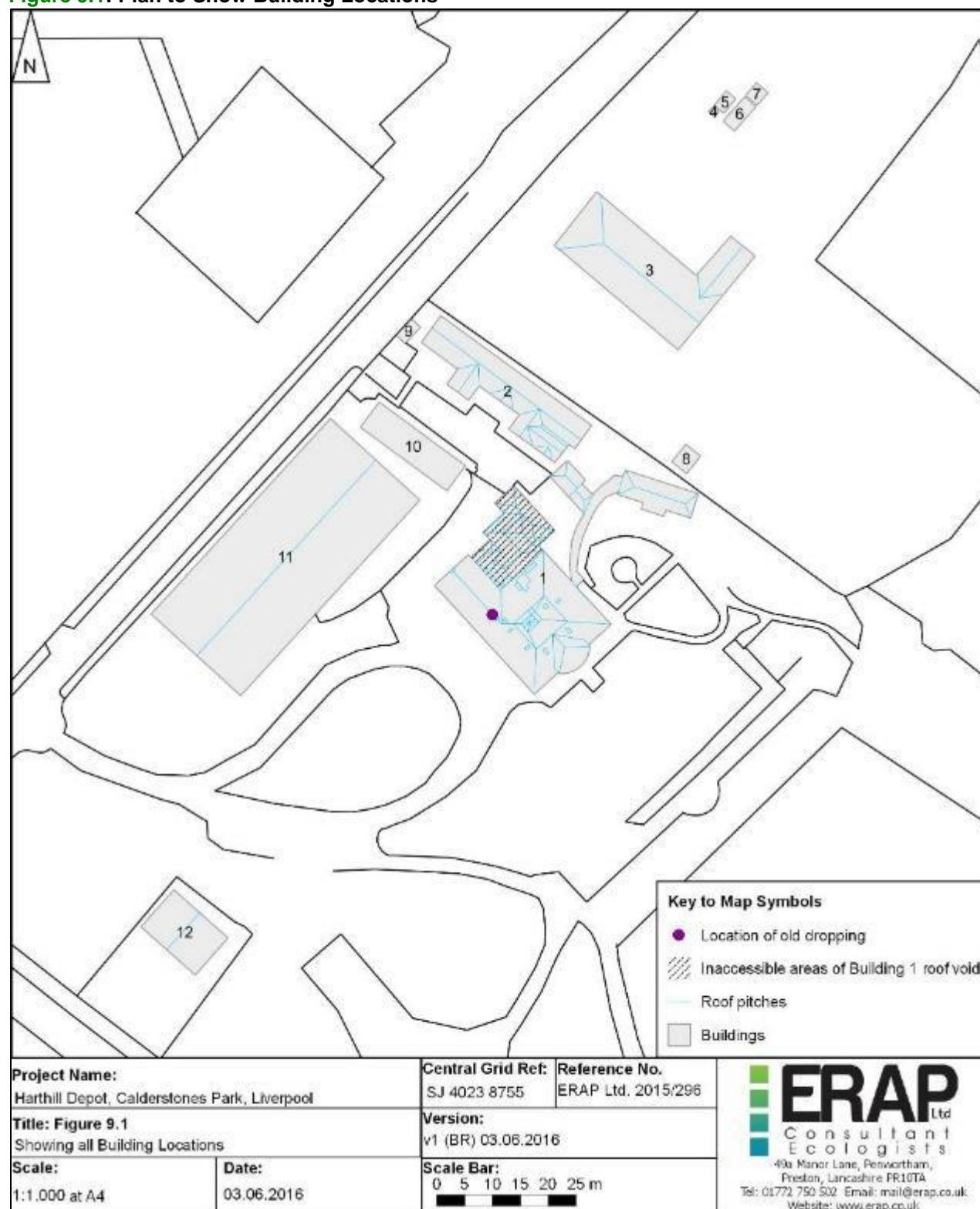
Date	Common pipistrelle	Noctule	Total
1 <sup>st</sup> September 2016	88	12	100
2 <sup>nd</sup> September 2016	47	0	47
3 <sup>rd</sup> September 2016	52	0	52
5 <sup>th</sup> September 2016	101	0	101
Total	288	12	300

