
Bat Hibernation and Nocturnal Survey Report

Rook Hill Farm, Offton

for

Andrew Chaplin

1 June 2022



Client

Andrew Chaplin

Planning authority

Mid Suffolk District Council

Time limit of reliance

Please note that the reported surveys were conducted on the date(s) stated in the report and that it represents site conditions at the time of the visit. The findings and recommended mitigation are based on these conditions. If site conditions change materially after the site survey, the original report cannot be relied upon and will need to be updated. Ecological reports and surveys can typically be relied on for 18 to 24 months from the date of survey.

Surveys supporting European Protected Species Mitigation Licence applications must be within the current or most recent survey season for bats (May to September), or within two survey seasons for great crested newts (March to June).


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Date	1 June 2022
Reference number	2623
Author	Ebonie Lambo-Hills M.Sc, B.Sc (Hons) Natural England licences (Great crested newt level 1)
Reviewer	Nathan Duszynski M.Sc, B.Sc (Hons), ACIEEM, Natural England licences (Bat survey level 2, Great crested newt level 1)
<i>Signed disclosure</i> <i>The information, data, advice and opinions provided in this report which I have provided is true and has been prepared in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. I confirm that the opinions expressed are my true and professional bona fide opinions.</i> <i>Etienne Swarts, ACIEEM</i>	
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SUMMARY

- Greenlight Environmental Consultancy Ltd. has been commissioned to carry out protected species surveys for hibernating bats, relating to a proposed development at Rook Hill Farm, Ipswich Road, Offton, Suffolk, IP8 4SF (grid reference: TM 07462 49311).
- This report provides the results of the bat hibernation survey and any potential effects of the proposed development on such species.
- The ecology report is required in support of a planning application for the partial demolition and conversion of the existing building into a residential dwelling.
- The survey and assessment were completed by independent qualified and experienced ecologists with Natural England survey licences for the relevant protected species, and in accordance with the latest survey guidelines.
- The findings of the assessment are that there are no significant ecological constraints that would prevent the proposed works.
- If the following mitigation and enhancements are incorporated into the proposed layout, there will be a net gain for biodiversity, as is encouraged by the National Planning Policy Framework.

Protected habitats/species	Status	Potential effect	Recommended mitigation and enhancements
Bats	<p>Hibernations surveys confirmed the building is used by a small number of:</p> <ul style="list-style-type: none"> • Common pipistrelle • Natterer's <p>Activity surveys confirmed the building is used as:</p> <ul style="list-style-type: none"> • Common pipistrelle non-breeding day roost. • Brown long eared non-breeding day roost. 	<p>Destruction of bat roosts present in building.</p> <p>Potential light disturbance of commuting and foraging habitats on site.</p>	<p><u>Mitigation</u></p> <p>EPS mitigation licence required from Natural England prior to any works being conducted. The licence will include the following:</p> <p>Workers to be given a toolbox talk.</p> <p>On the first day works are proposed to commence, the building will be inspected for bats using a torch and endoscope.</p> <p>A soft roof strip and partial demolition of the walls around the bat roosts.</p> <p>The installation of two integrated hibernation bat boxes on the converted building and two standalone hibernation bat boxes on suitable trees.</p> <p>The installation of six weatherboard roost to be installed on the main barn and cart lodge.</p> <p>The installation of two standalone bat boxes on suitable tree.</p> <p>Roofs will be lined with traditional type 1F bitumen felt, not non-bitumen coated roofing membrane (NBCRM).</p> <p>Any lighting schemes will follow guidance from the Bat Conservation Trust and CIE 150:2003.</p>

1. METHODOLOGY

Hibernation

- 1.1. A physical inspection of all the buildings on site were conducted and reported in the Preliminary Ecological Appraisal Report issued by Greenlight Environmental Consultancy Ltd. (2021).
- 1.2. A total of three hibernations surveys were conducted within the optimal surveying season for bats (Table 1).
- 1.3. The surveys were conducted by independent, qualified and experienced surveyors: Nathan Duszynski (Natural England bat licence level 2 2017-31943-CLS-CLS) and Ebonie Lambo-Hills.
- 1.4. Surveys were comprised of:
 - i. A detailed internal and external inspection of all suitable cavities, holes and crevices for roosting bats. The species and location of each bat identified was mapped and detailed in Figures 1 to 3.
 - ii. A static detector left in-situ for a 34-day period.
- 1.5. Equipment available for use during the surveys were binoculars, ladders, endoscopes, torches and a digital camera.
- 1.6. Bat calls were recorded using an Anabat Swift. Call data was analysed using AnaloookW and Analoook Insight software.
- 1.7. All survey methods were carried out in accordance with the most up to date good practice guidance (Collins, 2016).

Nocturnal

- 1.8. A total of two bat activity surveys (comprised of a dusk emergence and one dawn return-to-roost survey) were conducted within the optimal surveying season for bats and in suitable weather conditions (Table 5).
- 1.9. Seven independent, qualified and experienced surveyors were used per survey: Nathan Duszynski (Natural England bat licence level 2 2017-31943-CLS-CLS), Miranda Proctor (Natural England bat licence level 1 2020-44596-CLS-CLS), Ebonie Lambo-Hills, Mark Jermy, Matthew Ashley, Emma Laurie and Daniel Howes. The surveyors were stationed as shown in Figures 5-6.
- 1.10. The dusk surveys started approximately 15 minutes before sunset and finished approximately 1.5 hours after sunset. The dawn survey started approximately 1.5 hours before sunrise and ended approximately 15 minutes after sunrise.
- 1.11. Bat calls were recorded using an Anabat SD2, Anabat Walkabout and EchoMeter Touch. Call data was analysed using AnaloookW and Analoook Insight software.

- 1.12. Two Canon XA40 infrared cameras were used as survey aids to assist in detecting emerging bats. Each camera was equipped with two infrared floodlights and an infrared torch. Although these devices are infrared cameras, where applicable Thermal Imaging: Bat Survey Guidelines (2019) were followed.
- 1.13. All survey methods were carried out in accordance with the most up to date good practice guidance (Collins, 2016).

2. SITE CONTEXT

Location

- 2.1. The site is situated on the south-eastern edge of the village of Offton, with the A14 located approximately 5.3km east. The closest town is Ipswich, located approximately 6.6km southeast of the site.
- 2.2. The site is enclosed by grassland managed as lawn to the north and south, residential dwellings to the east and a deciduous woodland to the west. The wider surroundings are comprised of a mixture of residential dwellings, blocks of woodland and arable fields lined with mature trees and hedgerows.

3. DESCRIPTION OF THE DEVELOPMENT

- 3.1. The proposals are for the partial demolition and conversion of the existing building into a residential dwelling.

4. FIELD STUDY

Hibernation physical inspection surveys

- 4.1. The detailed physical inspection survey conditions are indicated in Table 1 below:

Visit	Date	Conditions
1	01/12/21	Air temperature: 7°C Cloud cover: 20% Wind: 12 mph Rain: none
1	04/01/22	Air temperature: 5°C Cloud cover: 80% Wind: 10 mph Rain: none
2	08/02/22	Air temperature: 13°C Cloud cover: 50% Wind: 29 mph Rain: none

Table 1, bat hibernation surveys information.

