Bat Mitigation and Enhancement Plan

11 Brookmans Avenue, Brookmans Park, Hatfield, Hertfordshire AL9 7QH

Client: Alan Cox Associates Ltd

9th December 2016

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Bat Mitigation and Enhancement Plan

1.0 Introduction and Context

1.1 Site

The survey site's address is 11 Brookmans Ave, Brookmans Park, Hatfield, Hertfordshire AL9 7QH. It is located at National Grid Reference TL24420414, and comprises a detached dwelling house. This was designated as B1 in the previous Preliminary Roost Survey report (Arbtech Consulting Ltd 2016) and is retained for this report. There are no other affected structures on site.

1.2 Project description

The proposed development is the subject of a planning application with Welwyn Hatfield Borough Council [6/2016/1778/FULL]. It is described from this as:

[The] Erection of replacement building containing 5 flats with forecourt parking following demolition of existing house.

It is expected that all works areas, storage and haul routes will be included within the site boundaries; access will be provided by existing roads and as such, no additional working footprints area anticipated. The existing site plan (Preliminary Roost Assessment Survey Map, Arbtech Consulting Ltd November 2016) and the proposed site plan (Proposed Site Plan and Street Scene) are provided as Figures 1 and 2 below.

1.3 Previous preliminary bat survey

A Preliminary Roost Assessment Survey was undertaken by Arbtech Consulting Ltd on 7th November 2016. This survey concluded that the existing house (B1) is a confirmed bat roost for at least one species of bat. Please refer to the report for full information on that survey's methodology, results and conclusions.

2.0 Scope of the Report

The proposed development will destroy at least one bat roost and could kill or injure bats. Also, any new lighting could disrupt commuting or foraging in the area.

The scope of this report is to provide a bat mitigation and enhancement plan for site, to outline the measures that would be used to comply with bat legislation. This strategy provides ecological mitigation and enhancements for the site to assist with the progression of the planning application, prior to the commencement of roost characterisation surveys to be completed in 2017. This is an iterative document and will be superseded by the Method Statement for the European Protected Species Licence application that

will be submitted to Natural England after the further surveys have been completed, and once planning permission has been granted. Works will not commence until the EPSM Licence has been granted.

This 'worst case scenario' mitigation plan approach is supported by Herts & Middlesex Wildlife Trust, as outlined in a letter dated 22nd November 2016.

2.1 Satisfying the 'Three Tests'

To assist with the progression of the planning application, prior to the commencement of roost characterisation surveys to be completed in the bat survey season of 2017, this document will also cover the 'three tests' that are applied by Natural England when assessing Licence applications.

In determining whether to grant a licence Natural England must apply the requirements of Regulation 53 of the Regulations and, in particular, the three tests set out in sub-paragraphs (2)(e), (9)(a) and (9)(b)6 of the Conservation of Habitats and Species Regulations 2010:

(1) Regulation 53(2)(e) states: a licence can be granted for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".

(2) Regulation 53(9)(a) states: the appropriate authority shall not grant a licence unless they are satisfied "that there is no satisfactory alternative".

(3) Regulation 53(9)(b) states: the appropriate authority shall not grant a licence unless they are satisfied "that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range."

The need for the proposed development satisfies the first two tests as it is categorised as "an imperative reason of overriding public interest with no satisfactory alternative".
There is no alternative to the proposed development as to 'do nothing' would result in the continued deterioration of the house which is no longer used or maintained. This will result in the eventual loss of any bat roosts present.
The replacement of the existing house with flats will assist with housing targets in the Borough, and will provide an additional income for the applicant as well as contributing to the local economy.

This mitigation plan will satisfy the third test.

The mitigation and enhancements recommended in this plan are based on the worst-case scenario that there is a brown long-eared bat maternity colony within B1, and exterior day/summer roosts for common (or soprano) pipistrelles.

Figure 1 Existing site plan (taken from the Preliminary Roost Survey report by Arbtech Consulting Ltd, November 2016).