**Graph 9.4: Mean Number of Anabat Recordings at Each Location between 1<sup>st</sup> and 5<sup>th</sup> September**



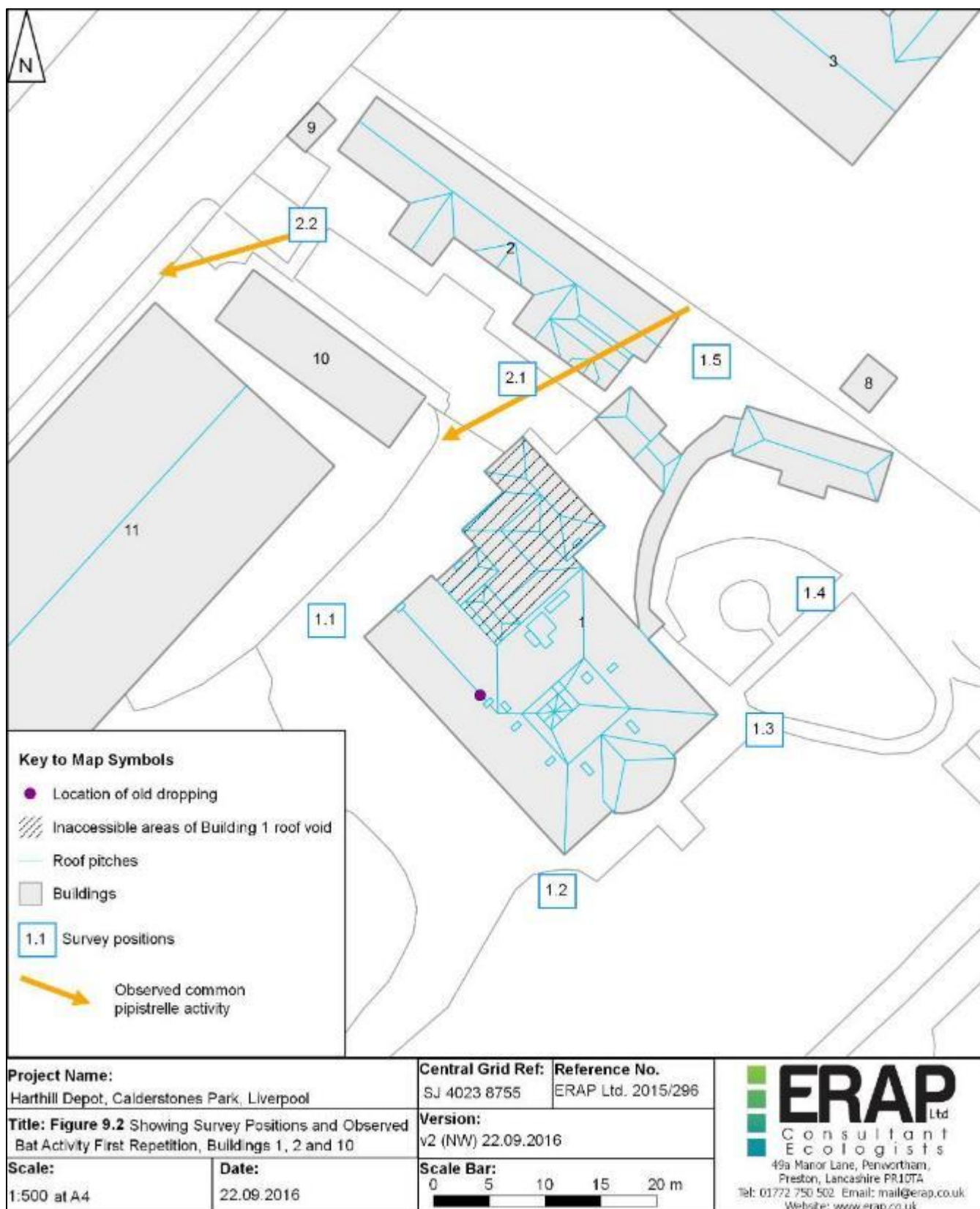
## 9.7 Figures Showing Buildings and Bat Activity Survey Results