First inspection survey – 1st December 2021

- 4.2. An inspection for hibernating bats was conducted during Preliminary Ecological Appraisal (Greenlight Environmental Consultancy Ltd., 2021), which found two bats (unidentified pipistrelle *Pipistrellus sp.* and an unidentified *Myotis sp.*) hibernating within mortise and tenon joints within the main barn (Figure 1, and Photo 1 and 2). Although the exact species could not be fully identified due to the location of the bats within the mortise and tenon joints, with only limited identification characteristics visible, they were considered to be common pipistrelle *Pipistrellus pipistrellus* and Natterer's *Myotis nattereri* based on the subsequent hibernation surveys. These bats were considered to be hibernating, with little to no movement and overnight lows of -2-3°C over the preceding days.
- 4.3. No further bats were identified, with all accessible crevices being searched using a torch and endoscope.



Photo 1, mortise and tenon joint with common pipistrelle, highlighted in red, located within the main barn on the 1st December 2021 and 4th January 2022.



Photo 2, mortise and tenon joint with Natterer's, highlighted in yellow, located within the main barn on the 1st December 2021.

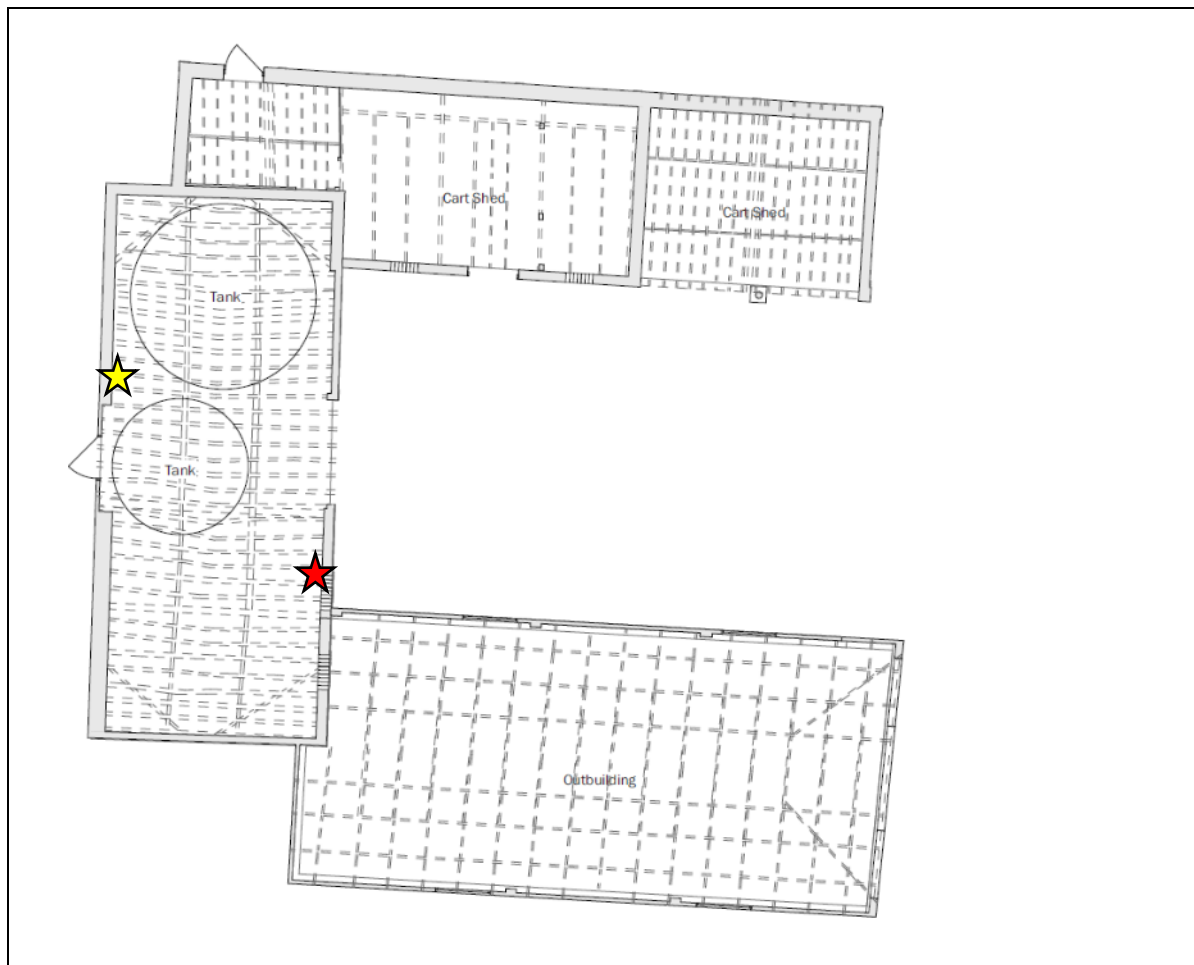


Figure 1, hibernation survey findings on 1st December 2021.
Key: One common pipistrelle = red star. One Natterer's = yellow star.

Second inspection survey – 4th January 2022

- 4.4. A total of two bats were observed hibernating within the main barn, consisting of two common pipistrelles.
- 4.5. Both common pipistrelles were observed hibernating within mortise and tenon joints within the main barn (Figure 2 – red stars), with the mortise and tenon joint to the southeast being the same location as the common pipistrelle identified on the 1st December 2021.
- 4.6. No further bats were identified, with all accessible crevices being searched using a torch and endoscope.



Photo 3, second roost location of hibernating common pipistrelle, highlighted in red, in mortise and tenon joint on 4th January 2022 and 8th February 2022.