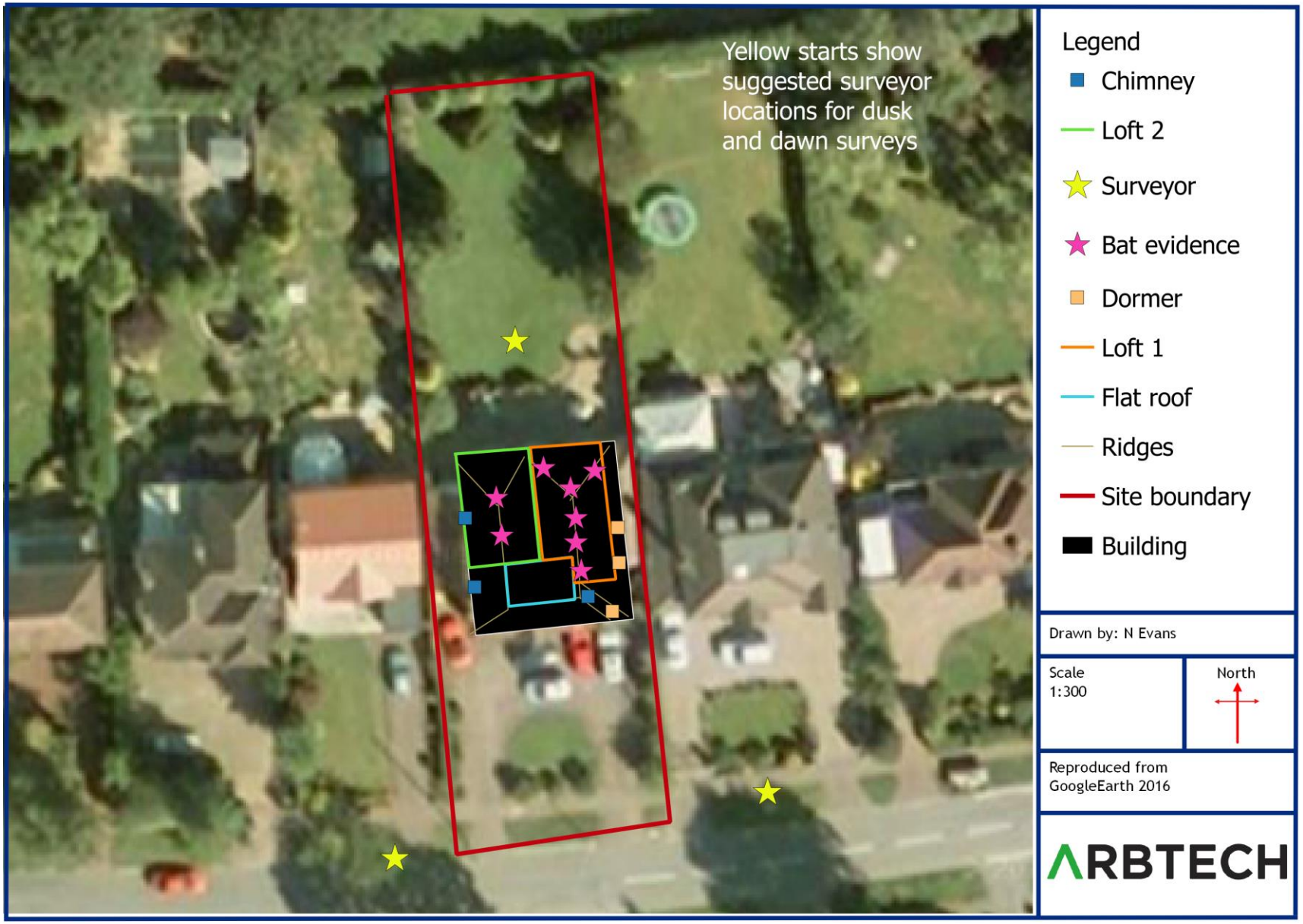


Figure 2 proposed site plan

3.0 Background and site description

3.1 Preliminary Roost Assessment Survey

A Preliminary Roost Assessment Survey was completed by Arbtech Consulting Ltd on 7th November 2016. The desk study and results from this are outlined below:

3.2 Desk study

A summary of the desk study results is provided below.

Designated sites

There are two statutory designated sites within the study area. Their location and extent are illustrated in Appendix 5.