**Figure 9.1: Plan to Show Building Locations**

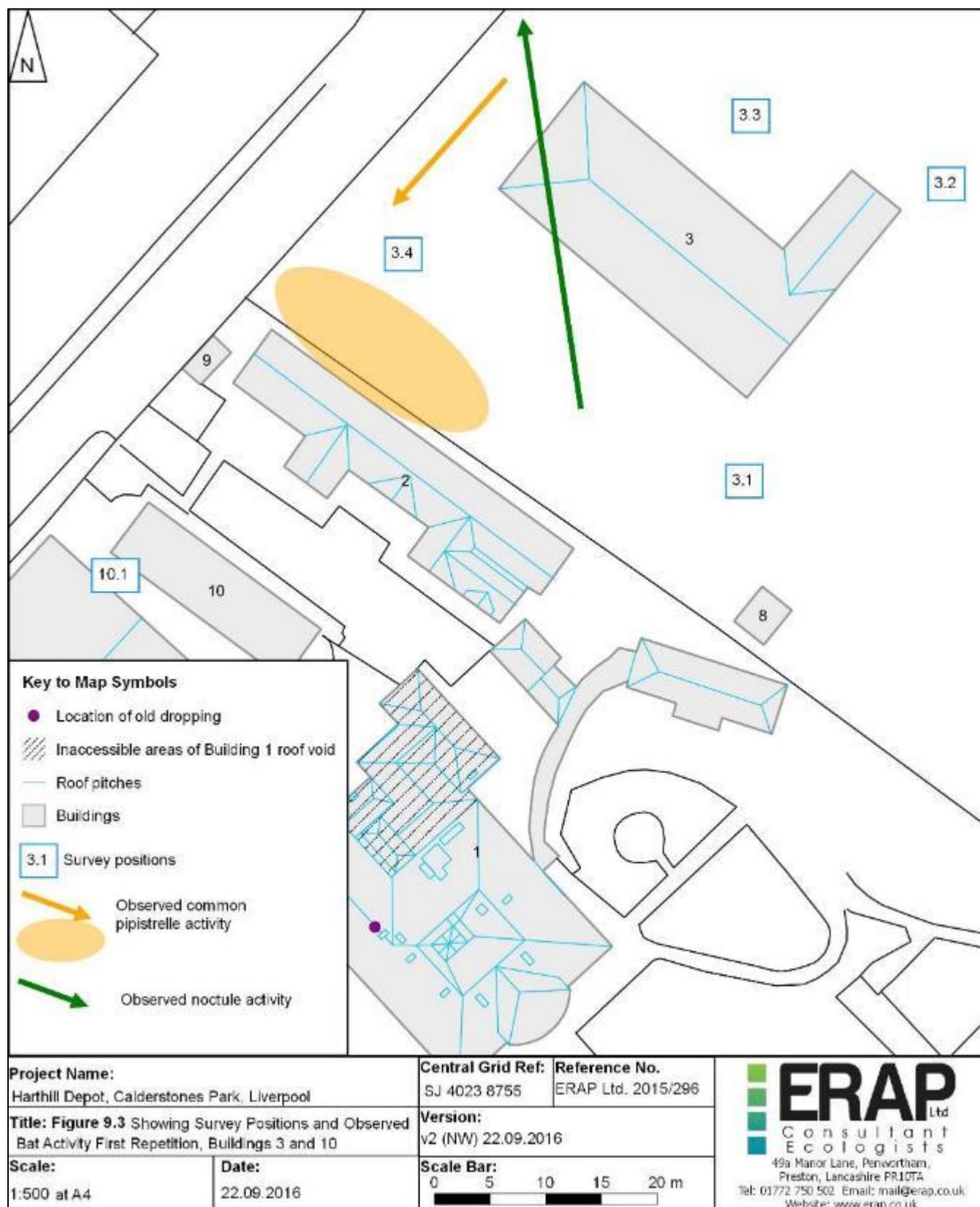




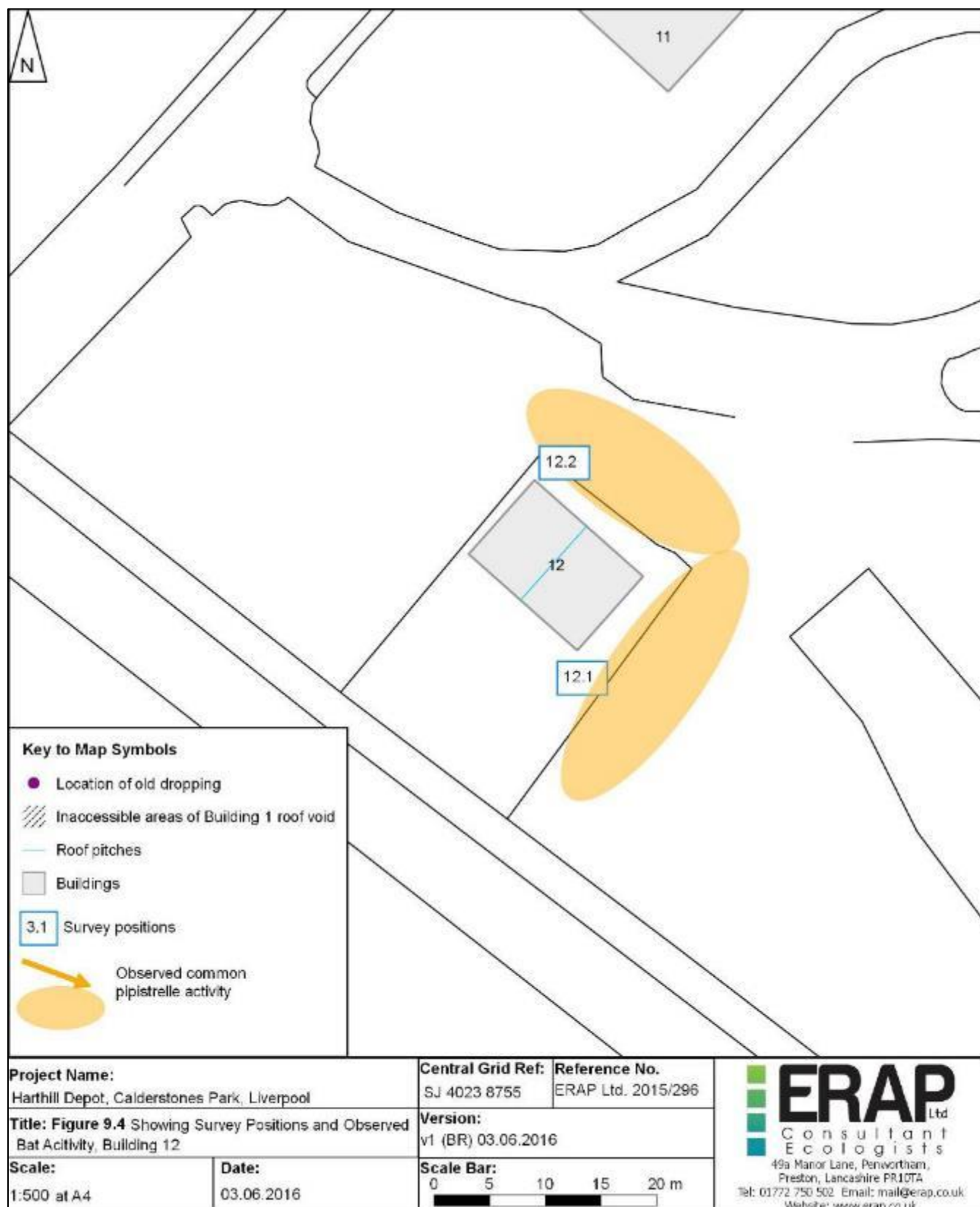
**Figure 9.2: Plan to Show Survey Positions and all Observed Bat Activity 1<sup>st</sup> Repetition, Buildings 1, 2 & 10**



**Figure 9.3: Plan to Show Survey Positions and all Observed Bat Activity 1<sup>st</sup> Repetition, Buildings 3 and 10**

