

BAT SURVEY

RED HALL, ELSDON



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DRAFT

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A. SUMMARY

E3 Ecology Ltd was commissioned by John Patten in December 2016 to undertake a daytime bat risk assessment survey of Red Hall, Elsdon. A further dusk and a dawn survey were undertaken in May and June 2017.

It is proposed to renovate the property. The house currently has a cat-slide roof. Works will include re-roofing of the house, with a re-alignment of the ridge to make it central to the main dwelling and the rear wall raised. The main western elevation wall has slipped away from the remaining structure and as such will need to be rebuilt and stone work keyed into the ridge.

Consultation with the Multi Agency Geographic Information for the Countryside (MAGIC) Map identified one Site of Special Scientific Interest (SSSI) within 2km. Consultation with Northumberland Bat Group identified the presence of a single Natterer's roost and a single brown long-eared roost within Raylees ~1.8km south of the site. Flight records of the following species were recorded within 2km; common pipistrelle, whiskered/Brandt's and Natterer's.

Initial site inspection was undertaken on 8th December 2016 and comprised a detailed inspection of the structures on site.

The site is situated in an area dominated by pasture. Residential dwellings are present to the north and east of the site and the Whiskershiel Burn is present ~175m south. Overall, the habitats present would suggest that there is a low to moderate risk of bats roosting, foraging and commuting in the local area.

The building to be renovated is of stone construction with a slate covered roof. A garage extension is present adjoined to the eastern elevation, a chicken shed extension is adjoined to the west and a small 'netty' extension is adjoined to the south of the garage. Gaps in mortar in stonework, under ridge tiles, under stone lintels, behind the fascia boards and under slipped and missing slates were noted. The large crack at the apex of the western elevation has the potential to allow internal access into the property. Overall it is considered that the building has a moderate to high suitability of roosts being present.

Thorough internal and external inspection of the building recorded no field signs of bats. Old bird nesting material was recorded within the timber porch to the front of the property and also within the small 'netty' extension.

Based on the daytime risk assessment the building was considered to be of moderate suitability to support roosting bats based on the features present and the surrounding habitat.

Dusk survey on the 18th May 2017 recorded no bats emerging from the property. Both common and soprano pipistrelles were recorded commuting along the front and rear elevations as well as over the roof top. Both species were also recorded foraging around trees to the western elevation of the property.

Dawn survey on the 2nd June 2017 recorded no bats re-entering the property. A single common pipistrelle was recorded re-entering the adjacent property to the east of the survey site. Common and soprano pipistrelles were recorded commuting along the front and rear elevations of the property. Moderate levels of common pipistrelle foraging were recorded around the trees to the east of the property. *Myotis* bats were recorded foraging around the eastern elevation of the property and a single noctule was heard but not seen.

Impacts of the renovation works are likely to include:

1. Low risk of harm or disturbance to bat species which may be present during renovation works to the property.

2. Loss of potential roosting locations within the stonework through renovation works.
3. Loss of potential crevice roosting locations under slates, lintels and ridge tiles during renovation works.
4. Destruction or obstruction to potential roost locations through renovation works.
5. Harm or disturbance to nesting birds should works be completed during the breeding bird season (March to August inclusive).

Key mitigation measures include:

- External lighting that may reduce bat use of the buildings will be avoided. High intensity security lights will be avoided as far as practical. Where security lights are required, these will be of minimum practicable brightness, be set on a short timer and will be motion sensitive only to larger objects.
- The following key elements of work will not be completed during the hibernation period (mid-November to mid-March inclusive):
 - Re-structuring/re-pointing of existing stonework
 - Removal of ridge tiles and slates
 - Removal of roof timbers
 - Exposing of the wall tops via roof stripping works
- All works on site will be completed in accordance with a precautionary working method statement (please see Appendix 5.)
- Crevice roosting opportunities within the stone walls and under the ridge will be retained through careful repointing.
- Any future landscaping planned for the land surrounding the property, within the site owner's landholding, will be designed to enhance structural diversity, and will include plants bearing flowers, nectar and fruits which are attractive to invertebrates, thereby helping to maintain the food resource for bats and wildlife generally.

The local planning authority are likely to require the means of delivery of the mitigation to be identified. It is recommended that mitigation and enhancement proposals are incorporated into the master-planning documents.

If you are assessing this report for a local planning authority and have any difficulties interpreting plans and figures from a scanned version of the report, E3 Ecology Ltd would be happy to email a PDF copy to you. Please contact us on 01434 230982.

B. INTRODUCTION

E3 Ecology Ltd was commissioned by John Patten in December 2016 to undertake a daytime bat risk assessment survey of Red Hall, Elsdon. Further a dusk and a dawn survey were undertaken in May and June 2017 respectively.

The purpose of this report is:

- To identify and describe all potentially significant effects on the local bat population associated with the proposed development
- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant effects
- To identify how mitigation measures will/could be secured
- To provide an assessment of the significance of any residual effects
- To identify appropriate enhancement measures
- To set out any requirements for post-construction monitoring

The site is located at the southern extent of the village of Elsdon, Northumberland at an approximate central grid reference of NY9359 9303. The site location is illustrated below in Figure 1.

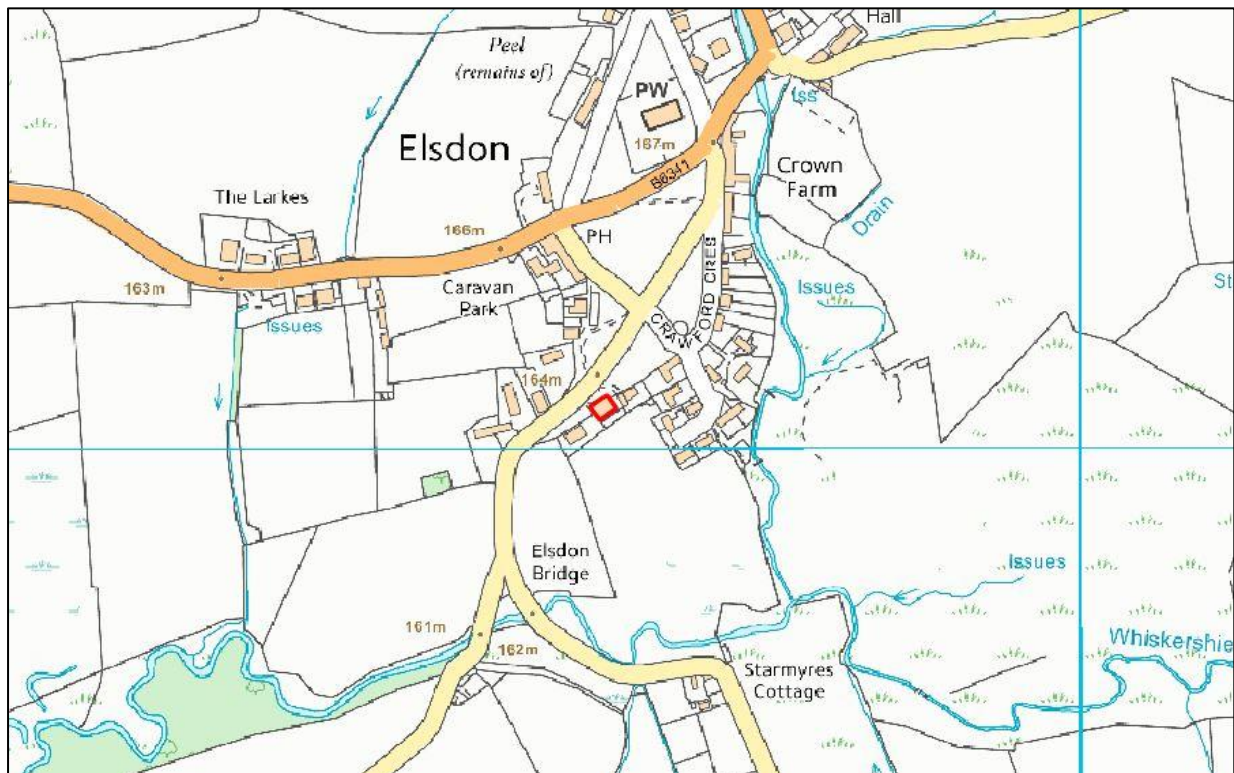


FIGURE 1: SITE LOCATION
(Reproduced from the Ordnance Survey map under licence)

It is proposed to renovate the property. The house currently has a cat-slide roof. Works will include re-roofing of the house, with a re-alignment of the ridge to make it central to the main dwelling and the rear wall raised. The main western elevation wall has slipped away from the remaining structure and as such will need to be rebuilt and stone work keyed into the ridge. Existing elevations and development proposals are shown in Figures 2 and 3 below.