Water End Swallow Holes Site of Special Scientific Interest (SSSI) lies approx. 1km north west. The willow carr/swamp community adjacent to the sinkholes is of biological importance. Pure stands of Reed Sweet-grass Glyceria maxima in deep water are replaced by a mixture of this species with Great Willowherb Epilobium hirsutum, Meadowsweet Filipendula ulmaria and Water Plantain Alisma plantago-aquatica in more silted areas. Willow carr, on the more stable ground, is dominated by Willow Salix spp. and Hawthorn Crataegus monogyna with Lesser Pond-sedge Carex acutiformis, Bulrush Typha latifolia and Yellow Iris Iris pseudacorus beneath. Also integral with the sinkhole group are semi-natural woodland, scrub and semi-improved grassland (Natural England).

Furzefield Wood and Lower Halfpenny Bottom Local Nature Reserve (LNR) lies approx. 1.8km south west. Woodland & Meadow provide varied age structure and light levels support a range of wildlife and plants. (Natural England).

Landscape

The Magic database shows the following notable habitats are present within a 2km radius of the site: deciduous woodland, ancient woodland, woodpasture and parkland, lowland meadows, floodplain grazing marsh and good quality semi improved grassland. The nearest deciduous woodland lies adjacent to the site to the north west. The closest ancient woodland is approx. 550m to the north west. These are likely to be considered as habitats of principal importance. A review of aerial photographs (Figure 1) and OS maps shows the site has excellent connectivity to valuable resources in the local environment via tree lined gardens and roads and woodland edges.

In conclusion, the local area provides excellent bat commuting and foraging habitat.

Historical bat records

Hertfordshire Environmental Records Centre (HERC) have provided bat records for the study area. These are summarised in Table 1 below.

Table 1: Bat records within a 2km radius of the site

Species	Record type
Common pipistrelle (*Pipistrellus pipistrellus*)	EPSL destruction of a resting place 2013 approx. 1.7km north east (Magic). EPSL destruction of a resting place 2009 approx. 1.9km north east (Magic). Maternity roost record and numerous non breeding roosts (HERC).
Brown long eared (*Plecotus auritus*)	EPSL destruction of a resting place 2013 approx. 1.7km north east (Magic). EPSL destruction of a resting place 2009 approx. 1.9km north east (Magic). Hibernation and maternity roost records (HERC).
Soprano pipistrelle (*Pipistrellus pygmaeus*)	EPSL destruction of a resting place 2013 approx. 1.7km north east (Magic). Maternity roost record (HERC).
Noctule (*Nyctalus noctula*)	Field records (HERC)
Natterers (*Myotis nattereri*)	Multiple hibernation records (HERC)
Whiskered (*Myotis mystacinus*)	Non-breeding and hibernation roost records (HERC).
Daubenton's (*Myotis daubentonii*)	Multiple hibernation records (HERC)
Serotine (*Eptesicus serotinus*)	Field records (HERC)

3.3 Site description

There is one survey building on site, designated as B1. It is a detached dwelling house. The following descriptions are taken from the Preliminary Roost Assessment Survey report (PRA) for the site, undertaken on 7th November 2016.

External:

The building is a detached dwelling of brick construction. The roof is hipped with a twin pitch and valley structure to the rear. There are gaps under the ridge tiles on the southern elevation which could be used by crevice dwelling bats species. This does not provide access into the loft areas for void dwelling bat species. There are dormer windows on the southern and eastern elevations which have tight fitting clay hanging tiles. Those on the eastern elevation could only be viewed from the footpath with binoculars so it is possible small gaps may have been missed which could provide roosting habitat for crevice dwelling bats species or access

into the loft spaces for void dwelling bat species. There are three brick chimneys with tight fitting lead flashing around the bases. There is a flat roofed section on the northern elevation of the southern roof pitch which could not be investigated due to its position on the building as it is blocked from view by the two northern roof pitches. The section that can be viewed through the valley appeared to be clad in clay hanging tiles which could provide roosting crevices. There is a gap in the roof on the north east corner at the rear which could provide access into the eastern loft space.

Internal:

There are two loft spaces within the building, one in each of the rear roof pitches. The loft area to the south has been converted and is used for storage.