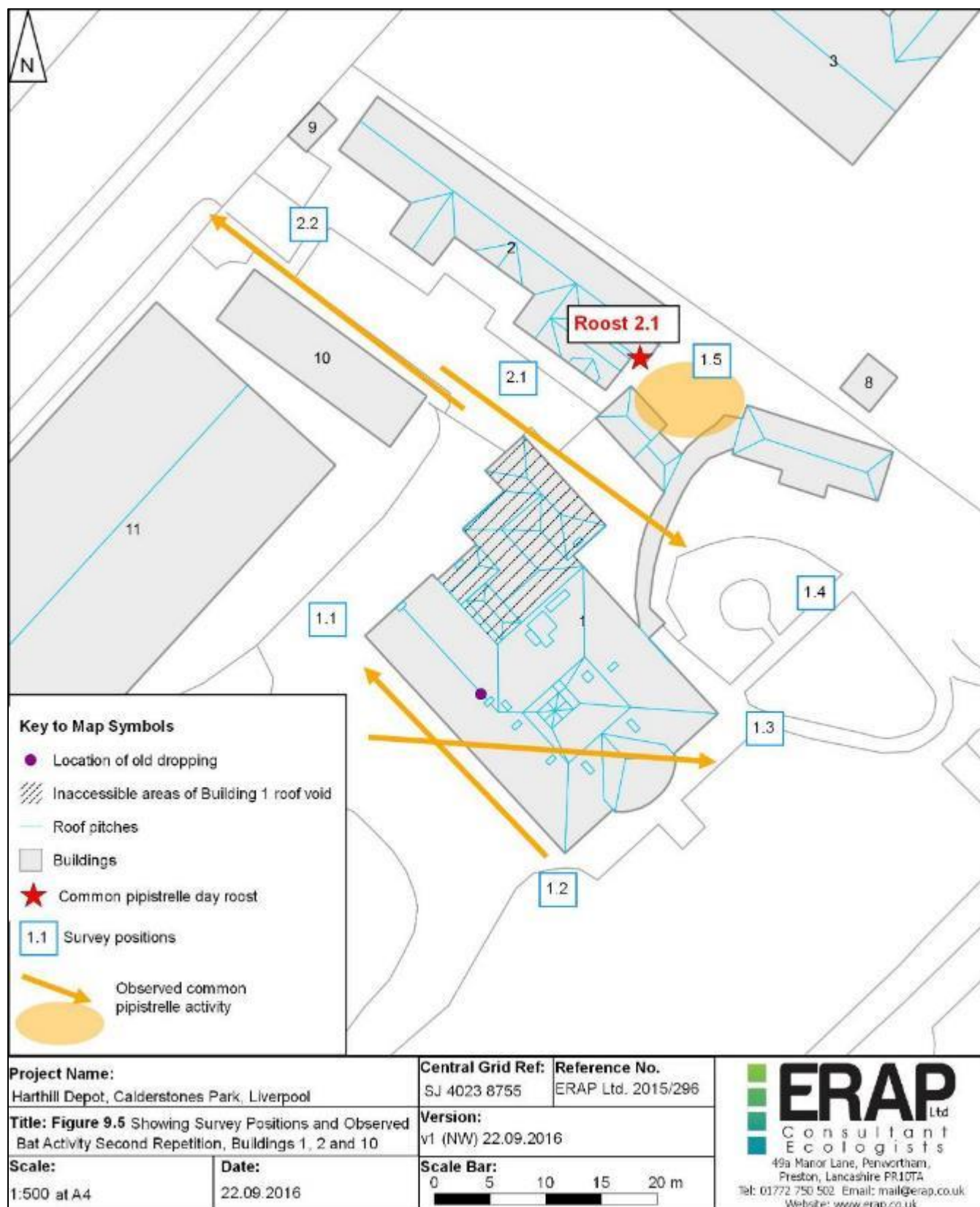


**Figure 9.4: Plan to Show Survey Positions and all Observed Bat Activity 1<sup>st</sup> Repetition, Building 12**