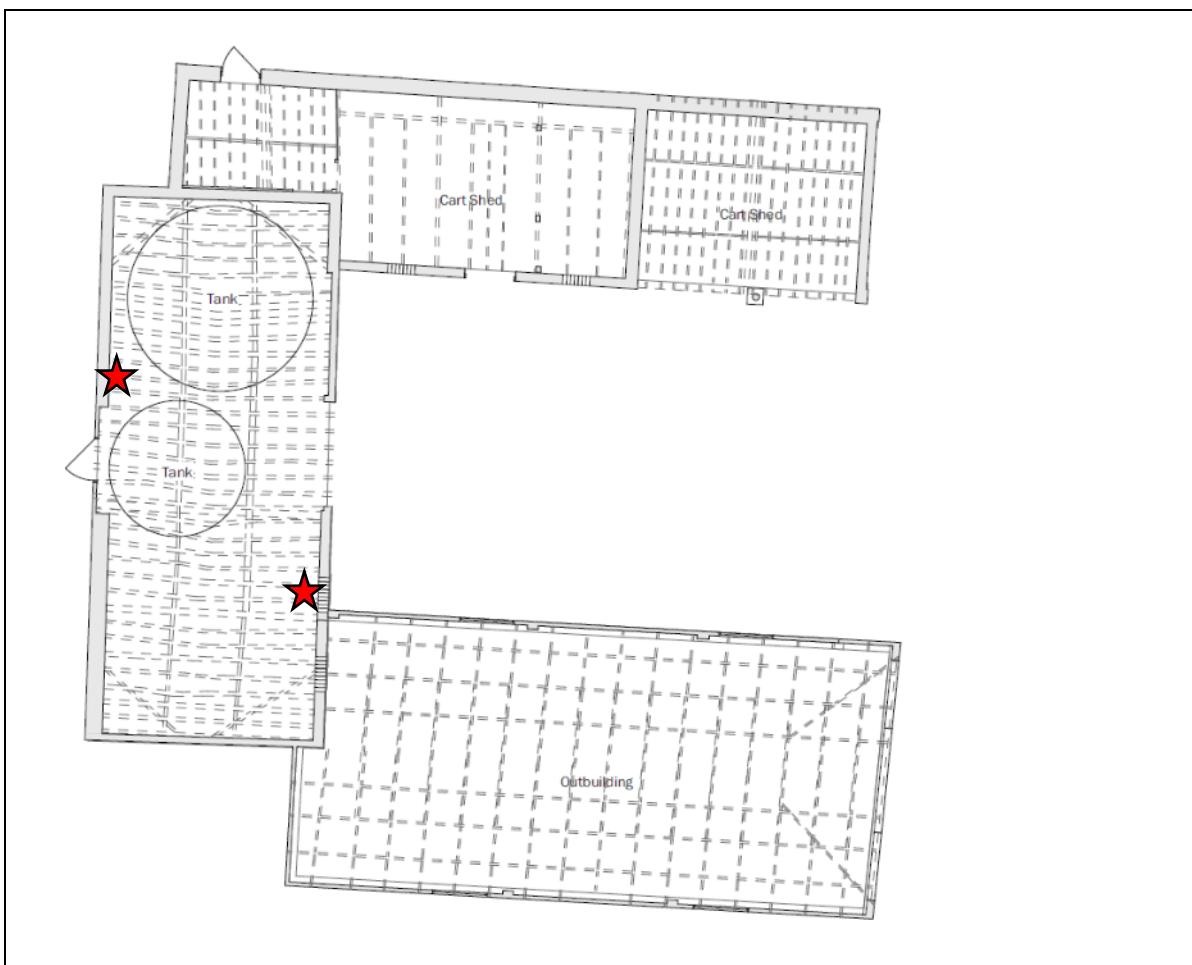
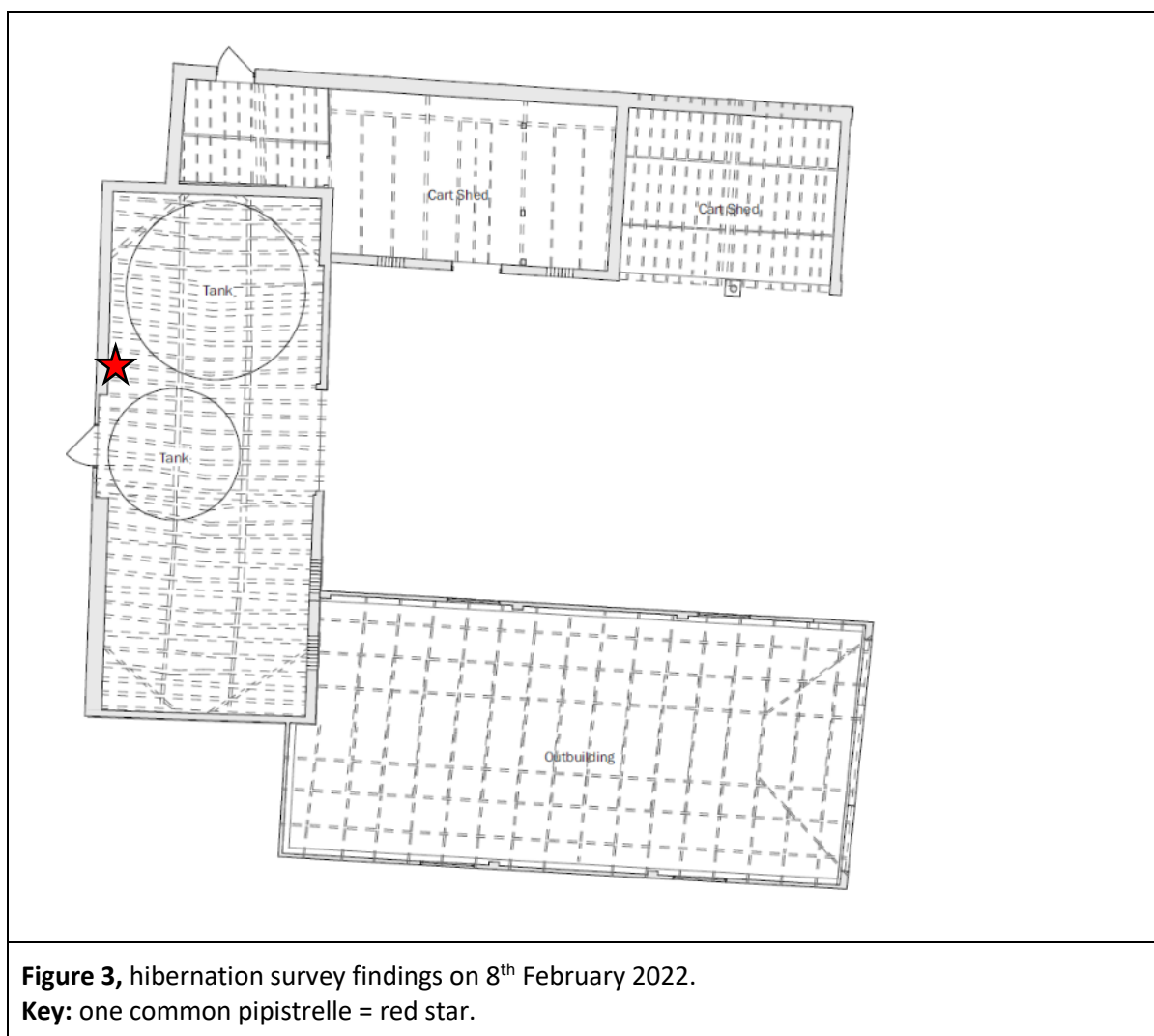


Figure 2, hibernation survey findings on 14th January 2022.
Key: two common pipistrelle = red star.

Third inspection survey – 8th February 2022

- 4.7. One bat was observed hibernating within the main barn, consisting of one common pipistrelle located in the mortise and tenon joint to the northwest of the main barn (Figure 3, Photo 3).
- 4.8. No further bats were identified, with all accessible crevices being searched using a torch and endoscope. Please note, the mortise and tenon joint located to the southeast (Figure 1 and 2, Photo 1) of the main barn, where a common pipistrelle was previously observed hibernating, was unable to be inspected on health and safety grounds due to a significant split within the support beam following storms Dudley, Eunice and Franklin (16-17th February 2022).