- Loft 1

  The eastern pitch. When entering the loft there is a small section which is distinct from the rest of the loft. This area is at the southern end of the building and is lined with timber sarking. There were heavy cobwebs floor to ceiling indicating that this area is not regularly used as the bat roost and is unlikely to be the access point. Past the trusses the loft opens out into a large open area lined with bitumen felt. Modern timber ridge beam and rafters are present for bat roosting. The lining of the roof has some holes and loose areas where bat access could be possible. Very few cobwebs were present indicating regular bat use. Loft dimensions are approx. 12m long by 5m wide with a ridge height of approx. 3m. The internal conditions were 11.7^{o}C and 58.8% humidity, warmer and less humid than external conditions.

  - Bat evidence in loft 1:

    Five bat droppings were found scattered in the small southern section. 150-200 droppings were found scattered under the ridge of the main loft area. The droppings were quite fresh, some older, indicating this is a long-standing roost that was also used in the recent 2016 active season. There were also clusters under rafters of around 50 droppings where separate roosting areas have been located. The size, shape and location of the droppings suggest a brown long-eared bat roost. The number of droppings is indicative of a non-breeding roost.

- Loft 2

  The western pitch. The loft is lined with bitumen felt with loose areas that could potentially be used for bat access. Modern timber ridge beam and rafters are present for bat roosting. Heavy cobwebs were present along the ridge in the southern half of the loft but the northern half is clear where the roost has been present. Loft dimensions are approx. 8m long by 4m wide with a ridge height of approx. 2.5m. The internal conditions were 11.7^{o}C and 58.8% humidity, warmer and less humid than

external conditions. The lofts are connected by a narrow space which runs under the valley between the roof pitches.

- Bat evidence in loft 2:

  Around 50-75 droppings were located scattered under the ridge, mostly at the northern end of the loft under the apex of the roof timbers. The droppings were mixed age, indicating this is a long standing roost that was also used in the recent 2016 active season. The size, shape and location of the droppings suggest a brown long-eared bat roost. The number of droppings is indicative of a non-breeding roost.

Table 2: Evaluation of PRA – Likelihood of bats being present

Reference	Value for / Likelihood of bats using the building for roosting	Brief summary of justification
B1	Confirmed bat roost	Bat presence has been confirmed by bat droppings in lofts 1 and 2. The droppings suggest a long standing, non-breeding roost of brown long-eared bats. The building also has features suitable to support crevice dwelling bat species. The site lies adjacent to a golf course and in close proximity to ancient woodland which provide valuable foraging resources for bats.

Note: until DNA analysis of the bat droppings is returned, it is assumed that they were deposited by brown long-eared bat (*Plecotus auritus*)

4.0 The Mitigation and Enhancement Plan

The following Table 3 outlines the mitigation and enhancements of the site for bats. These are detailed below and will be undertaken in year 1 of the ecology enhancement plan.

Table 4 outlines the post-development monitoring and maintenance to be undertaken in years 2-10 of the ecology enhancement plan.

NB: The mitigation and enhancements are based on the worst-case scenario that there is a brown long-eared bat maternity colony within the loft spaces of B1, and day/summer roosts of common (or soprano) pipistrelles are present in the gaps in the roof structure.
This assumption will be updated after the roost characterisation surveys have been completed in 2017.

Table 3: Mitigation, Capital Works and Enhancements in Year 1

Work	Specification
Compliance with Legislation	Works to the existing dwelling (B1) will be completed once the roost characterisation surveys have been completed in 2017, once planning permission has been granted, and when the EPS Mitigation Licence has been obtained from Natural England. **No works to B1 will be completed until the EPS Mitigation Licence has been granted by Natural England.** Works will be completed in accordance with the Work Schedule submitted to Natural England as part of the licence application. Any deviation from the Work Schedule and/or Method Statement will require a modification request to be submitted to Natural England.
Bat Mitigation and Compensation	Ecological supervision of the works will be completed by the Named Ecologist on the Licence or their Accredited Agent. *Timing of works* Due to the assumed presence of a brown long-eared bat maternity roost, the works will occur between October and April when the maternity colony is not present (in accordance with the Bat Mitigation Guidelines (2004)). *Provision of alternative roosting site before works commence* Temporary (during works) A Schwegler 1FW hibernation bat box will be installed on a retained tree on site prior to the commencement of works. The bat box will be positioned 3-5m above ground level, and will face in a northerly direction with clear flight paths to and from the entrance. Two Schwegler 2FN bat boxes will also be installed on other trees with the same parameters to provide roosts for any pipistrelles found in the existing building. Schwegler 2FN bat boxes are suitable winter roosts for small crevice dwelling species such as common pipistrelles due to the insulated and draught proof design, therefore providing a stable internal temperature required by bats during the winter months. *Avoidance of killing and injury during works*