FIGURE 2: EXISTING ELEVATIONS



FIGURE 3: DEVELOPMENT PROPOSALS

C. PLANNING POLICY AND LEGISLATIVE CONTEXT

C.1 NATIONAL PLANNING POLICY

Table 1 details the key paragraphs from the National Planning Policy Framework (NPPF)¹ relating to the natural environment:

TABLE 1: NATIONAL PLANNING POLICY FRAMEWORK: NATURAL ENVIRONMENT	
Statement	Paragraph
The planning system should contribute to and enhance the natural and local environment by: <ul style="list-style-type: none"> o Recognising the wider benefits of ecosystem services; o Minimising impacts on biodiversity and providing net gains in biodiversity where possible 	109
Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value.	111
Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife sites will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks	113
To minimise impacts on biodiversity, planning policies should: <ul style="list-style-type: none"> o Promote the preservation, restoration and re-creation of priority habitats ecological networks and the protection and recovery of priority species populations, linked to national and local targets 	117
When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principals: <ul style="list-style-type: none"> o If significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; o Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted; o Opportunities to incorporate biodiversity in and around developments should be encouraged; o Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees, found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss 	118
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	125

Section 40 of the Natural Environment and Rural Communities Act 2006, places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity.

Planning Practice Guidance² states:

- *'The National Planning Policy Framework is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution' (para. 007).*
- *'Information on biodiversity impacts and opportunities should inform all stages of development An ecological survey will be necessary in advance of a planning application if the type and location of development are such that the impact on biodiversity may be significant and existing information is lacking or inadequate' (para. 016).*
- *'Where an Environmental Impact Assessment is not needed it might still be appropriate to undertake an ecological survey, for example, where protected species may be present' (para. 016).*

¹ National Planning Policy Framework (March 2012), Department for Communities and Local Government,

² Planning Practice Guidance: Natural Environment (www.planningguidance.communities.gov)

- *'Local planning authorities should only require ecological surveys where clearly justified, for example if they consider there is a reasonable likelihood of a protected species being present and affected by development. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity' (para. 016).*
- *'Biodiversity enhancement in and around development should be led by a local understanding of ecological networks, and should seek to include:*
 - *habitat restoration, re-creation and expansion;*
 - *improved links between existing sites;*
 - *buffering of existing important sites;*
 - *new biodiversity features within development; and*
 - *securing management for long term enhancement' (para. 017).*

C.2 RELEVANT LEGISLATION

Within England all bat species are specially protected under the Conservation of Habitats and Species Regulations (2010).

As a result there is a requirement to consult with Natural England before undertaking any works that may disturb bats or their roost, and under the Conservation of Habitats and Species Regulations it is illegal to.

- Deliberately kill, injure or capture bats.
- Deliberately obstruct access to a bat roost.
- Damage or destroy a bat roost.
- Deliberately disturb bats; in particular any disturbance which is likely to impair their ability:
 - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - (iii) to affect significantly the local distribution or abundance of the species to which they belong.

Under the Wildlife and Countryside Act (1981) the above offence of disturbing bats includes low level disturbance and as such under this act it is also an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a roost.
- Intentionally or recklessly obstruct access to a roost.

Under the above legal protection, only the offences under the Conservation of Habitats and Species Regulations (2010) are strict liability offences; the remaining offences, under the Wildlife and Countryside Act (1981), are offences only where they are carried out "intentionally or recklessly".

Under the Countryside and Rights of Way Act 2000 (CROW Act) the offence in section 9(4) of the Wildlife and Countryside Act 1981 of disturbing bats is extended to cover reckless damage or disturbance.

The Hedgerow Regulations 1997 provide for the conservation of important hedgerows and their constituent trees. The presence of a protected species such as bats is a relevant consideration when assessing whether a hedgerow is important and may influence a local planning authority's decision on whether to approve removal of such hedges.

C.3 WILDLIFE SITE POLICY AND LEGISLATION

Details of the legislation surrounding protected sites are provided in the appendices.

C.4 PRIORITY SPECIES

Although not afforded any legal protection, national priority species (species of principal importance, as listed in Section 41 of the NERC Act (2006)), and local and regional priority species, as detailed within the relevant biodiversity action plans, are material considerations in the planning process and as such have been assessed accordingly within this report.

The following bat species are listed as national priority species: Barbastelle bat, Bechstein's bat, noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat. 'Bats' as a species group is also listed on the relevant local biodiversity action plan for this site.

D. METHODOLOGY

D.1 SCOPE OF STUDY

The scope of the study, in terms of the survey area and the desk study area, is based on professional judgement. The scope has been determined based on the site's characteristics, the nature of the surrounding area, the development proposed at the time of reporting and the likely associated zone of influence.

For this site the survey area comprised the red line boundary as defined within Figure 3 with, in addition, a 50m buffer around the periphery appraised where access was available. The survey area included all potential roost sites within and adjacent to the survey area, which may be affected by the proposed development.

The desk study included an assessment of land-use in the surrounding area and a data search covering a 2km buffer zone (see below for further detail).

The level of survey effort employed at the site has taken account of the recommendations within the Bat Conservation Trust Good Practice Survey Guidelines³.

Figure 4 illustrates the site boundary whilst, to provide context, Figure 5 illustrates the broad habitats present on site and within an approximate 500m buffer zone.

³ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust



FIGURE 4: SITE BOUNDARY
(Reproduced under licence from Google Earth Pro.)



FIGURE 5: SITE AND SETTING
(Reproduced under licence from Google Earth Pro.)

D.2 DESK STUDY

Initially, the site was assessed from aerial photographs and 1:25,000 Ordnance Survey maps. Following this, a data search was submitted to the local bat group in December 2016, requesting data relating to bats and non-statutory sites for nature conservation within 2km of the survey area. In addition, a search was made of the Multi Agency Geographic Information for the Countryside (MAGIC) website⁴ for all statutorily protected sites for nature conservation within 2km of the survey area.

D.3 PRELIMINARY FIELD STUDY METHODOLOGY

D.3.1 HABITAT SURVEY

The potential suitability of the habitats within the survey area in relation to commuting and foraging bats was classified as negligible, low, moderate or high, based on guidelines provided by the Bat Conservation Trust⁵ and detailed within Table 2.

TABLE 2: GUIDELINES FOR ASSESSING THE POTENTIAL SUITABILITY OF PROPOSED DEVELOPMENT SITES FOR BATS, BASED ON PRESENCE OF HABITAT FEATURES WITHIN THE LANDSCAPE. <i>(TO BE APPLIED USING PROFESSIONAL JUDGEMENT, TABLE 4.1 BAT SURVEY GUIDELINES)</i>	
Suitability	Commuting and foraging habitats
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 un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a 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 connected 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 that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland tree lined watercourses and grazed parkland. Site is close to and connected to known roosts.

D.3.2 DAYTIME BAT RISK ASSESSMENT (STRUCTURES)

A daytime assessment was made of all structures affected by the proposed development, in order to evaluate their potential for supporting bat roosts, and, where present, to record signs of use by bats.

Structures were inspected both externally and internally where access was available. Binoculars and extendable ladders were used to assist with the inspection for droppings and other field signs.

⁴ Multi Agency Geographic Information for the Countryside (www.magic.gov.uk)

⁵ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

Where present, soffits, purlins and ridge boards were searched thoroughly, together with the walls and floor under potential roost sites and any mortise joints, particularly in the gable walls. Wherever practicable, roof spaces and attic areas were surveyed for signs of droppings, which persist all year in dry conditions, food debris, entry points and bats themselves.

Externally, the buildings were examined for potential roost access points indicated by clean crevices, urine marks, polished wood or stonework and droppings. Particular attention was given to sheltered areas under the eaves of buildings, window ledges and towards the tops of windows where droppings are less likely to have been washed off.

Structures were categorised as having negligible, low, moderate or high suitability to be used by roosting bats, based on guidelines provided by the Bat Conservation Trust⁶ and detailed within Table 3.

TABLE 3: GUIDELINES FOR ASSESSING THE POTENTIAL SUITABILITY OF PROPOSED DEVELOPMENT SITES FOR BATS, BASED ON PRESENCE OF ROOSTING HABITAT FEATURES (STRUCTURES) <i>(TO BE APPLIED USING PROFESSIONAL JUDGEMENT, TABLE 4.1 BAT SURVEY GUIDELINES)</i>	
Suitability	Roosting Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure with one or more potential roost site that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

The bat risk assessment of the structures was undertaken on 8th December 2016.

Note that comments on the state of the structures within the site relate solely to their potential use by bats and must not be taken as a professional assessment of the structural integrity or safety of the structures. For example, descriptions of walls and roofs being in ‘good’ or ‘poor condition’ relate to likely provision of roost sites for bats, potential access routes to roost sites, and likely persistence of field signs such as droppings and feeding remains, which will not persist in exposed conditions. Maternity roosts are less likely to be present in cool, exposed, damp and draughty locations which may develop in a building in poor condition.