Hibernation activity surveys

4.9. The location of the static detectors are shown in Figures 4.

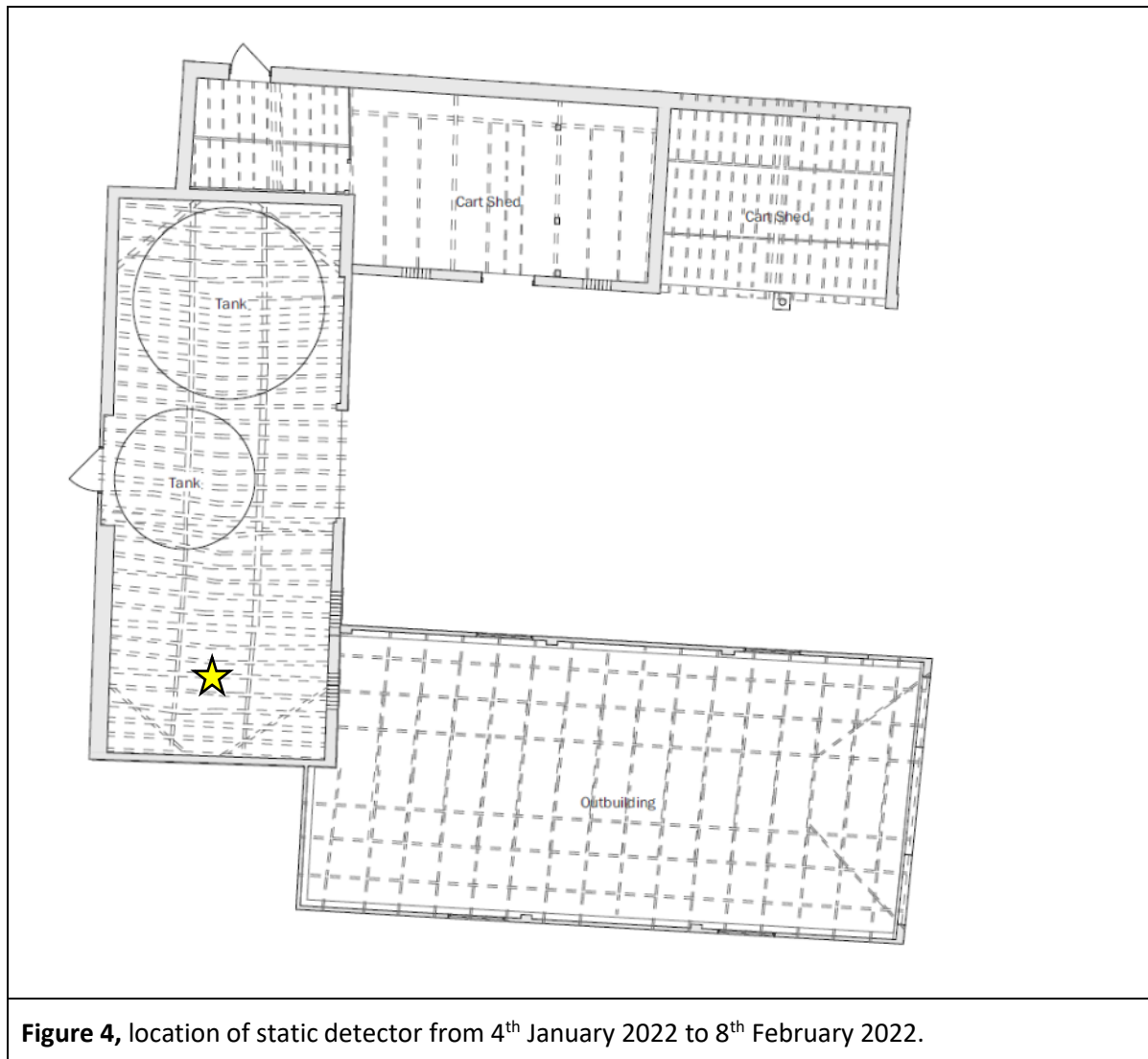


Figure 4, location of static detector from 4th January 2022 to 8th February 2022.

4.10. The activity survey conditions are indicated in Table 2 below:

Date	Temperature (overnight low)	Wind (mph)	Percipitation overnight
04/01/2022	0°C	8-14	Dry
05/01/2022	0°C	10-18	Dry
06/01/2022	-4°C	6-14	Dry
07/01/2022	0°C	11-13	Dry
08/01/2022	0°C	8-18	Light rain between 6:00 and 12:00
09/01/2022	0°C	8-14	Dry
10/01/2022	0°C	5-10	Dry
11/01/2022	4°C	4-10	Rain between 6:00 and 18:00

Date	Temperature (overnight low)	Wind (mph)	Percipitation overnight
12/01/2022	0°C	4-7	Dry
13/01/2022	0°C	6-7	Dry
14/01/2022	-1°C	2-6	Dry
15/01/2022	2°C	6	Dry
16/01/2022	1°C	7-9	Dry
17/01/2022	-1°C	4-8	Dry
18/01/2022	0°C	4-8	Dry
19/01/2022	2°C	7-13	Dry
20/01/2022	0°C	9	Dry
21/01/2022	-2°C	8-9	Dry
22/01/2022	-1°C	4-8	Dry
23/01/2022	4°C	3-5	Dry
24/01/2022	3°C	2-4	Dry
25/01/2022	0°C	2-8	Dry
26/01/2022	0°C	7-13	Dry
27/01/2022	1°C	7-16	Dry
28/01/2022	0°C	6-12	Dry
29/01/2022	4°C	14-22	Dry
30/01/2022	0°C	4-16	Dry
31/01/2022	-1°C	9-25	Dry
01/02/2022	4°C	12-27	Dry
02/02/2022	7°C	6-14	Rain between 6:00 and 12:00
03/02/2022	6°C	9-11	Dry
04/02/2022	2°C	14-17	Rain between 6:00 and 12:00
05/02/2022	0°C	12-24	Dry
06/02/2022	3°C	18-27	Dry
07/02/2022	0°C	10-13	Dry
08/02/2022	6°C	12-17	Dry

Table 2, bat hibernation surveys information.

- 4.11. Static detectors recorded a **low** to **high** level of bat activity from common pipistrelles, soprano pipistrelles *Pipistrellus pygmaeus*, unidentified pipistrelles, brown long-eared *Plecotus auritus*, Natterer's, *Myotis sp.*, barbastelle *Barbastella barbastellus* and other unidentified social calls.
- 4.12. The *Myotis sp.* recorded are considered to be Natterer's *Myotis nattereri*.

Survey date	Species	Total number of calls
4 th January to 8 th February	Barbastelle	46
	Brown long-eared	6
	Common pipistrelle	111
	Natterer's	83
	<i>Pipistrelle sp.</i>	22
	Soprano pipistrelle	18
	Social	1

Table 3, total number of bat calls per species/detector/month.

Species	Average per night	% of calls
Barbastelle	1	15.59%
Brown long-eared	0	2.03%
Common pipistrelle	3	37.63%
Natterer's	2	30.85%
Pipistrelle sp.	1	7.46%
Soprano pipistrelle	1	6.1%
Social	0	0.34%
Total	8	100.00%

Table 4, number of bat calls per species/month.

- 4.13. Species composition of bat activity was dominated by common pipistrelle and Natterer's (making up ≈68% of calls), with relatively high numbers of barbastelle, and lower numbers of soprano pipistrelle and brown long-eared.
- 4.14. Common pipistrelle and Natterer's were recorded on a regular basis on the static detectors within their typical emergence times and considered to routine roost and hibernate within the building.
- 4.15. Brown long-eared, soprano pipistrelle and barbastelle have all been recorded towards the end of their typical emergence times. Although they cannot be confirmed to be hibernating within the building, given the mild winter and the call times, there is a strong possibility that these species may roost within the building on occasion.

Summer activity surveys

4.1. The survey conditions, start/end times and sunset/sunrise times are indicated in Table 1 below:

Visit	Date	Conditons	Start	End	Start of survey	End of survey	Sunset/sunrise
1	04/05/22	Temp Cloud cover Wind Precipitation	12°C 60% 6 mph None	11°C 60% 5 mph Drizzle	20:10	21:55	20:25
2	25/05/22	Temp Cloud cover Wind Precipitation	8°C 40% 7 mph None	8°C 40% 7 mph None	03:10	05:05	04:50

Table 5, bat activity surveys information.