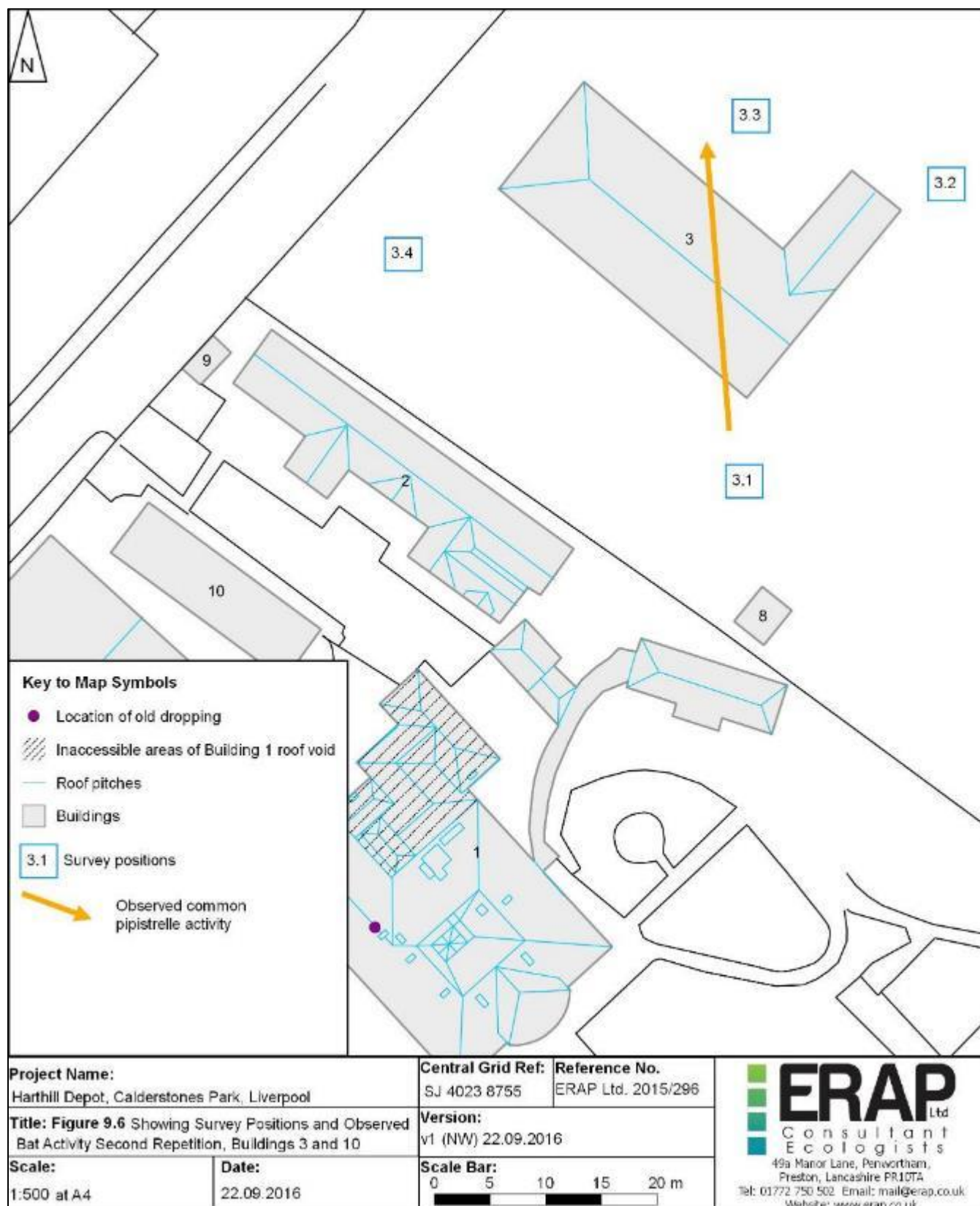


**Figure 9.5: Plan to Show Survey Positions and all Observed Bat Activity 2<sup>nd</sup> Repetition, Buildings 1, 2 & 10**