D.3.3 PRELIMINARY SURVEY - EQUIPMENT

- Clulite CB2 high powered torch.
- 8x42 binoculars
- Digital camera

D.3.4 PRELIMINARY SURVEY - ENVIRONMENTAL CONDITIONS

TABLE 4: DAYTIME SURVEY CONDITIONS				
DATE	TEMPERATURE	CLOUD COVER	PRECIPITATION	WIND CONDITIONS
08.12.16	10°C	90%	LIGHT RAIN	WFO

⁶ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

D.3.5 PRELIMINARY SURVEY - CONSTRAINTS

At the time of the survey the interior of the structure had been gutted with no loft void present. Internal works to the property which have been completed to date meant that the interior of the structure was very dusty and this limited the potential to find field signs, if present.

The section of the first floor to the rear (southern section) of the property was partially missing and remaining sections of floor in this area were considered unstable. Access to this section of the property was therefore restricted.

D.4 DETAILED SURVEY METHODOLOGY

D.4.1 DUSK EMERGENCE AND DAWN RE-ENTRY SURVEYS

D.4.1.1 *SURVEY EFFORT*

The level of survey effort employed has taken account of the guidance provided by the Bat Conservation Trust (BCT)⁷ and summarised within Table 5.

TABLE 5: RECOMMENDED NUMBER AND TIMING OF PRESENCE/ABSENCE SURVEY VISITS REQUIRED TO PROVIDE CONFIDENCE IN NEGATIVE PRELIMINARY ROOST ASSESSMENT RESULTS (FROM TABLE 7.1 AND TABLE 7.3 BCT GUIDELINES)			
	Low Roost Suitability*	Moderate Roost Suitability	High Roost Suitability
Recommended minimum number of survey visits for presence/absence survey to give confidence in a negative result	One survey visit. One dusk emergence or dawn re-entry survey (structures). For trees with low roost suitability, no further surveys required.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn.
Recommended timings for presence/absence surveys	May to August	May to September with at least one of the surveys between May and August	May to September with at least two of the surveys between May and August
* If a structure is classified as having low suitability for bats an ecologist should make a professional judgement on how to proceed based on all of the evidence available. If sufficient areas of a structure have been inspected and no evidence found (and is unlikely to have been removed by weather or cleaning or be hidden), then further surveys may not be appropriate.			
Note: Where a roost is confirmed as being present, further surveys may be required to fully characterise the roost			

The recommendations provided above are guidelines and it is recognised by BCT that 'the number of visits could be adjusted (up or down) if necessary by the ecologist, bearing in mind the site-specific circumstances'.

In this case, from the preliminary daytime inspection, the structure within the site was concluded to have moderate roost potential. As such one dusk emergence and one dawn re-entry survey were undertaken.

Activity surveys were undertaken on the dates and times as detailed within Table 6.

⁷ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

DATE	START TIME	END TIME	TIME OF SUNRISE/ SUNSET	NO. OF SURVEYORS
18.05.17	21.00	22.45	21.013	2
02.06.17	02.49	04.50	04.34	2

D.4.1.2 SURVEY METHODS

Activity surveys were undertaken in suitably mild conditions when bats are active. Surveyor locations sought to box-in the site and give a good degree of confidence as to whether bats were flying into or out of the survey area.

Light levels were recorded at 5 minute intervals, using a light meter, located in an open area and directed upwards to ensure a standard baseline. Light levels generally provide a more reliable indicator of the likely times for bat emergence than minutes past sunset and this approach is recommended by BCT⁸. There is significant variation in emergence times, but hundreds of surveys by E3 in northern England over recent years have indicated that pipistrelles are likely to start emerging around 70 lux, noctule at a similar level or earlier, *Myotis* bats generally start to emerge below 10 lux, with most *Myotis* activity and brown long-eared emergence below 2lux. Bats are rarely recorded above 150 lux, and as light levels go below 0.5 lux bat activity in the vicinity of the roosts tends to decrease as bats disperse across the wider countryside. Bat emergence will start at higher light levels when there is good cover close to the roost. For example *Myotis* bats have been recorded emerging in light conditions above 50 lux when there is a short flight line from the roost site to dense woodland. If a species is recorded when light levels are close to expected emergence light levels, then the likelihood that a roost is nearby is greatly increased.

Surveyors were positioned to ensure coverage of all high-risk areas of the site, including any potential flight-lines from structures within the site to adjacent cover such as woodland blocks. If bats were recorded within the site before bats were seen in the wider area, or seen flying into the site, it is assumed that roosts are present within the site.

All surveyors used both Batbox Duet bat detectors to listen for bats and Anabat Express detectors, at each surveyor location, to record and better identify bat species. Listening through earphones to both heterodyne and frequency division signals helps ensure that all bat species were detected⁹, whilst recording all bat activity using the Express removes the risk of surveyor error in timings and species ID.

Timings for observations of key bat activity such as emergence, first records of each species and commuting routes were recorded using radio-wave synchronised clocks. All data were recorded using the Anabat Express for future reference and to allow confirmation of species identification through call analysis (using Analook software), and to capture brief echolocation calls that could not be reliably identified in the field¹⁰. Field survey recorded numbers of bats detected, feeding activity, flight paths, species (as far as is practicable), and social calls.

A total of 4 person-nights work was undertaken. Figures provided within the results section of this report illustrate the approximate location of each surveyor.

⁸ http://www.bats.org.uk/pages/recording_light_level_data.html

⁹ Listening to frequency division calls as well as heterodyne significantly increases the detection rate of *Nyctalus* species

¹⁰ Reviewing data recorded by surveyors using Duet detectors and the Anabat data indicated that reliable *Myotis* records increased through Anabat use, particularly once conditions were too dark for visual cues to assist in identification, when there was a lot of bat activity, and with bats in clutter. It also reduces errors where pipistrelles in clutter can be mis-identified as *Myotis* bats.

D.4.1.3 DUSK EMERGENCE AND DAWN RE-ENTRY – ENVIRONMENTAL CONDITIONS

Table 7 details the environmental conditions for each activity survey.

DATE	TEMPERATURE (°C)		CLOUD COVER (%)		PRECIPITATION		WIND CONDITIONS (BEAUFORT SCALE)	
	START	END	START	END	START	END	START	END
18.05.17	15°C	10°C	20%	30%	NULL	NULL	WF0	WF0
02.06.17	13°C	12°C	100%	90%	NULL	LIGHT RAIN	WF0	WF0

D.4.1.4 SURVEY EQUIPMENT

- Duet bat detector
- Anabat Express

D.4.2 DATA ANALYSIS

All bat calls were analysed using Analook, with calls identified to species where possible, referencing call parameters as detailed within Russ (2012)¹¹ and Middleton et al (2014)¹².

Species from the *Myotis* genus of bats produce frequency modulated calls with overlapping call parameters and cannot be reliably distinguished to species level on call alone. As such, within this report, *Myotis* calls are identified as '*Myotis ?species*', with the most likely species identified through an assessment of a combination of call slope, loudness, frequency range, habitat and, where the bat was observed in flight, flight characteristics. Where insufficient information is available, calls are simply identified as '*Myotis sp.*'.

Bats from the pipistrelle genus also produce calls with overlapping parameters and the call criteria used to differentiate between species of this genus, based on peak frequencies, are detailed within Table 8.

Species	Call Peak Frequency Range (KHz)
Common pipistrelle	>42 and <49
Soprano pipistrelle	≥51
Nathusius' pipistrelle	<40
Common or soprano pipistrelle ('50KHz pip')	≥49 and <51
Common or Nathusius' pipistrelle ('40KHz pip')	≥40 and ≤42

Similarly, bats of the *Nyctalus* genus produce calls with overlapping call parameters. Where calls are obtained in an open environment, the two *Nyctalus* species found in this region can be differentiated and calls will be identified as noctule or Leisler's bat. Where there is doubt, calls are noted as *Nyctalus sp.*

Within this report, for all species, if the species name is given without qualification, the record was of good quality and fell within recognised parameters with no potential overlap with other species present in the region. If there is a degree of uncertainty this is indicated by a question mark, e.g. ?brown long-eared. If identification to species is not practicable, then where possible calls are identified to genus

¹¹ Russ, J. (2012) British Bat Calls: A Guide to Species Identification. Pelagic Publishing

¹² Middleton, N., Froud, A. and French, K. (2014) Social Calls of the Bats of Britain and Ireland. Pelagic Publishing

D.5 PERSONNEL

The table below details the personnel who undertook the survey work.