First activity survey (dusk) – 5th May 2022

- 4.2. Two common pipistrelles were recorded emerging from the main barn during the survey.
- 4.3. The first bat recorded was a common pipistrelle, observed emerging from between a timber and the weatherboarding on the east aspect of the main barn at 20:36 (Figure 5, Photo 4), the common pipistrelle then departed from the main barn via weatherboarding on the west aspect at 20:38 (Photo 6).
- 4.4. A second common pipistrelle was recorded emerging from between the weatherboarding and timber on the south aspect of the main barn at 20:48 (Figure 5, Photo 5) and departed the building via the entrance to the main barn on the east aspect.
- 4.5. Several common pipistrelles were recorded throughout the survey entering the main barn via the entrance on the east aspect and foraging within.
- 4.6. No further bats were observed emerging from the building during the survey.
- 4.7. A high level of foraging and commuting activity was recorded and observed by common pipistrelles, soprano pipistrelles, brown long-eared, noctules *Nyctalus noctula* and serotines *Eptesicus serotinus*.



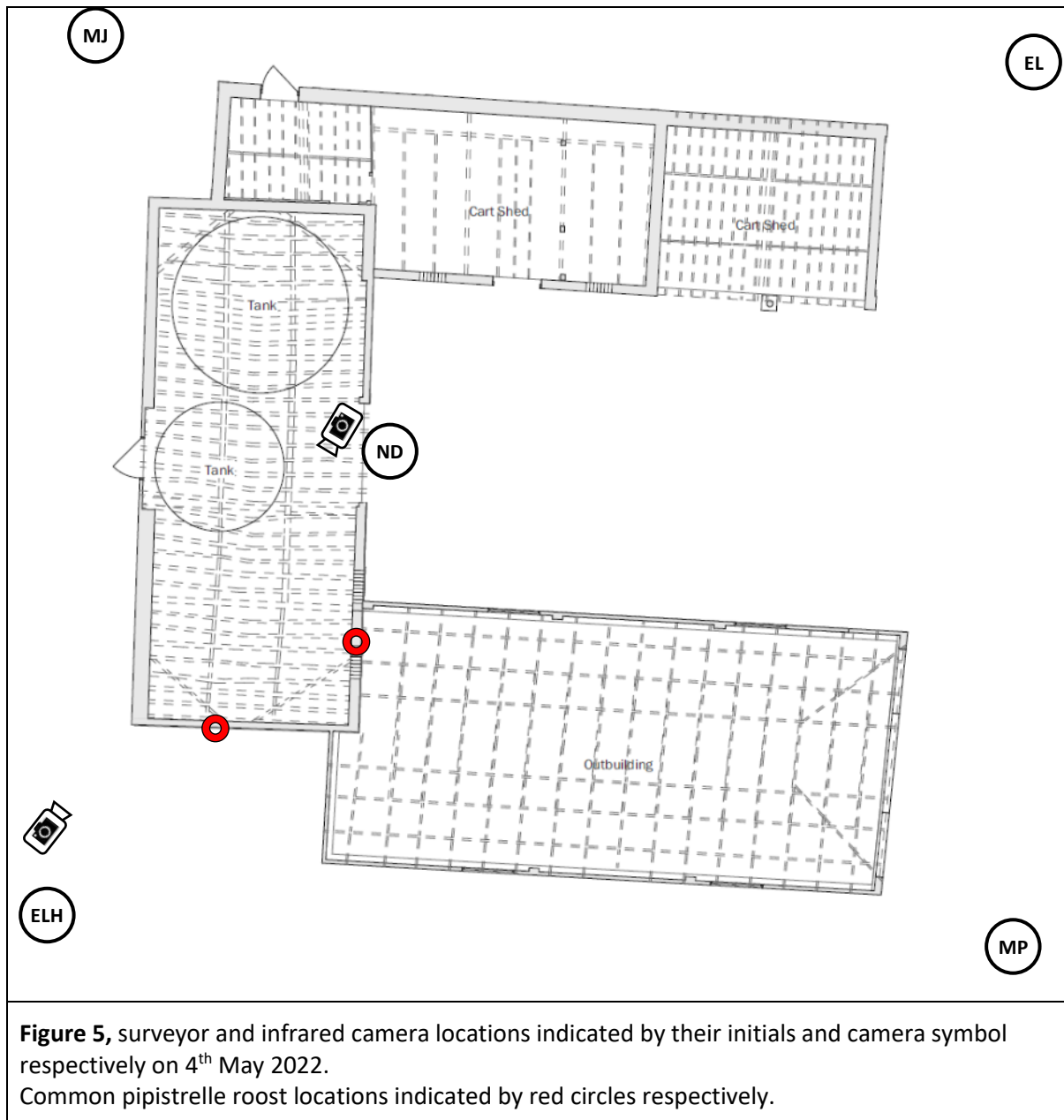
Photo 4, common pipistrelle roost location on the east aspect of the main barn, highlighted in red. 4th May 2022.



Photo 5, common pipistrelle roost location on the south aspect of the main barn highlighted in red. 4th May 2022.



Photo 6, common pipistrelle exiting the barn via weather boarding on the west, highlighted in red. 4th May 2022.



Second activity survey (dawn) – 25th May 2022

- 4.8. A total of four bats were recorded entering and roosting within the main barn and the cart lodge during the survey, consisting of two brown long-eared and two common pipistrelles.
- 4.9. The first brown long-eared was recorded entering the main barn via the entrance on the eastern aspect and roosting between the timber and weatherboarding on the east aspect of the main barn at 03:20 (Figure 6, Photo 7). A second brown long-eared was recorded roosting in a crevice between the lining and the ridge within the main barn at 03:25 (Figure 6, Photo 8).
- 4.10. A common pipistrelle was recorded entering a roost behind a section of weatherboarding around the eaves on the western aspect of the main barn at 04:13 (Figure 6). The second common pipistrelle was recorded entering a roost within a crevice between the brick and timber weatherboarding on the eastern gable end of the cart lodge at 04:20 (Figure 6, Photo 9).
- 4.11. No further bats were observed entering the building during the survey.
- 4.12. A low level of foraging and commuting activity was recorded and observed by common pipistrelles, soprano pipistrelles and noctule.



Photo 7, brown long-eared roost location located on the eastern aspect of the main barn, highlighted in blue respectively. 25th May 2022.