- The loft space of the existing dwelling (B1) will be inspected by the Licence Named Ecologist or Accredited Agent using ladders, torches and an endoscope immediately prior to the commencement of works.
- Any bats found will be carefully captured by hand and transported to an appropriate bat box by the Named Ecologist or Accredited Agent.
- Bat droppings will be collected from the loft spaces at this stage, and will be used to seed the new bat loft to provide olfactory cues to increase the likelihood of the new loft being located and used by the brown long-eared bat colony (see bat loft details below).
- A destructive search by soft demolition will be completed on the roof structure of the existing dwelling. This will be completed by hand under ecological supervision. Any bats found during the soft demolition will be carefully captured by hand and transported to an appropriate bat box by the Named Ecologist or Accredited Agent.
- All contractors working on site will be informed of the procedure to follow should a bat be unexpectedly found during the works i.e. all work must stop and further advice sought from a bat licenced ecologist.
- Any bats accidentally harmed during the works will be carefully placed in a vivarium (see example of a bat vivarium below) and passed to the local bat group carer until which time they can be re-released at the site.

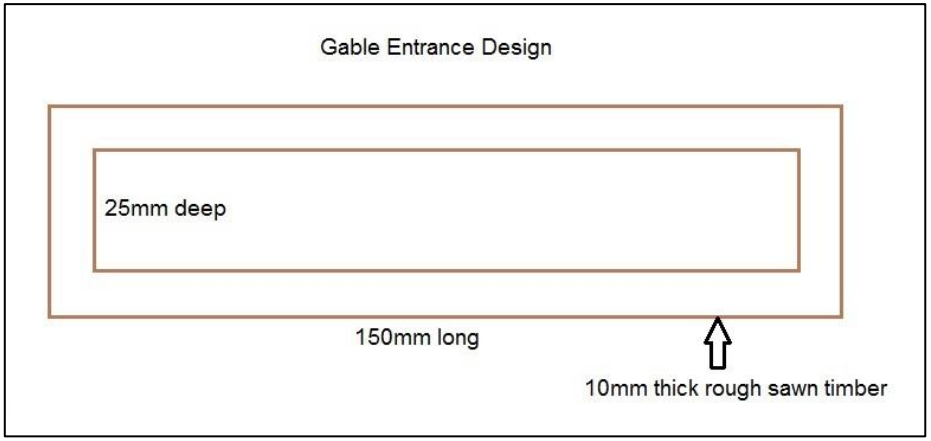
Permanent roost replacement (see Appendices 1.2 and 1.3)

In accordance with the Bat Mitigation Guidelines (2004), a bat loft is required as a permanent roost replacement for brown long-eared bat maternity roosts. Due to the design of the proposed new building (i.e. a flat roof with no roof voids), a stand alone, purpose-built bat loft will need to be created. This will provide permanent roosting provision for the colony on the site. The location of the loft, at the northern end of the garden, will ensure that there are no impacts on emergence times caused by artificial lighting.