Name	Position	Professional Qualifications	Natural England Survey Licence Numbers
Mandy Rackham	Senior Ecologist	BA MSc MCIEEM	2015-12470-CLS-CLS (Bats)
Hannah Norman	Ecologist	BSc MSc GradCIEEM	-

Further details of experience and qualifications are available at www.e3ecology.co.uk.

D.6 ASSESSMENT METHODOLOGY

The relative value of the ecological receptors (habitats, species and designated sites) was assessed using a geographical frame of reference. For designated sites this is generally a straightforward process with the assigned designation generally being indicative of a particular value, e.g. Sites of Special Scientific Interest are designated under national legislation and are therefore generally considered to be receptors of national value. The assignment of value to non-designated receptors is less straightforward and as recognised by the Guidelines for Ecological Impact Assessment produced by the Chartered Institute of Ecology and Environmental Management¹³, is a complex and subjective process and requires the application of professional judgement.

When assessing the value of species and habitats, relevant documents and legislation are considered including the lists of species and habitat of principal importance annexed to the NERC Act (2006) and those provided within relevant local Biodiversity Action Plans. Data provided through consultation is also considered. These data sources can provide context at a local, regional and national scale.

The table below provides examples of receptors of value at different geographical scales.

Level of Value	Examples
International	An internationally designated site or candidate site.
	A site meeting criteria for international designation.
	The site is of functional importance* to a species population with internationally important numbers (i.e. >1% of the biogeographic population)
National	A nationally designated site.
	The site is of functional importance* to a species population with nationally important numbers (i.e. >1% of the national population)
Regional	The site is of functional importance* to a species population with regionally important numbers (i.e. >1% of the regional population)
County	A Local Wildlife Site (LWS) or equivalent, designated at a County level
	The site is of functional importance* to a species population of county value (i.e. >1% of the county population)
District	A Local Wildlife Site (LWS) or equivalent, designated at a District level
	The site is of functional importance* to a species population of district value (i.e. >1% of the district population)
Parish	A species population considered to appreciably enrich the nature conservation resource within the context of the parish.
	Local Nature Reserves

13 Chartered Institute for Ecology and Environmental Management (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal

Level of Value	Examples
Local	A species population that contributes to local biodiversity but are not exceptional in the context of the parish.
Low	Habitats that are unexceptional and common to the local area.

** Functional importance defined as 'a feature which, based on professional judgement, is of importance to the day to day functioning of the population, the loss of which would have a detectable adverse effect on that population',*

Higher quality sites for bats are likely to have a good number of bats and range of species, particularly species that are scarcer in the region and require higher habitat quality such as whiskered/Brandt's, Natterer's, brown long-eared bat and Nathusius. Sites with over five species regularly recorded will generally be of above average quality.

E. RESULTS

E.1 DESKTOP STUDY

E.1.1 PRE-EXISTING INFORMATION

ORDNANCE SURVEY MAPPING AND AERIAL PHOTOGRAPHY

Figures 1 (B) and 5 (D1) show that the general land use in the surrounding area is dominated by pasture. Residential dwellings are present to the north and east of the site and the Whiskershiel Burn is present ~175m south.

The most recent aerial photograph of the site (Figure 4, D1, 2006) indicates that habitats on site are dominated by the dwelling. The neighbouring property to the west of the survey site is not present on this aerial photograph and as such is thought to have been developed after 2006. Historic imagery suggests that habitats within the local area have remained the same since 2002 with no large-scale development noted.

MULTI AGENCY GEOGRAPHIC INFORMATION FOR THE COUNTRYSIDE WEBSITE¹⁴

The table below details the internationally and nationally statutorily designated sites within 2km of the survey area (excluding those designated primarily for ornithological interest).

Designation	Site Name	Reason for Designation	Distance from Survey Area
Site of Special Scientific Interest	Mill and Whiskershiel Burns	Upland calcareous grassland. Situated on the western edge of the Simonside Hill, the Mill and Whiskershiel Burns form part of the catchment for the River Rede. The burns, flowing along a sloping, well jointed pavement of carboniferous limestone and onto a level plain, are flanked by mire and grassland vegetation which are strongly influenced by the lime-rich seepage water and soils. The calcareous mire flush and fen vegetation communities extensive along the burnsidings are unusual and of limited occurrence in Northumberland. Also blue moor grass occurs here, along the two burns, at two of only three known locations in Northumberland.	~1.4km East

The site is located within the boundaries of the Northumberland National Park.

E.1.2 CONSULTATION

LOCAL BAT GROUP

Consultation with Northumberland Bat Group identified the presence of a single Natterer's roost and a single brown long-eared roost within Raylees ~1.8km south of the site. Flight records of the following species were recorded within 2km; common pipistrelle, whiskered/Brandt's and Natterer's.

¹⁴ Multi Agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk

E.2 DAYTIME RISK ASSESSMENT

E.2.1 HABITATS

FORAGING HABITATS

Areas of grassland to the south of the property and the Whiskershiel Burn have the potential to provide low to moderate quality foraging habitat for bat species.



COMMUTING ROUTES

Within the immediate area surrounding the site, hedgerows and scattered broadleaf trees have the potential to provide suitable commuting connectivity into and out of the site.



ALTERNATIVE ROOST LOCATIONS

Within the village of Elsdon there are a number of residential dwellings of similar construction which have the potential to provide alternative roosting locations.



E.2.2 BUILDINGS

Building features which have the potential to support roosting bats are underlined, whilst, where recorded, field signs that confirm bat use are in bold.

RED HALL

- Single residential dwelling with a garage extension to the eastern elevation, a chicken shed adjacent to the western elevation and a small 'netty' extension to the south of garage.
- Stone built structure with clay ridge tiles. Gaps noted under the ridge where mortar is missing.
- Roof covered with Welsh slates and stone lintels at the edges and a 'cat-slide' roof to the rear. Internally is lined with bitumen sarking. Slipped and missing slates noted on the roof and gaps also noted under the lintels.
- Stone chimneys at either end of the roof with a third chimney on the rear extension. Gaps noted in the mortar around the chimneys.
- Small decorative timber porch to the front of the building with evidence of an old birds nest.
- Two sets of double timber doors on the northern elevation of the garage.
- Single timber door on the northern elevation of the chicken shed.
- Small timber door on the netty extension which was open at the time of the survey.
- Mix of timber and uPVC windows with small skylights within the southern extension.
- Guttering is a mix of metal and plastic and was noted to have slipped on the southern elevation.
- Timber fascia present along the southern elevation. Gaps noted along the entire elevation between the fascia and the stonework.
- Internally the main dwelling has been gutted and from the first floor is open to the timber rafters.
- Stonework is exposed throughout the building with only small sections of concrete present.
- Mortar around the stone works has failed and there are numerous large gaps into the stonework.
- Small section of brickwork noted at the apex of the western extension. Large cracks present in this area where the western elevation wall has slipped away from the main dwelling.
- Roof lined with bitumen sarking.
- Sections of the first floor in the southern



section of the building are missing and as such access to this area was limited. However sections of timber panelling lined the roof in this area.

- Interior of the garage extension is currently used for storage. The slate roof is unlined and large cracks at the wall tops were noted.
- Roof of the chicken shed is lined internally with bitumen sarking.
- Small extension to the rear of the garage has evidence of old bird nests at the interior wall tops.
- There is a small timber shed to the south west corner of the property with timber walls and single pitch corrugated metal roof.
- No field signs for bats were recorded around the exterior or interior of the structure.
- Overall the main dwelling is considered to be of moderate to high suitability for supporting roosting bats.



E.2.3 TREES

There are no trees within the site.

E.3 OVERVIEW OF SITE SUITABILITY

TABLE 12: OVERVIEW OF SITE SUITABILITY FOR BATS

HABITATS AND SETTING ¹⁵				
	NEGLECTIBLE	LOW	MODERATE	HIGH
HABITATS AND COVER WITHIN 200M	City Centre	Open, exposed arable, amenity grass or pasture	Hedges and trees linking site to wider countryside	Excellent cover with mature trees and/or good hedges
HABITATS WITHIN 1KM	City Centre	Little tree cover, few hedges, arable dominated	Semi-natural habitats e.g. trees, hedgerows	Good network of woods, wetland and hedges
ALTERNATIVE ROOSTS WITHIN 1KM	City centre	Numerous alternative roost sites of a similar nature	A number of similar buildings in the local area	Few alternative buildings and site of good quality for roosts
SETTING	Inner city	Urban with little green space	Build development with green-space, wetland trees	Rural Lowland with woodland and trees.
DISTANCE TO WATER/ MARSH	>1km	500m-1000m	200m-500m	<200m

¹⁵ Building and habitat risk assessment technique audited in a research project with York University which compared the risk assessment scoring with the results of detailed field assessment for over 100 sites. Statistically significant associations were found between habitat setting and building features and the presence of absence of different bat species. For example habitat connections and nearby woodland were significant for brown long-eared bats and the presence of species-rich grassland is important for many species.