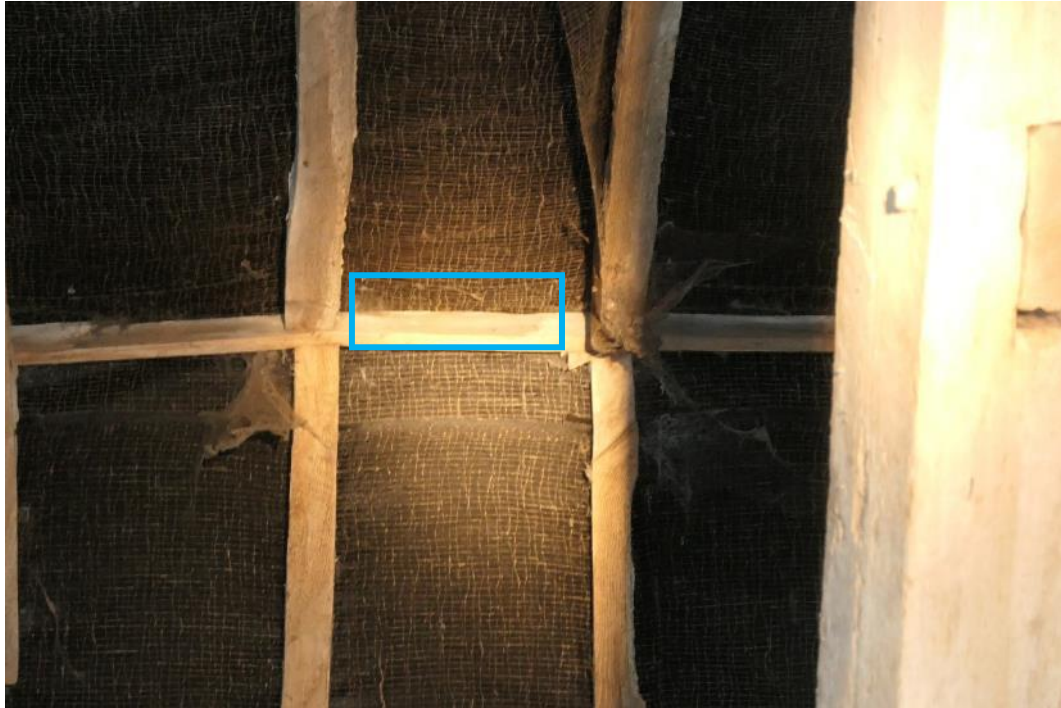


Photo 8, brown long-eared roost location between the lining and the ridge within the main barn, highlighted in blue. 25th May 2022.



Photo 9, common pipistrelle roost location on the eastern gable end of the cart lodge. 25th May 2022.

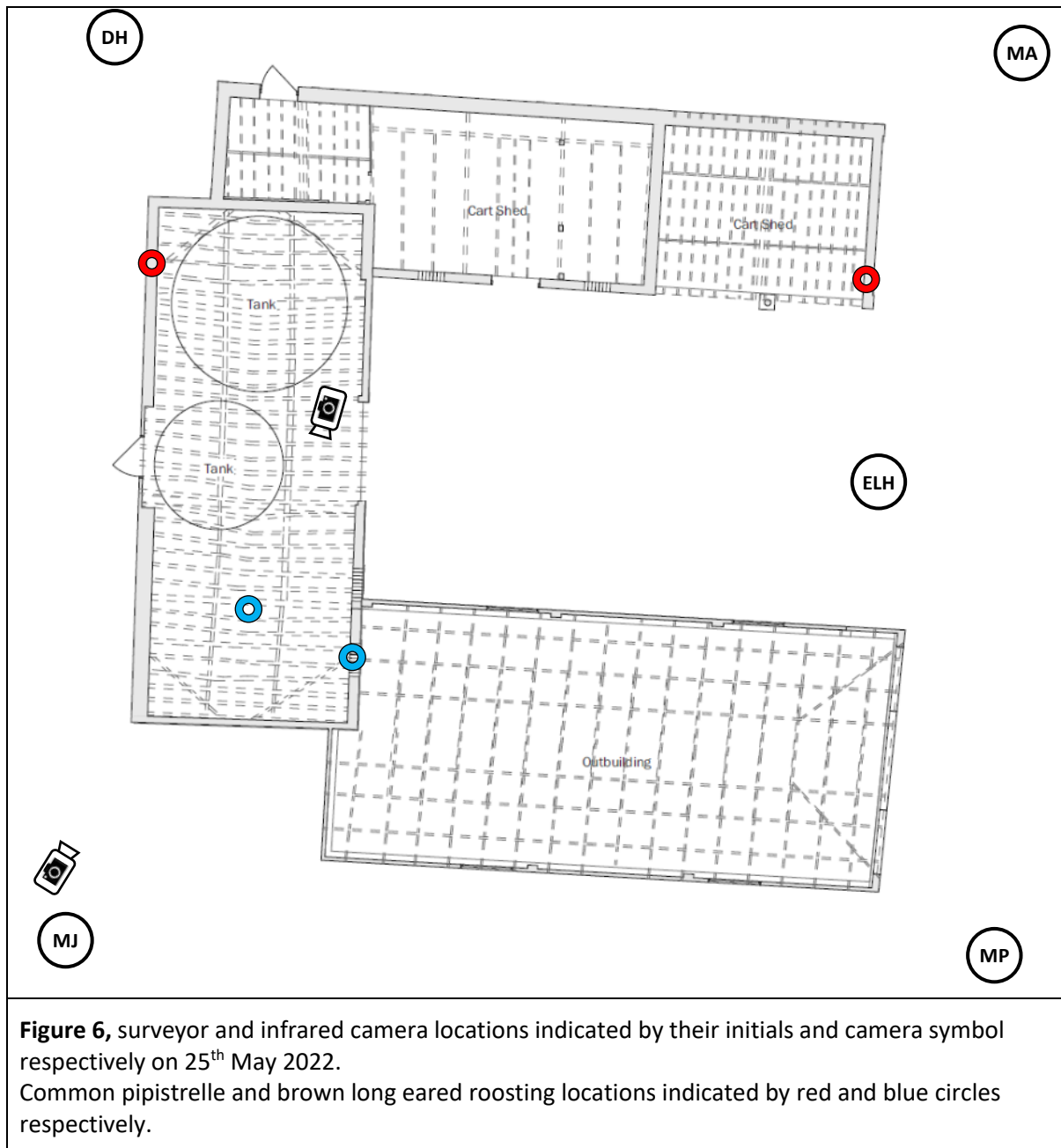


Figure 6, surveyor and infrared camera locations indicated by their initials and camera symbol respectively on 25th May 2022. Common pipistrelle and brown long eared roosting locations indicated by red and blue circles respectively.

5. DISCUSSION AND CONCLUSIONS

- 5.1. The wintering hibernation surveys confirmed the use of the building by low numbers of common pipistrelle and Natterer's, and may occasionally be used by soprano pipistrelle, brown long-eared and barbastelle, albeit this cannot be confirmed. The summer activity surveys confirmed the building is also used as a non-breeding day roost by common pipistrelles and brown long-eared.
- 5.2. The proposed works involve for the partial demolition and conversion of the existing building into a residential dwelling, resulting in the modification/destruction of roosting locations.
- 5.3. Common pipistrelles are common and widespread (BCT, 2014) and the **modification/destruction of a minor hibernation roost and non-breeding day roost** would have a potentially **high** and **low** impacts on the local bat population respectively (Mitchell-Jones, 2004).
- 5.4. Natterer's bats are uncommon but widespread (BCT, 2014) and the **modification/destruction of a minor hibernation roost** would have a potentially **high** impact on the local bat population (Mitchell-Jones, 2004).
- 5.5. Brown long eared are common and widespread (BCT, 2014) and the **modification/destruction of a non-breeding day roost** would have a potentially **low** impact on the local bat population (Mitchell-Jones, 2004).
- 5.6. In order to be able to proceed with the proposed works and to ensure that no detrimental impacts will result on the species, a European Protected Species mitigation licence from Natural England will be required for the proposed works and the following mitigation measures will be implemented:
 - i. Workers to be given a toolbox talk prior to works commencing detailing bat signs, potential roosts/access points, what to do if bats are found and to avoid activities that might cause high vibrations or noise.
 - ii. On the first day works are proposed to commence, the building will be inspected for bats using a torch and endoscope. If any bats are found and accessible, they will be captured by gloved hand, given a health check and removed to safety.
 - iii. A soft roof strip and partial demolition of the walls around the bat roosts will be undertaken with special care and under watching brief of a licenced bat ecologist. If any bats are found, work will cease immediately and any bats removed to safety.
 - iv. Once the roof/weatherboarding has been removed, any potential roosting features will be sealed and any timber treated using an approved product.
 - v. The installation of two integrated hibernation bat boxes (1WI Schwegler Summer and Winter Bat Box – Appendix B).