Specifics of bat loft

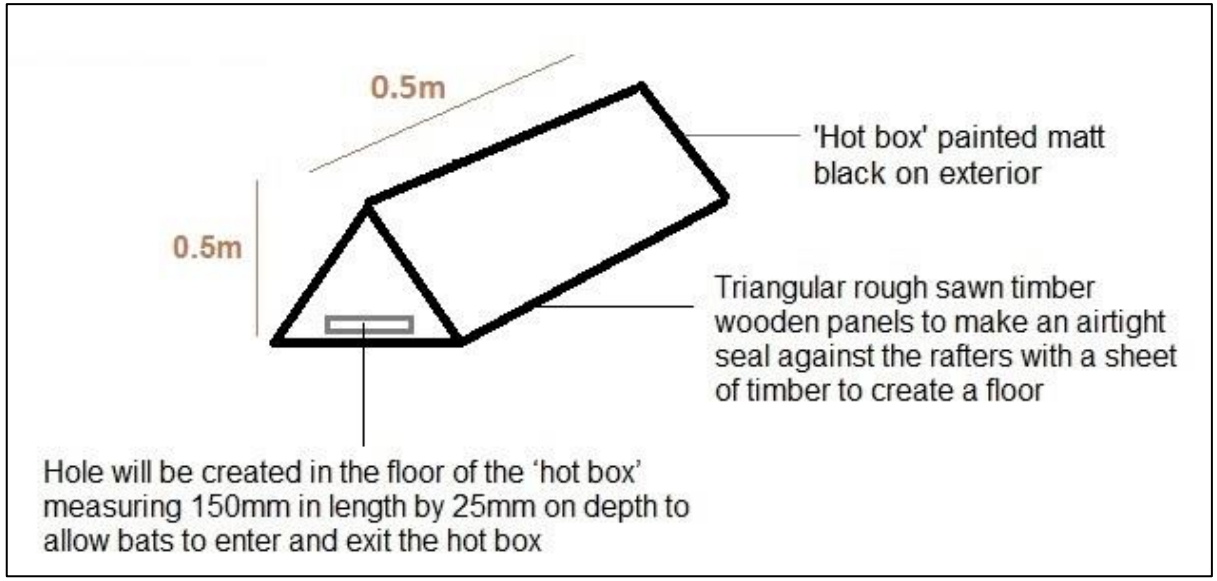
- The new east-west bat loft on in the garden will measure 4m wide, 5m long and the enclosed roof structure will have an internal height of 2m to the ridge line. The bat loft will be constructed from timber and will be on stilts with an enclosed roof space. The roof structure will be slate tiled (see Appendix 1 for design specifications of the bat loft).
- The roof of the bat loft will be lined with traditional Type 1F bitumen felt with the new tiles. Only Type 1F bitumen felt will be used, **not** a Breathable Roof Membrane (BRM). Scientific research has shown that BRMs are not only harmful to bats with bats becoming entangled in lose fibres resulting in the death of bats. But also, BRMs used in bat roosts quickly become shredded by the bats claws resulting in a significantly reduced lifespan of the product (www.batsandbrms.co.uk).
- Access to the bat loft will be via gable entrances in the western and eastern gable ends. The gable entrances will be created from 10mm thick rough sawn timber, measure 150mm long and 25mm deep as shown in Figure 5 below:

Figure 5 Gable entrance design



- Access to the bat loft for monitoring by bat licenced ecologists will be via a small hatch 45cm x 45cm in the floor of the bat loft.
- A 'hot-box' will be constructed inside the bat loft to provide a warmer area for the pups. This will be constructed at ridge level using rough sawn timber and will measure 0.5m in length, and 0.5m in depth with a small access hole will be created in the timber sheet floor as shown in Figure 6 below:

Figure 6 'Hot-box' design



See Appendix 1 for location and design sketches of the bat loft.

- Bat droppings from the loft spaces of the existing dwelling (collected by the Named Ecologist or Accredited Agent during the pre-works inspection) will be used to 'seed' the newly constructed bat loft. These will provide olfactory cues to increase the likelihood of the new roost being located and used by the brown long-eared bats.
- Gaps will be provided in the northern and southern pitches of the roof structure to provide crevices to replace the common/soprano pipistrelle day/summer roosts. Gaps will be created by inserting an approximate 20-25mm plug of lime mortar beneath the bottom corners of the roof tiles to create an approximate 20-25mm gap for bats to crawl into to roost between the tiles and the felt lining. Two of these bat adapted access tiles will be inserted in each pitch of the roof.