TABLE 12: OVERVIEW OF SITE SUITABILITY FOR BATS				
DISTANCE TO WOODLAND/ SCRUB	>1km	500m-1000m	200m-500m	<200m
DISTANCE TO SPECIES-RICH GRASSLAND	>1km	500m-1000m	200m-500m	<200m
COMMUTING ROUTES	Isolated by development, major roads, large scale agriculture	No potential flyways linking site to wider countryside	Some potential commuting routes to and from site	Site is well connected to surrounding area with multiple flyways
BUILDINGS ²				
	MINIMAL	LOW	MEDIUM	HIGH
AGE (APPROX.)	Modern	Post 1940's	1900-1940	Pre 20 th C
BUILDING/ COMPLEX TYPE	Industrial complex of modern design	Single, small building	Several buildings, large old single structure	Traditional farm buildings, country house, hospital
BUILDING - STOREYS	N/A	Single storey	Multiple storeys	Multiple storeys with large roof voids
STONE/BRICK WORK	No detectable crevices	Well pointed	Some cracks and crevices	Poor condition, many crevices, thick walls
FRAMEWORK – TIMBERS/STEEL	Modern metal frame with sheet cladding	Timber purlins, sheet asbestos	Timbers kingpost or similar	Large timbers traditional joints
ROOF COVERING	Modern sheet materials and tightly sealed	Good condition or very open not weatherproof modern sheet materials	Some potential access routes, slates, tiles	Uneven with gaps, not too open, stone slates
ADDITIONAL FEATURES	Very well maintained and tightly sealed	No features with potential access	Some features with potential access	Hanging tiles, cladding, barge boards, soffits with access gaps
EXTERNAL LIGHTING	Extensive security lights covering much of the site	Widespread areas above 2 lux at night	Intermittent lights of low intensity	Minimal
BUILDING USE	Very noisy, dusty	Regular use	Intermittent use	Disused

The assessment indicates that the habitats present are of low to moderate potential to support foraging and commuting bats with the building itself of moderate to high suitability. Overall from the site setting and the nature of the building the site is considered to be of moderate suitability to roosting bats.

E.4 ACTIVITY SURVEYS

E.4.1 DUSK EMERGENCE SURVEY

18th May 2017

No bats were recorded emerging from the property during the survey. Both common and soprano pipistrelles were recorded commuting along the front and rear elevations as well as over the roof top. Both species were also recorded foraging around trees to the western elevation of the property.

Key survey data are provided in Appendix 6. Figure 6 provides a summary of the results of dusk emergence survey.

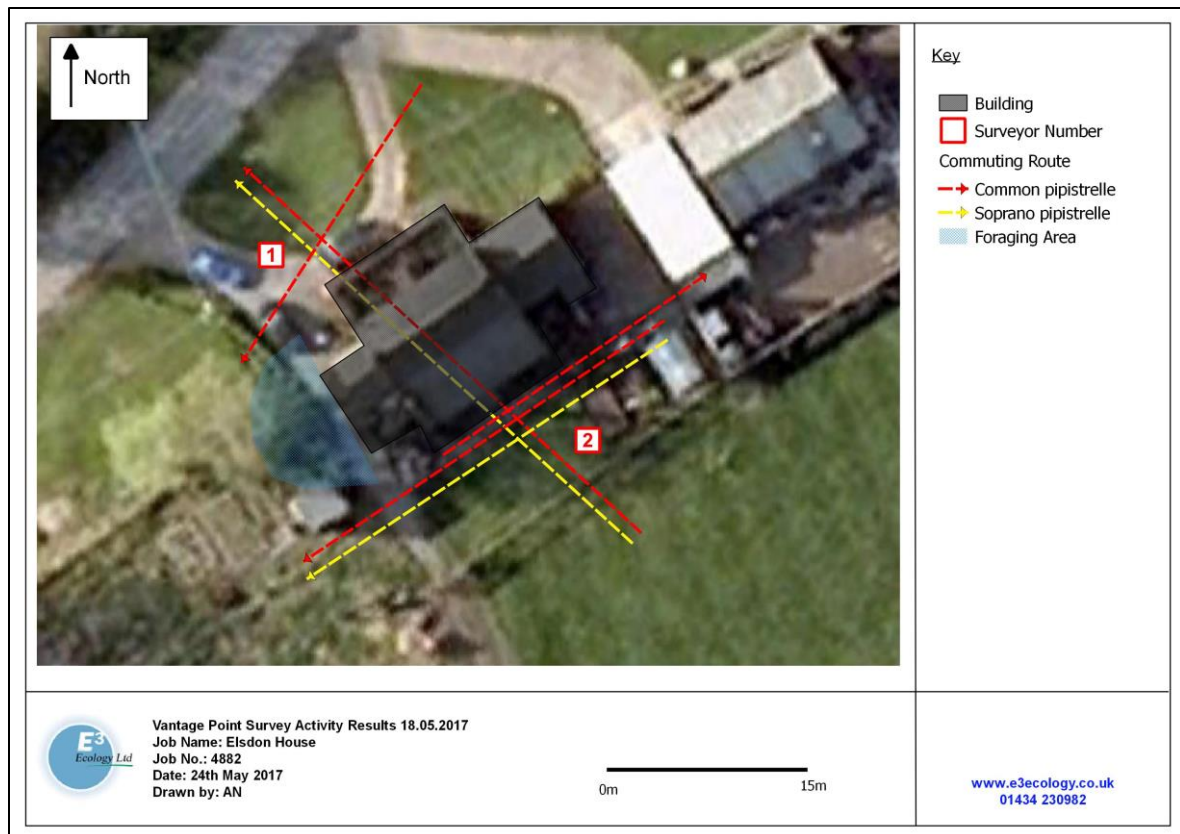


FIGURE 6: SUMMARY OF DUSK EMERGENCE SURVEY RESULTS
(Reproduced under licence from Google Earth Pro.)

E.4.2 DAWN RE-ENTRY SURVEY

2nd June 2017

No bats were recorded re-entering the property during the survey. A single common pipistrelle was recorded re-entering the adjacent property to the east of the survey site. Common and soprano pipistrelles were recorded commuting along the front and rear elevations of the property. Moderate levels of common pipistrelle foraging were recorded around the trees to the east of the property. *Myotis* sp were recorded foraging around the eastern elevation of the property and a single noctule was heard but not seen.

Key survey data are provided in Appendix 6. Figure 7 provides a summary of the results of dawn re-entry survey.

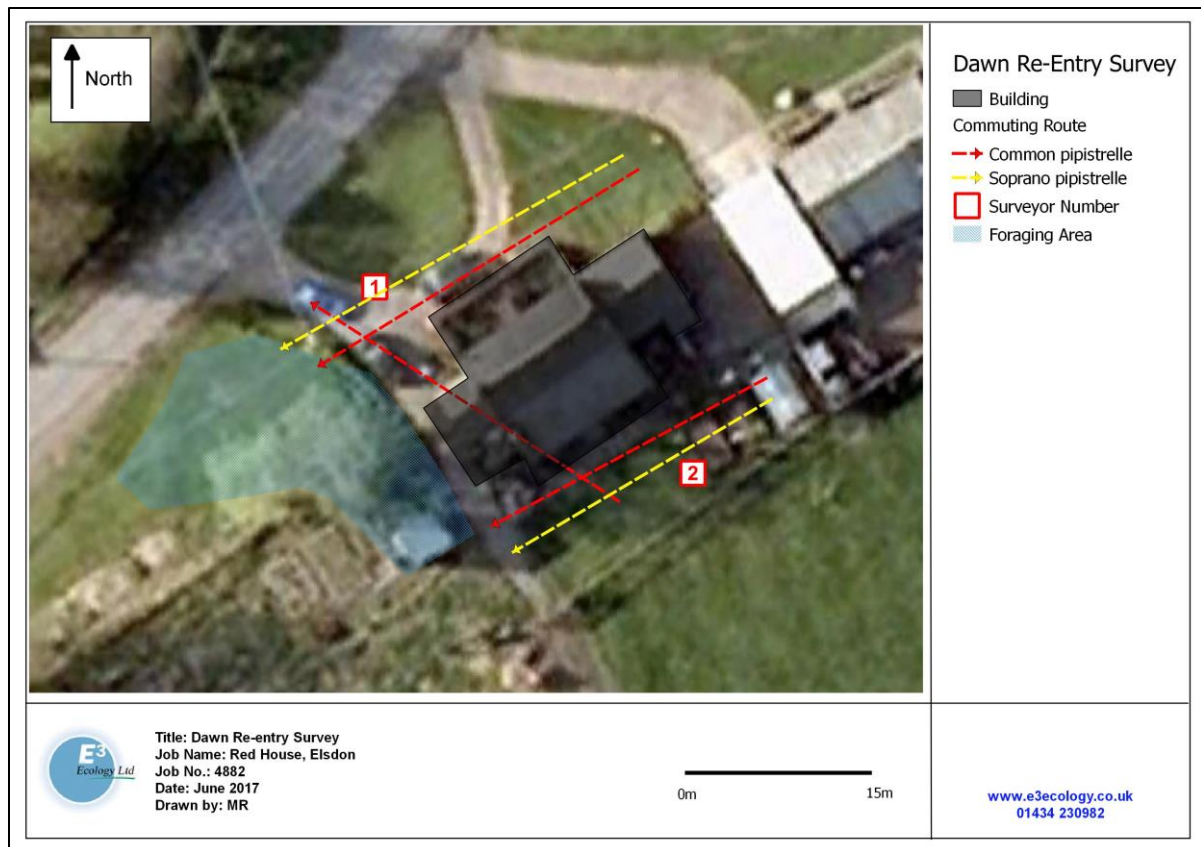


FIGURE 7: SUMMARY OF DAWN RE-ENTRY SURVEY RESULTS
(Reproduced under licence from Google Earth Pro.)