- vi. The installation of two standalone hibernation bat boxes on a suitable tree in the local vicinity (1FW Schwegler Bat Hibernation Box – Appendix B).
 - vii. The installation of six weatherboard roosts to be installed on the main barn and cart lodge (integrated weatherboard roost – Appendix B).
 - viii. The installation of two standalone bat boxes on suitable trees in local vicinity (1FF Schwegler Bat Box with built-in wooden rear panel – Appendix B).
 - ix. Roofs will be lined with traditional type 1F bitumen felt, not non-bitumen coated roofing membrane (NBCRM) which includes both breathable and non-breathable membranes; these are proven to entangle bats through regular contact, which also compromises the integrity of the membrane.
 - x. Any lighting schemes will follow guidance from the Bat Conservation Trust and CIE 150:2003. Warm-white (long wavelength) lights with UV filters will be fitted as close to the ground as possible. Lighting units will be angled below 70° and equipped with movement sensors, baffles, hoods, louvres and horizontal cut off units at 90°.
 - xi. A soft landscaping scheme to include the planting of new native species-rich (≥ 5 species), hedgerows and trees around the site (see Appendix C for suggested species).
- 5.7. After the effects of the above mitigation, we consider that the favourable conservation status of the local bat population will be maintained and that an EPS mitigation licence should be granted by Natural England.

6. BIBLIOGRAPHY

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Appendix A

Legislation

European Protected Species

National Planning Policy - National Planning Policy Framework (NPPF)

Section 15 of the National Planning Policy Framework 2021 (NPPF): Conserving and enhancing the natural environment states that 'planning policies and decisions should contribute to and enhance the natural and local environment by ... minimising impacts on and providing net gains for biodiversity.'

Office of The Deputy Prime Minister ("ODPM") Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their impact within the planning system.

Paragraph 98 of Circular 06/2005 states that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat'.

Implications of legislation and policies

Without this ecological assessment, the potential developer would be unable to demonstrate due diligence in his responsibilities. Furthermore, the local planning authority would not have been provided with sufficient information for a planning decision to be made. This could result in non-determination or refusal of the application.

With legal responsibilities and planning implications, it is essential that any ecological assessment of a potential development site, including the area of this report, must determine the possible presence or absence of any protected species as part of any planning development consideration.

Where mitigation or compensation measures are required to ensure that no significant impacts will result on biodiversity from the development, the proposed measures may be secured through planning conditions or by EPS Mitigation Licences from Natural England.

Bats

All bat species in Britain are protected under the Wildlife and Countryside Act 1981 through inclusion on Schedule 5. They are also protected under the Conservation (Natural Habitats &c.) Regulations 1994 (which were issued under the European Communities Act 1972), through inclusion on Schedule 2. On 30th November 2017, these Regulations, together with subsequent amendments, were consolidated into the Conservation of Habitats and Species Regulations 2017.

European protected animal species ("EPS") and their breeding sites or resting places are protected under Regulation 42. It is an offence for anyone to deliberately capture, injure or kill any such animal or to deliberately take or destroy their eggs. It is an offence to damage or destroy a breeding or resting place of such an animal. It is also an offence to have in one's possession or control, any live or dead European protected species.

The threshold above which a person will commit the offence of deliberately disturbing a wild animal of a European protected species has been raised. A person will commit an offence only if he deliberately disturbs

such animals in a way as to be likely significantly to affect (a) the ability of any significant groups of animals of that species to survive, breed, or rear or nurture their young, or (b) the local distribution of abundance of that species. The existing offences under the Wildlife and Countryside Act (1981) as amended which cover obstruction of places used for shelter or protection (for example, a bat roost), disturbance and sale still apply to European protected species.

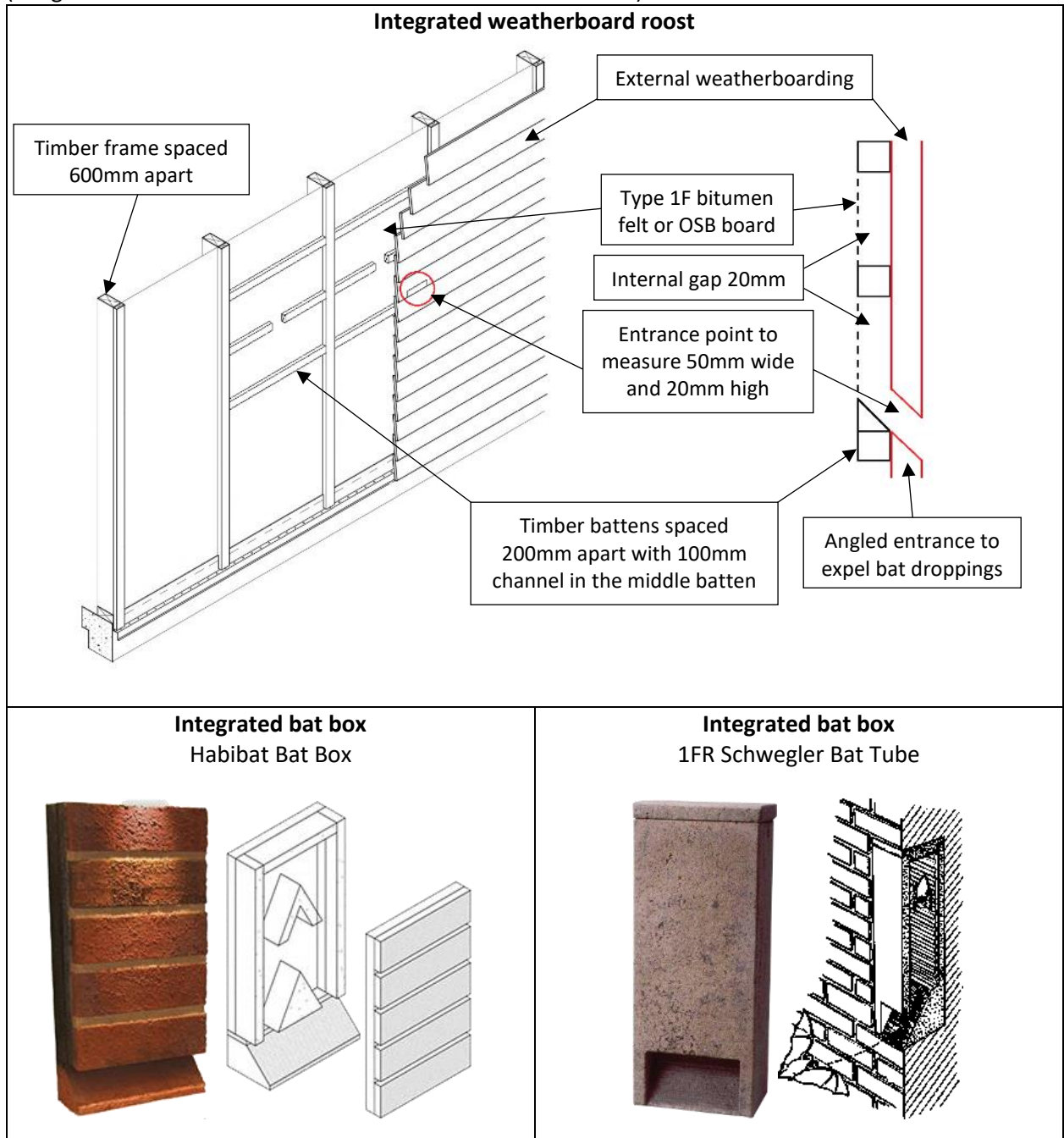
This legislation provides defences so that necessary operations may be carried out in places used by bats, provided the appropriate Statutory Nature Conservation Organisation (in England this is Natural England) is notified and allowed a reasonable time to advise on whether the proposed operation should be carried out and, if so, the approach to be used. The UK is a signatory to the Agreement on the Conservation of Bats in Europe, set up under the Bonn Convention. The Fundamental Obligations of Article III of this Agreement require the protection of all bats and their habitats, including the identification and protection from damage or disturbance of important feeding areas for bats.