	There will be no impact upon the connectivity of the site to the surrounding key foraging areas as the existing tree lined boundaries will be retained.
Bats – Lighting Strategy	Lighting will be controlled across the developed site. Research into the effects of artificial lighting on bats has shown that it can impact upon bat emergence times and lead to a reduced foraging time (particularly for the light sensitive brown long-eared bat). As bats are faithful to their roost sites, often returning to the same site for many years, the impact of lighting on emergence times and in turn reduced foraging times can ultimately result in the roosts being abandoned. Key areas of the site which are sensitive to artificial lighting are the garden area at the rear of the site and the site boundaries which consist of tree lines providing foraging and commuting routes for bats. The lighting on the developed site will be limited to the replacement building only. No lighting will be installed within the garden area or tree lined boundaries, thereby maintaining the existing dark areas within the developed site for bats. No up-lighting will be used near the trees where the bat boxes are to be located. Low impact lighting strategies will be adopted from the guidance outlined in the Bat Conservation Trust's 'Bats and Lighting' publications: http://www.bats.org.uk/pages/bats_and_lighting.html The lighting on the site will: • Use narrow spectrum light sources to lower the range of species affected by lighting • Use light sources that emit minimal ultra-violet light • Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin. • Not use bare bulbs and any light pointing upwards. The spread of light will be kept in line with or below the horizontal.

	Light spill will be reduced via the use of low level lighting used in conjunction with hoods, cowls, louvers and shields. Lights will also be directional to ensure that light is directed to the intended areas only. External lighting will be on PIR sensors that are sensitive to large objects only (so that they are not triggered by passing bats), and will be set to the shortest time duration to reduce the amount of time the lights are on. Wall lights and security lights will be 'dimmable' and set to the lowest light intensity settings. There are several products on the market that allow the control of the light intensity and the duration that the lights are on. All lighting on the developed site will make use of the most up to date technology available. All of the above will ensure that the provision of replacement roosting areas for the brown long-eared bat maternity roost and common/soprano pipistrelle day roosts, will not be affected by any external lighting ensuring the long-term use of the replacement roosts.
Post-Development inspection	A site visit will be undertaken upon completion of the development to check the bat provision. Upon completion of the post-development monitoring (see Table 5 below) a 'Report of Actions Taken Under Licence' will then be returned to Natural England within 14 days of the expiration date of the EPSM Licence in accordance with the terms and conditions of the licence.

Table 4 – Post Development Monitoring, Management and Maintenance

Activity	Year 1	Years 2 to 10
Maintenance of bat roosting provision	Monitor the bat loft to ensure the gable entrances do not become blocked e.g. by vegetation/moss.. Minimal maintenance is required for Schwegler bat boxes due to the materials used for their construction (i.e. woodcrete). The only maintenance required is to replace any bat boxes that are broken or fall down e.g. during storms.	Monitor the bat loft to ensure the gable entrances do not become blocked e.g by vegetation/moss. Ensure that the bat loft itself is maintained for 10 years in accordance with the requirements of the EPSM Licence. Monitor the bat boxes to ensure entrances do not become blocked or the boxes become damaged or fall down e.g. during storms. Replace any that become inviable or broken.
Lighting	The location and suitability of the external lighting will be checked by a bat licenced ecologist upon completion of the development. Recommendations for improvements will be made where applicable.	Maintain approved lighting levels across the developed site. No changes will be made until advice has been sought from a bat licenced ecologist.
Post-development monitoring	The brown long-eared bat maternity roost will be monitored for two years following completion of the development – June/July 2018 & June/July 2020. New guidelines from Natural England requires large maternity colonies to be monitored for two years following completion of the development, and this monitoring should be staggered i.e. not completed in two consecutive years. Monitoring will include an internal inspection of the bat boxes, and the purpose built bat loft for signs of use and to check temperature and humidity levels. This will be followed by an emergence or re-entry survey to monitor the population.	