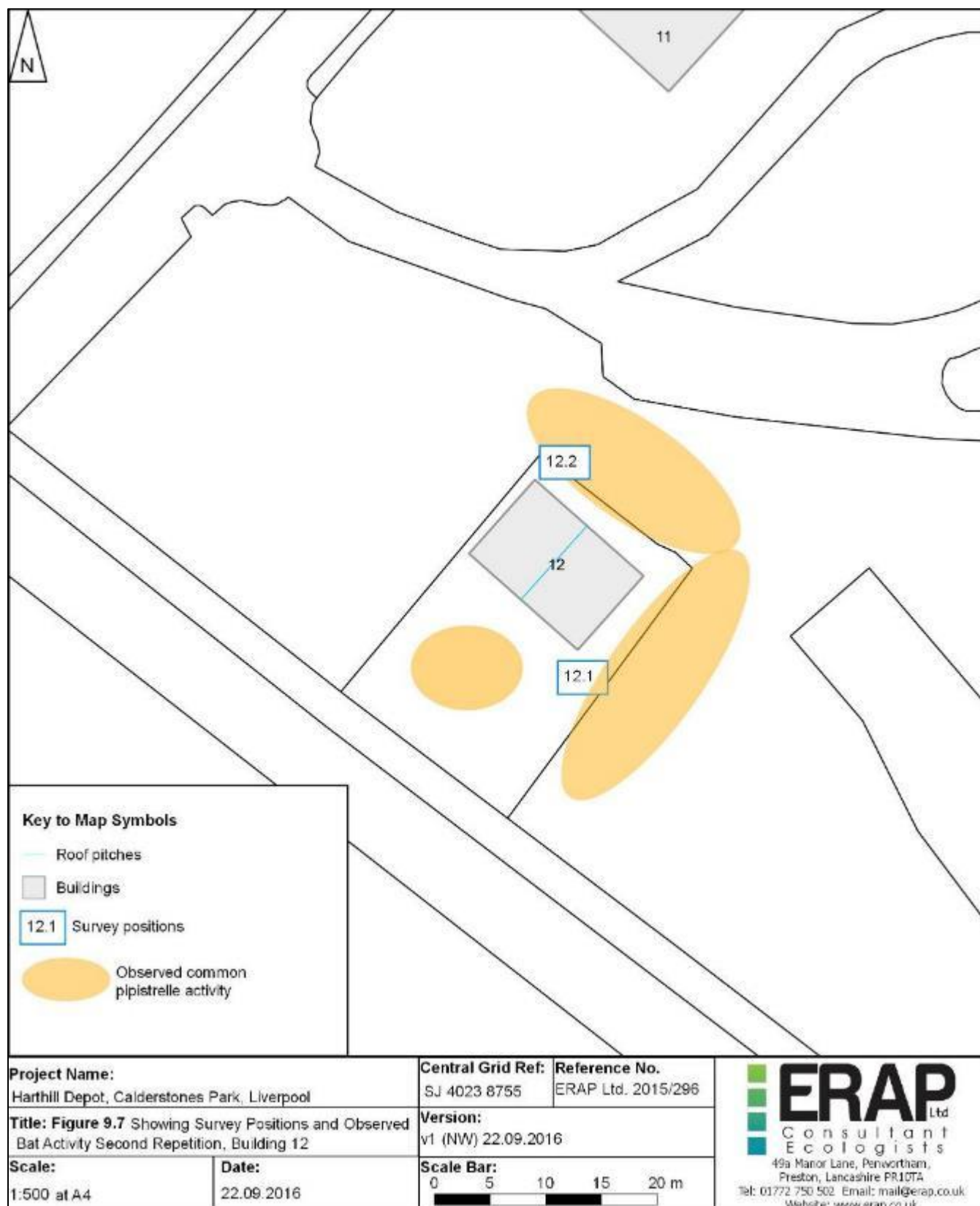




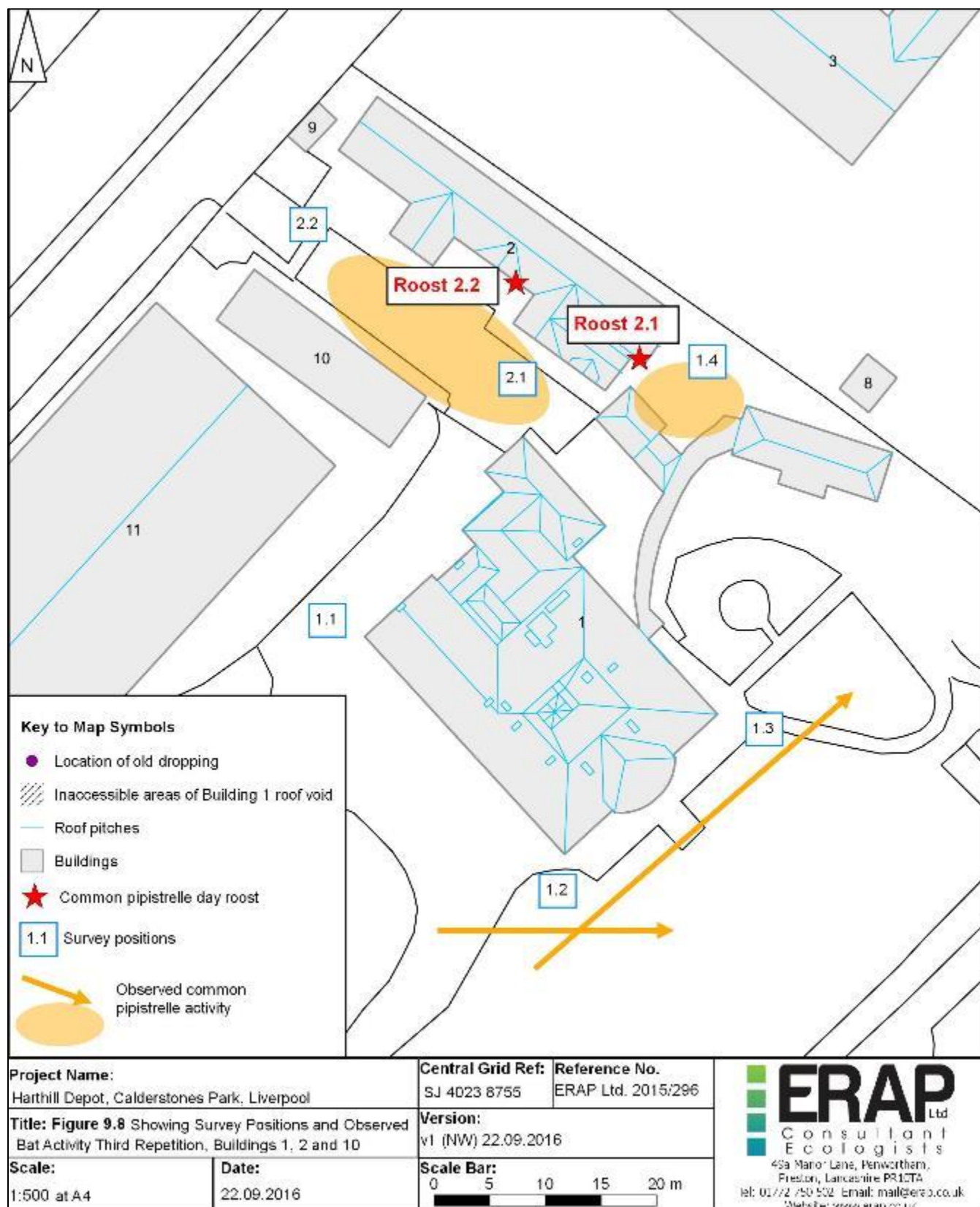
**Figure 9.6: Plan to Show Survey Positions and all Observed Bat Activity 2<sup>nd</sup> Repetition, Building 3**