E.5 ADDITIONAL SPECIES GROUPS

House sparrow, robin and starling were noted within the site during the survey. Old nesting material was recorded within the porch to the front of the property and also within the small out building adjacent to the south eastern corner of the building.

F. SITE ASSESSMENT

F.1 ASSESSMENT OF SURVEY FINDINGS

No field signs for bats were recorded around the exterior or within the interior of the building during the survey. However numerous potential roosting locations were noted around the exterior of the building including slipped and missing slates, gaps under the ridge and stone lintels and gaps between fascias and stonework. Large cracks at the apex of the western elevation have potential to allow access into the interior of the building.

No bats were recorded emerging or re-entering the structure during the dusk and dawn surveys and no evidence of a maternity colony has been identified on site. However, the structure has the potential to provide suitable hibernation roosting features.

F.2 POPULATION SIZE CLASS ASSESSMENT

No evidence of a roost has been identified on site however due to the number of potential roosting locations present there remains a low risk that the structure could be used by small numbers of bats throughout the year. As such it is recommended that works are carried out in accordance with a precautionary working method statement.

F.3 LIMITATIONS AND CONSTRAINTS

At the time of the day time risk assessment survey the interior of the structure had been gutted with no loft void present. Internal works to the property which have been completed to date meant that the interior of the structure was very dusty and this limited the potential to find field signs, if present and had there been any old field signs, these would no longer be present.

The section of the first floor to the rear (southern section) of the property was partially missing and remaining sections of floor in this area were considered unstable. Access to this section of the property was therefore restricted.

G. IMPACT ASSESSMENT

G.1 DIRECT DEVELOPMENT IMPACTS

Impacts of the development are likely to include:

- Low risk of harm or disturbance to bat species which might be present during renovation works to the property.
- Loss of numerous potential roosting locations around the exterior of the property through repointing and renovation works.
- Loss of potential crevice roosting locations under slates, lintels and ridge tiles during renovation works.
- Destruction or obstruction to potential roost locations through renovation works.
- Harm or disturbance to nesting birds should works be completed during the breeding bird season (March to August inclusive).

G.2 IMPACTS ON STATUTORY OR NON STATUTORY SITES

Due to the small scale of renovation works proposed no impact on designated sites is anticipated.

The structure is located within the boundaries of Northumberland National Park however due to the small scale of proposed renovation works, use of suitable (and salvaged) building materials and retention of the existing build footprint with no additional extension, no significant impacts on the National Park are anticipated.

H. RECOMMENDATIONS

H.1 FURTHER SURVEY

If development does not happen within 12 months of this report, an updating survey will be required, ideally to be undertaken between May and August.

H.2 AVOIDANCE AND MITIGATION STRATEGY

H.2.1 SITE DESIGN

- External lighting that may reduce bat use of the buildings will be avoided. High intensity security lights will be avoided as far as practical. Where security lights are required, these will be of minimum practicable brightness, be set on a short timer and will be motion sensitive only to larger objects.

H.2.2 TIMING OF WORKS

- Two bat boxes (as detailed below) will be provided on site prior to works commencing to provide alternative roosting opportunities during works.
- The following key elements of work will not be completed during the hibernation period (mid-November to mid-March inclusive):
 - Re-structuring/re-pointing of existing stonework
 - Removal of ridge tiles and slates
 - Removal of roof timbers
 - Exposing of the wall tops via roof stripping works
- Works will be undertaken outside of the bird nesting season (March to August inclusive) unless a checking survey by a suitably qualified ornithologist confirms the absence of active nests.

H.2.3 WORKING METHODS AND BEST PRACTICE

- Works will be carried out in accordance with a precautionary working method statement (please see Appendix 5)
- Old slates, ridge tiles, lintels and fascias will be removed carefully by hand, being aware that bats may be present beneath slates or ridge tiles, within mortise joints and cavity walls, between loose stones, between lintels and in gaps around window frames.
- If bats are found during works, works will stop in that area and the ecological consultant will be contacted immediately. If it is necessary to move bats for their safety, this will be undertaken by a licensed bat handler.

The following measures should be included as general good working practice:

- Timber treatments that are toxic to mammals will be avoided. If required, timber treatment will be carried out in the spring or autumn. Both pre-treated timbers and timber treatments will use chemicals classed as safe for use where bats may be present (see http://www.jncc.gov.uk/pdf/batwork_manualpt4.pdf).

H.3 COMPENSATION STRATEGY

The following compensation strategy is proposed:

H.3.1.1 *CREVICE ROOST SITES*

A total of 4 external crevice roost sites, 1 on each elevation, within the stone walls will be marked up and access retained through careful repointing (see Appendix 4). Such gaps will be from 15-20mm wide and 40-80mm long, or repointed to create such a gap by using a roll of newspaper 20mm in diameter angled upwards into the gap, applying the mortar around, and

then removing the paper before the mortar is fully cured to leave a weather-proof access route for bats.

H.4 ADDITIONAL ENHANCEMENT RECOMMENDATIONS

The following additional enhancement measures are recommended in order to further enhance the site for biodiversity:

- Any future landscaping planned for the land surrounding the property, within the site owner's landholding, will be designed to enhance structural diversity, and will include plants bearing flowers, nectar and fruits which are attractive to invertebrates, thereby helping to maintain the food resource for bats and wildlife generally.

APPENDIX 1. STATUTORILY AND NON- STATUTORILY DESIGNATED SITES

STATUTORILY DESIGNATED SITES

Ramsar Sites

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. The Convention recognizes wetlands as important ecosystems and includes a range of wetland types from marsh to both fresh and salt water habitats. The wetlands can also include additional areas adjacent to the main water-bodies such as river banks or coastal areas where appropriate.

Special Protection Areas (SPAs)

SPAs are classified by the UK Government under the EC Birds Directive and comprise areas which are important for both rare and migratory birds.

Special Areas of Conservation

SACs are designated under the EC Habitats Directive and are areas which have been identified as best representing the range and variety of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the Conservation of Habitats and Species Regulations 2010 (as amended) unless they are offshore.

Sites of Special Scientific Interest

SSSIs are designated as sites which are examples of important flora, fauna, or geological or physiographical features. They are notified under the Wildlife and Countryside Act 1981 with improved provisions introduced by the Countryside and Rights of Way Act 2000. They are often components of larger SACs or SPAs.

National Nature Reserves (NNRs)

NNRs are designated by Natural England under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 and support important ecosystems which are managed for conservation. They may also provide important opportunities for recreation and scientific study.

Country Parks

Country Parks are statutorily designated and managed by local authorities in England and Wales under the Countryside Act 1968. They do not necessarily have any nature conservation importance, but provide opportunities for recreation and leisure near urban areas.

NON-STATUTORILY DESIGNATED SITES

Local Nature Reserves (LNRs)

LNRs are designated under the National Parks and Access to the Countryside Act 1949 by local authorities in consultation with Natural England. They are managed for nature conservation and used as a recreational and educational resource.

Non-Governmental Organisation Property

These are sites of biodiversity importance which are managed as reserves by a range of NGOs. Examples include sites owned by the RSPB, the Woodland Trust and the Wildlife Trusts

Local Wildlife Sites (LWSs)

These are sites defined within the local plans under the Town and Country Planning system and are material considerations of any planning application determination. They are designated by the local authority although criteria can vary between authorities.