5.0 Document Production and Approval

Status	Version	Author/Reviewer	Date
Draft	0.1	Craig Williams BSc (Hons) MSc GradCIEEM, MRSB – Associate ecologist	01/12/2016
Reviewed	0.2	Jo Gregory BA (Hons) MSc GradCIEEM – Senior Consultant	08/12/2016
Final	1.3	Craig Williams BSc (Hons) MSc GradCIEEM, MRSB – Associate ecologist	09/12/2016

6.0 Limitations

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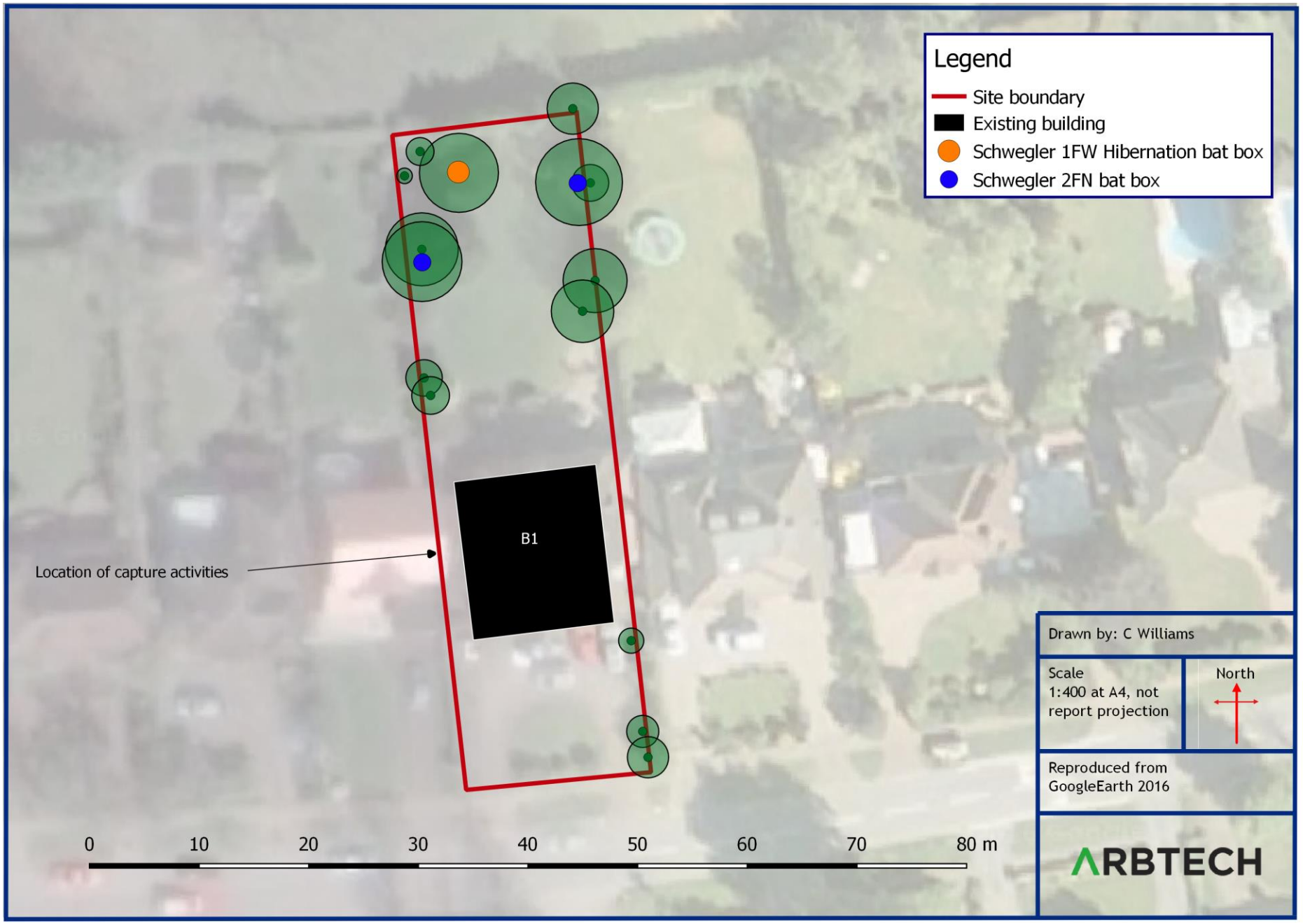
Appendix 1.1: Mitigation plan – capture activities and temporary roosts



Appendix 1.2 Mitigation plan – Location of replacement roost

Appendix 1.3 Mitigation plan – Photo of similar replacement roost proposed

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