**Figure 9.7: Plan to Show Survey Positions and all Observed Bat Activity 2<sup>nd</sup> Repetition, Building 12**



**Figure 9.8: Plan to Show Survey Positions and all Observed Bat Activity 3<sup>rd</sup> Repetition, Building 1, 2 & 10**





**Figure 9.9: Plan to Show Survey Positions and all Observed Bat Activity 3<sup>rd</sup> Repetition, Building 3**

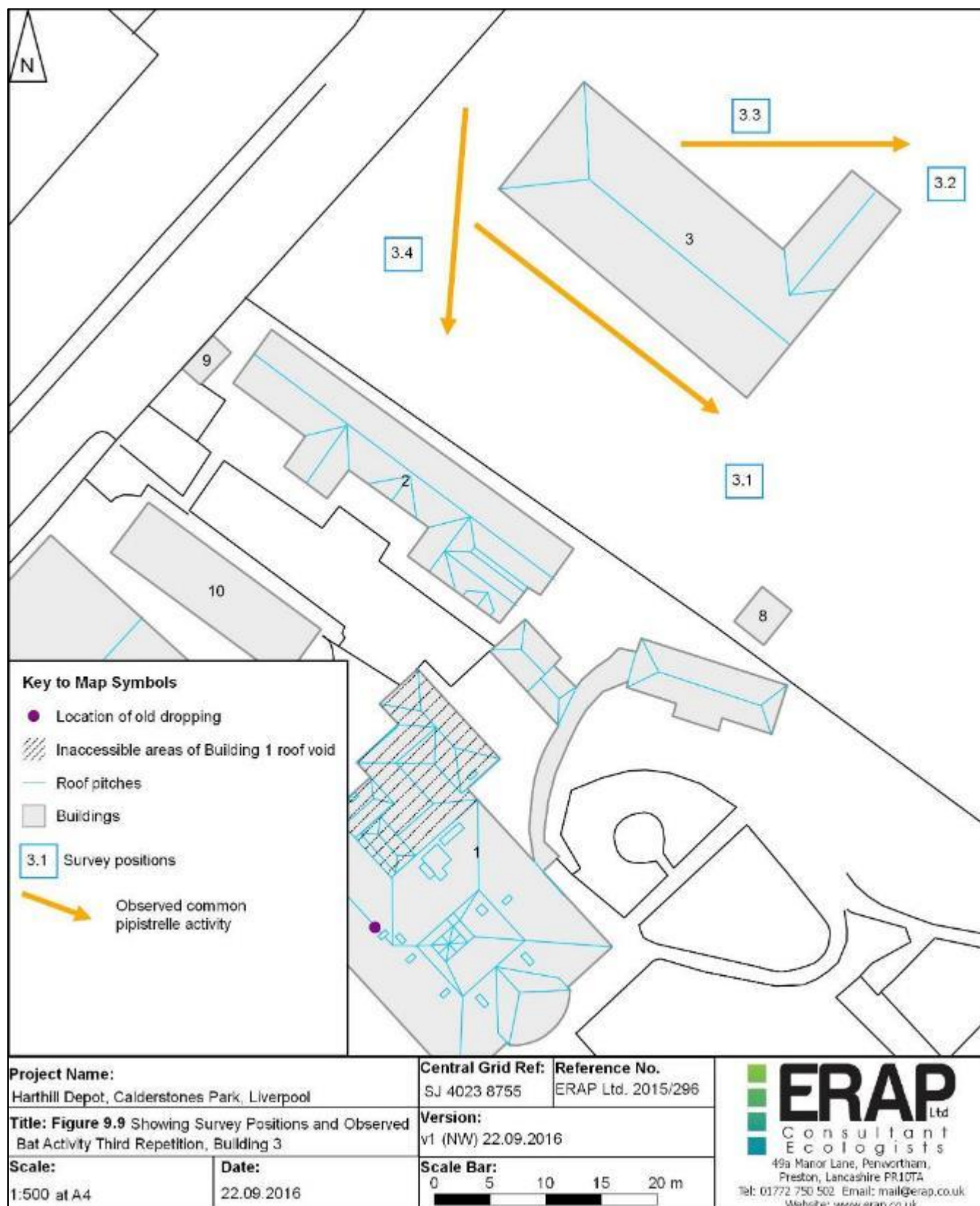




Figure 9.10: Plan to Show All Transect, Point Count and Static Survey Locations