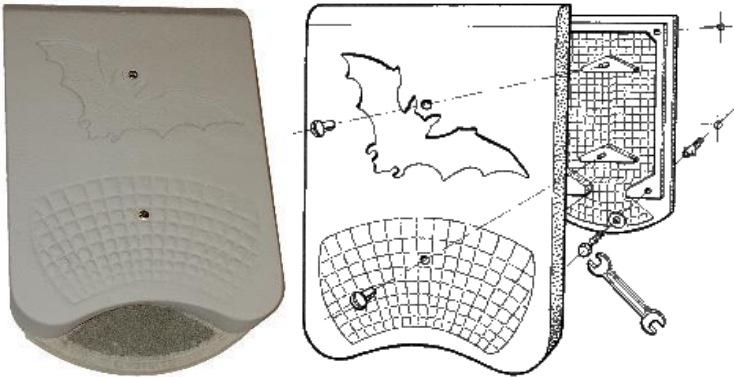
Natural England Licensing - EPS Mitigation Licensing

Licences can be obtained from the Wildlife Management and Licensing Service at Natural England to allow certain activities that would otherwise constitute an offence, for the purposes of development (e.g. destruction of a bat roost, loss of great crested newt aquatic and terrestrial habitat, etc).

Appendix B Examples of bat boxes

(images sourced from www.nhbs.com and www.habibat.co.uk)



<p>Standalone bat box 2F Schwegler Bat Box (General purpose)</p> 	<p>Standalone bat box 1FF Schwegler Bat Box with built-in wooden rear panel</p> 
<p>Integrated hibernation bat box 1WI Schwegler Summer and Winter Bat Box</p> 	<p>Standalone hibernation bat box 1FW Schwegler Bat Hibernation Box</p> 
<p>External wall hibernation bat box 1WQ Schwegler Summer and Winter Bat Box (external walls only)</p> 	

Recommendations for installing bat boxes:

(Sourced from Bat Conservation Trust www.bct.org)

Ideally, several boxes should be put up facing in different directions to provide a range of conditions.

Locate boxes:

- Where bats are known to feed close to hedges and treelines (some bats use a treeline or hedgerow for navigation, putting boxes near these features may help the bats find the box).
- On trees: boxes should be placed on the trunk of a mature tree, where there is a clear flight line/accessible entrance.
- On buildings: boxes should be placed as close to the eaves as possible.
- As high as possible (ideally, at least 3 to 4m above the ground, where safe installation is possible).
- Summer boxes: in sunny places, sheltered from strong winds (usually between south-west and south-east).
- Hibernation boxes: on a north facing aspect.

Make sure the boxes are secured.

Boxes can be installed on trees using adjustable ties to avoid damaging the trees. Otherwise, timber screw bolts or nails can be used. Aluminium alloy nails are less likely to damage saws and chipping machinery.

Bats need time to find and explore new homes, and it may be several months or even years before boxes have residents. Once bats find a place they want to live they can return over and over again. Droppings on the landing area, urine stains around the lower parts of the box and chattering noises from inside on warm afternoons and evenings are signs of occupation.

Appendix C

Native species suitable for planting and sowing

Plants should be obtained from specialist nurseries and preferably be of local genetic stock.

Key: (f) – fruit and berry species; (e) – evergreen species; (se) semi-evergreen species; (d) – deciduous species

Trees	
Alder (d)	<i>Alnus glutinosa</i>
Apples (f; d)	<i>Malus spp.</i> (local varieties)
Ash (d)	<i>Fraxinus excelsior</i>
Beech (d)	<i>Fagus sylvatica</i>
Bird cherry (f; d)	<i>Prunus padus</i>
Elder (f; d)	<i>Sambucus nigra</i>
Elm (d)	<i>Ulmus procera</i>
Field maple (d)	<i>Acer campestre</i>
Pedunculate oak (d)	<i>Quercus robur</i>
Rowan (f; d)	<i>Sorbus aucuparia</i>
Pears (f; d)	<i>Pyrus spp.</i>
Silver birch (d)	<i>Betula pendula</i>
Small-leaved lime (d)	<i>Tilia cordata</i>
White willow (d)	<i>Salix alba</i>
Wild cherry (f; d)	<i>Prunus avium</i>
Walnut (d)	<i>Juglans regia</i>

Shrubs	
Blackthorn (f; d)	<i>Prunus spinosa</i>
Buckthorn (f; d)	<i>Rhamnus catharticus</i>
Crab apple (f; d)	<i>Malus sylvestris</i>
Dog rose (f; d)	<i>Rosa canina</i>
Dogwood (f; d)	<i>Cornus sanguinea</i>
Field maple (d)	<i>Acer campestre</i>
Guelder-rose (f; d)	<i>Viburnum opulus</i>
Hawthorn (f; d)	<i>Crataegus monogyna</i>
Hazel (d)	<i>Corylus avellana</i>
Holly (e)	<i>Ilex aquifolium</i>
Honeysuckle (f; d)	<i>Lonicera periclymenum</i>
Spindle (f; d)	<i>Euonymus europaeus</i>
Wild privet (f; se)	<i>Ligustrum vulgare</i>
Yew (f; e)	<i>Taxus baccata</i>

Flowering plants	
Bird's-foot trefoil	<i>Lotus corniculatus</i>
Black knapweed	<i>Centaurea nigra</i>
Common cat's-ear	<i>Hypochoeris radicata</i>
Common sorrel	<i>Rumex acetosa</i>
Common vetch	<i>Vicia sativa</i>
Cowslip	<i>Primula veris</i>
Field scabious	<i>Knautia arvensis</i>
Foxglove	<i>Digitalis purpurea</i>
Lady's bedstraw	<i>Galium verum</i>
Meadow buttercup	<i>Ranunculus acris</i>
Meadow vetchling	<i>Lathyrus pratensis</i>
Oxeye daisy	<i>Leucanthemum vulgare</i>
Primrose	<i>Primula vulgaris</i>
Red clover	<i>Trifolium pratense</i>
Selfheal	<i>Prunella vulgaris</i>
Sweet violet	<i>Viola odorata</i>
Wild daffodil	<i>Narcissus pseudonarcissus</i>
Yarrow	<i>Achillea millefolium</i>

Grasses	
Common bent	<i>Agrostis capillaris</i>
Crested dog's-tail	<i>Cynosurus cristatus</i>
Meadow fescue	<i>Festuca pratensis</i>
Red fescue	<i>Festuca rubra</i>
Rough meadow-grass	<i>Poa trivialis</i>
Small timothy	<i>Phleum bertolonii</i>
Smooth meadow-grass	<i>Poa pratensis</i>
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>
Yellow oat-grass	<i>Trisetum flavescens</i>