APPENDIX 2. BAT ECOLOGY

BAT LIFECYCLE

Bat survey timings are based on the lifecycle of bats which varies through the calendar year. The table below illustrates recommended survey timings and how they relate to the bat lifecycle:

BAT LIFECYCLE AS IT RELATES TO SURVEY TIMING ¹⁶												
SURVEY TYPE	J	F	M	A	M	J	J	A	S	O	N	D
Roost Inspection												
Mating/Swarming Survey												
Hibernation Survey												
Tree survey from the ground												
Tree roost activity survey												
Building roost activity survey												
Dark grey are optimal timings, light grey suboptimal.												
BAT ROOST USE THROUGH THE YEAR												
Day Roost												
Night Roost												
Feeding Roost												
Transitional/Occasional Roost												
Swarming Site												
Mating Site												
Maternity Roost												
Hibernation Roost												
Satellite Roost												

¹⁶ Based on information provided within Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

BAT ROOST TYPES

Bat Roost Types	
Roost Type	Definition
Day Roost	A place where individual bats or small groups of males, rest or shelter in the day but are rarely found by night in the summer.
Night Roost	A place where bats rest or shelter in the night but are rarely found in the day. May be used by a single individual on occasion or could be used regularly by the whole colony.
Feeding Roost	A place where individual bats or a few individuals rest or feed during the night but are rarely present by day.
Transitional/Occasional Roost	Used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.
Swarming Site	Where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites.
Mating Site	Sites where mating takes place from late summer and can continue through winter.
Maternity Roost	Where female bats give birth and raise their young to independence. Females typically give birth to a single pup per year, therefore these roosts are critical to the long-term survival of a colony. Disturbance of maternity roosts can lead to abandonment and death of young.
Hibernation Roost	Where bats may be found individually or together during winter. They have a constant cool temperature and high humidity. Bats are particularly vulnerable to disturbance during the hibernation period as, once roused, they may be unable to replace energy lost due to a lack of sufficient available insect prey at this time.
Satellite Roost	An alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.

SPECIES SPECIFIC ECOLOGY

Pipistrelle maternity colonies generally consist of 25 to 100 individuals, but colonies numbering up to 1000 are not uncommon¹⁷. Adult females often form large maternity roosts, occupied between May and August, and frequently number around 300 individuals. Males are often solitary or in small groups during the summer, later congregating with the females at winter hibernation roosts¹⁸.

Maternity colonies of brown long-eared bats are generally small, consisting of 10 to 20 adults^{19,20} (although numbers are likely to be underestimated, due to presence in inaccessible areas of the roost). In exceptional circumstances, colonies can reach 200+ bats.

Natterer's bats roost within crevices and cavities, typically within hollow trees, old buildings, caves and tunnels²¹. Maternity colonies comprising up to 200 adult females can be found in buildings during the summer months while bachelor roosts comprising up to 28 males have been recorded during the summer months in Scotland²². Maternity roosts are not exclusively female, with both adult and immature males comprising up to 25% of the colony. Male only colonies have been found with up to 30 bats²³. Foraging individuals will perch during the night at roosts near to foraging areas, not used as day roosts. Mostly these roosts are trees or shrubs but barns will also be used²⁴.

¹⁷ Roberts, G.M. & Hutson, A.M. 2000. *Pipistrelle*. British Bats No. 6. The Bat Conservation Trust, London

¹⁸ Corbet, G.B & Southern, H.N., 1964. The handbook of British Mammals).

¹⁹ Speakman, J. R. *et al.*, 1991. Minimum summer populations and densities of bats in NE Scotland, near the northern borders of their distributions. *J. Appl. Ecol.*, 225: 327-345

²⁰ Entwistle, A.C., 1994. Roost ecology of the brown long-eared bat *Plecotus auritus* in north-east Scotland. Unpublished PhD thesis, University of Aberdeen, UK

²¹ Stebbings, R.E. 1991. Natterer's bat *Myotis nattereri*. In The handbook of British Mammals. 3rd Edition Corbet, G.B. & Harris, S. (Eds) Oxford: Blackwell Scientific.

²² Swift, S. M. 1997 Roosting and foraging behaviour of Natterer's bats (*Myotis Nattereri*) close to the northern border of their distribution. *J. Zool. (Lond)* **242**: 375-384.

²³ Altringham, J.D. 2003. British Bats. The New Naturalist. Pub. Harper Collins.

²⁴ Smith, P.G. & Racey, P.A. 2005. The itinerant Natterer: physical and thermal characteristics of summer roosts of *Myotis nattereri* (Mammalia: Chiroptera) *J. Zool. Lond.* 266: 171-180.

Whiskered bats roost in trees and buildings. Nursery roosts can number over 100 bats, and are almost exclusively female bats. This species hibernates singly in caves, hanging on the open wall or in crevices²³.

Brandt's bat is thought to have similar roosting behaviour and foraging ecology to the whiskered bat, however, further research is needed to clarify this²³.

A third small *Myotis* species, the Alcatraz's bat has recently been confirmed within the UK.

APPENDIX 3. BATS AND DEVELOPMENT

A list of development types likely to affect bats where they impact on particular features is provided within the table below.

PLANNING AND DEVELOPMENT TRIGGER LIST FOR BAT SURVEYS²⁵	
NATURE OF WORK	TYPE OF BUILDING OR FEATURE
Conversion, modification, demolition or removal of buildings (including hotels, schools, hospitals, churches, commercial premises and derelict buildings)	Agricultural buildings e.g. farmhouses, barns and outbuildings) of traditional brick or stone construction and/or with exposed wooden beams
	Buildings with weather boarding and/or hanging tiles that are within 200m of woodland and/or water
	Pre-1960 detached buildings and structures within 200m of woodland and/or water
	Pre-1914 buildings within 400m of woodland and/or water
	Pre-1914 buildings with gable ends or slate roofs, regardless of location
	Buildings located within, or immediately adjacent to woodland and/or immediately adjacent to water
	Dutch barns or livestock buildings with a single skin roof and board and gap or Yorkshire boarding if following a preliminary roost assessment, the building appears particularly suited to bats
Any development works	Any underground duct or structure including tunnels, mines, kilns, ice houses, adits, military fortifications, air raid shelters, cellars
	Unused industrial chimneys that are lined and of brick/stone construction
Floodlighting	Churches and listed buildings, green space (e.g. sports pitches) within 50m of woodland, water, field hedgerows or lines of trees with connectivity to woodland or water
	Any building listed in reference 1
Felling, removal or lopping	Woodland
	Field hedgerows and/or lines of trees with connectivity to woodland or water bodies
	Old and veteran trees that are more than 100 years old
	Mature trees with obvious holes, cracks or cavities or which are covered with mature ivy (including dead trees)
Any development works	Within 200m of rivers, streams, canals, lakes, reedbeds or other aquatic habitats
Any development works	Within or immediately adjacent to quarries or gravel pits
	Immediately adjacent to or affecting natural cliff faces and rock outcrops with crevices or caves and sinkholes
Any single or multiple wind turbine construction	N/A – although for single turbines this can depend on size and location
Any development works	Sites where bats are known to be present

²⁵ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

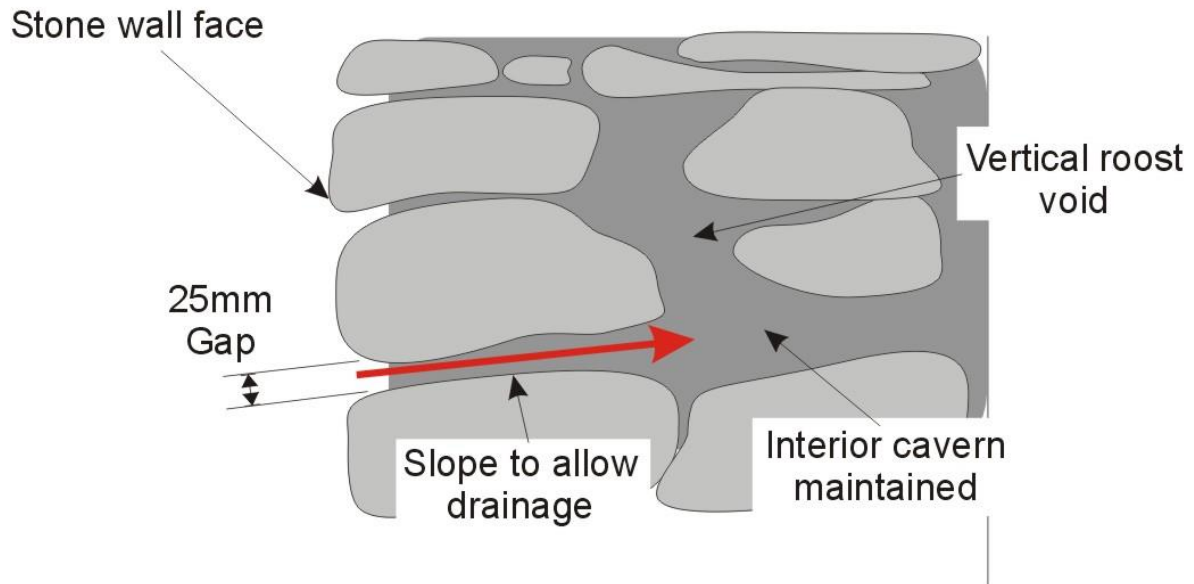
A summary of the likely scale of impact at a site level in relation to various bat features and development effects is provided below.

SUMMARY OF MAIN IMPACTS AT SITE LEVEL				
Habitat Feature	Development Effect	Scale of impact		
		Low	Medium	High
Maternity Roost	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance outside breeding season	✓		
	Post-development interference			✓
Major Hibernation	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance outside hibernation season	✓		
	Post-development interference			✓
Minor Hibernation	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Modified management		✓	
	Temporary disturbance outside hibernation season	✓		
	Post-development interference		✓	
	Temporary destruction then reinstatement	✓		
Mating	Destruction		✓	
	Isolation caused by fragmentation		✓	
	Partial destruction; modification	✓		
	Modified management	✓		
	Temporary disturbance outside hibernation season	✓		
	Post-development interference	✓		
	Temporary destruction then reinstatement	✓		
Night Roost	Destruction	✓		
	Isolation caused by fragmentation	✓		
	Partial destruction; modification	✓		
	Modified management	✓		
	Temporary disturbance outside hibernation season	✓		
	Post-development interference	✓		
	Temporary destruction then reinstatement	✓		

N.B. This is a general guide only and does not take into account species differences. Medium impacts in particular depend on the care with which any mitigation is designed and implemented and could range between high and low.

APPENDIX 4. BAT MITIGATION FEATURES

Solid stone wall bat roost



APPENDIX 5. PRECAUTIONARY WORKING METHOD STATEMENT

This method statement contains information regarding:

- bat legal status
- and site working methods

We have read and fully understood this method statement and all key aspects have been explained to the site operatives.

	Print Name	Signature	Date
Supervisor:			
Operative:			
Operative:			
Operative:			
Operative:			

Relevant Legislation

All bat species are specially protected under the Conservation of Habitats and Species Regulations (2010) and under Schedule 5 of the Wildlife and Countryside Act of 1981. As a result it is illegal to:

- Deliberately kill, injure or capture bats.
- Deliberately or recklessly disturb bats.
- Deliberately or recklessly obstruct access to a bat roost.
- Damage or destroy a bat roost.

Fines of up to £5000 *per bat* affected and confiscation of vehicles used can be imposed for deliberate or reckless disturbance of bats or damage to a roost site.

Bat Roost Sites

Bat roost sites in buildings and stone structures can be difficult to locate. British bats vary in size, the smallest being the crevice roosting Pipistrelle with a body the size of a matchbox. The small size of these animals means that they can roost within the smallest cracks or crevices.

Common locations for crevice roosting bats within buildings include beneath slates or tiles, within mortise joints, rubble fill and cavity walls and between loose stones (see photos). It is possible that small colonies may be present within the fabric of a building yet no external signs are visible. Therefore care is needed when works affect such features.



Working Methods

Working methods to minimise the risk to bats and avoid causing reckless damage or disturbance must include the following:

- Old slates, ridge tiles, lintels and fascias will be removed carefully by hand, being aware that bats may be present beneath slates or ridge tiles, within mortise joints and cavity walls, between loose stones, between lintels and in gaps around window frames.
- If bats are found during works, works will stop in that area and the ecological consultant will be contacted immediately. If it is necessary to move bats for their safety, this will be undertaken by a licensed bat handler.

If bats are found at any time during the development work, E³ Ecology Ltd (01434 230982) must be contacted immediately. If it is necessary to move the bats, gloves should be worn and the bats should be carefully placed into a cardboard box and either kept in a quiet place or moved to a part of the building that will not be affected by the construction work and released after dark, close to the roost site.

If works risk recklessly harming bats then the police can order all construction/renovation work to cease until the issue is properly addressed.

APPENDIX 6. RAW DATA

Site:	Date:	Start Time:	End Time:	Number of Surveyors:	Number of Remote Recording Points:
Red House	18.05.17	21.00	22.45	2	0
Start Temp:	End Temp:	Cloud Cover:	Precipitation:	Wind:	Sunset:
15°C	10°C	30%	NULL	WF0	21.13
Summary of Survey:					
No bats were recorded emerging from the property during the survey. Both common and soprano pipistrelles were recorded commuting along the front and rear elevations as well as over the roof top. Both species were also recorded foraging around trees to the western elevation of the property.					
Activity Table:					
Time	Light Level (Lux)	Surveyor 1	Surveyor 2		
21.00					
21.05					
21.10					
21.15					
21.20					
21.25					
21.30					
21.35					
21.40		21.40.49 1x45 C in front of house 21.43.52 1x45 C along western elevation	21.40.10 1x45 C to rear of house 21.42.00 1x45 C rear of house 21.44.12 1x45C to rear of house		
21.45		21.45.38 45 HNS	21.49.25 1x55 C to rear of house		
21.50		21.50.33 1x45 C over roof top 21.52.13 1x55 C in front of building			
21.55		21.58.15 1x45C in front of house			
22.00		22.01.51 2x45 F in front of house - 22.04.52	22.01.50 - 22.05.10 2x45 F at western elevation		
22.05					
22.10		22.10.26 45 HNS	22.11.55 1x45 C to rear of house		
22.15		22.18.17 - 22.23.34 45 HNS			
22.20		22.24.56 1x45 F in front of house	22.21.30 45 HNS		
22.25		22.29.47 45 HNS			
22.30					

22.35			
22.40			
22.45			
Surveyor		HN	AH
	Sunset		
<p>45 – common+A22:F40 pipistrelle 55- soprano pipistrelle Noc – Noctule BLE - brown long-eared bat Nat – Natterer’s WB – Whiskered/Brandt’s. ? before a name indicates uncertain identification due to poor sonogram or closely related species. BP – bat passes. Records in bold indicate roost present. HNS – heard not seen, generally bat is behind the surveyor or hidden by trees/building. F – foraging C- commuting SC – social call</p>			

Site:	Date:	Start Time:	End Time:	Number of Surveyors:	Number of Remote Recording Points:
Red House	02.06.17	2.49	4.50	2	0
Start Temp:	End Temp:	Cloud Cover:	Precipitation:	Wind:	Sunrise:
13°C	12°C	100%	Light drizzle	WF0	4.34
Summary of Survey:					
<p>No bats were recorded re-entering the property during the survey. A single common pipistrelle was recorded re-entering the adjacent property to the east of the survey site. Common and soprano pipistrelles were recorded commuting along the front and rear elevations of the property. Moderate levels of common pipistrelle foraging were recorded around the trees to the east of the property. Myotis sp were recorded foraging around the eastern elevation of the property and a single noctule was heard but not seen.</p>					
Activity Table:					
Time	Light Level (Lux)	Surveyor 1	Surveyor 2		
2.55					
3.00					
3.05		03.05.26 45 and 55 HNS	03.06.00 55 HNS 03.09.40 1x45 C along rear of house		
3.10			03.13.40 1x45 C along rear of house		
3.15		03.17.28 1x45 C in front of house			
3.20		03.22.20 1x45 C in front of house			
3.25					
3.30		03.33.50 1x45 C in front of house 03.34.50 Noc HNS			
3.35					
3.40		03.40.48 1x45 C over roof top	03.40.35 1 x45 C along rear of property		
3.45		03.46.50 1x55 C in front of house			
3.50		03.51.01 55 HNS 03.52.01 1x45 In front of house	03.50.55 1x45 F at eastern elevation 03.53.00 1x45 C along rear of property		
3.55		03.57.10 3x Myotis F at western elevation	03.57.20 1x45 C along rear of property		
4.00		04.00.56 1x45 and 1x55 C and F in front of house 04.03.48 1x45 reentering adjacent property to the east.	04.03.50 1x45 reentering adjacent property to the east		
4.05					
4.10		04.10.53 1x45 F around trees			
4.15		04.15.50 1x45 F around trees			

4.20			
4.25		04.29.54 1x45 C and F along front of house	
4.30			
4.35			
4.40			
4.45			
4.50			
Surveyor		MR	AH
	Sunrise		
<p>45 – common+A22:F40 pipistrelle 55- soprano pipistrelle Noc – Noctule BLE - brown long-eared bat Nat – Natterer’s WB – Whiskered/Brandt’s. ? before a name indicates uncertain identification due to poor sonogram or closely related species. BP – bat passes. Records in bold indicate roost present. HNS – heard not seen, generally bat is behind the surveyor or hidden by trees/building. F – foraging C- commuting SC – social call</p>			