I & G Ecological Consulting

Buildings at Wild Rose Cottage, Duffryn Lane, St Nicholas, Vale of Glamorgan, CF5 6TA

Bat Survey Report for Mr A. Walker

A European Protected Species Licence will not be required

for this development to be undertaken

Report type	Bat Survey Report
Report reference	IG2022WildRoseCottage
Site	Buildings at Wild Rose Cottage, Duffryn Lane, St Nicholas, Vale of Glamorgan, CF5 6TA
Grid reference	ST 09412 73666
Client	Mr A. Walker
Date(s)/time(s)/ type(s) of survey(s)	**Scoping surveys:** 6th January and 12th July 2022 **Dawn activity survey:** 12th July 2022 between 03:10 and 05:15 **Dusk activity survey:** 31st July 2022 between 20:50 and 23:05
Surveyor details	**Scoping survey:** Mr Glyn Lloyd-Jones, Natural Resources Wales Licence number S091520/1 and Mr Iestyn Evans, Natural Resources Wales Licence number S090746/1 **Activity surveys:** as above with assistance from Mr Pete Watts; Mr Greg Evans; Ms Sharon Doherty; Ms Bonnie Illingworth; Mr Lewis Jones; and Miss Ceri Daugherty, Natural Resources Wales Licence number S089483/1
Architect/Agent	Mr G. John, Geraint John Planning

Version	Status	Changes	Name	Position	Date
1	**Draft**	Sent for review on 23/10/2022	Ceri Daugherty	Author	22/10/22

	Name	Position	Date
Reviewed by	Ceri Daugherty	Author	23/10/2022
Approved by	Iestyn Evans	Director	23/10/2022
Sent to Client	Iestyn Evans	Director	23/10/2022

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Executive summary

- At Wild Rose Cottage (the property) the **Garage (Building 1)** is a single storey, east facing structure that is subject to proposed plans for conversion to provide a 'front of house' building and is constructed of part painted brick walls with a pitched tile roof. The walls are intact with no potentially exploitable cracks or crevices and while the timber soffit/fascia/barge boards are beginning to rot, there are no gaps present which could offer roosting potential. In addition, the timber garage doors to the front only have small gaps around the frames; however, while there are no missing/slipped/damaged tiles on the roof, there are some small (but potentially exploitable) gaps under the tiles at the edges. **Building 2** is a single storey, east facing structure that is subject to proposed plans for conversion to provide a one bedroomed holiday let. It is constructed of brick walls with a pitched corrugated sheet roof and is generally in good condition and has been well maintained. The walls are intact with no potentially exploitable cracks or crevices but the timber soffit/fascia/barge boards are beginning to rot and offer potentially exploitable gaps in places. In addition, the smaller section which adjoins the **Garage** is open to the front. Further, there is a hole in the transparent sheet roof to the rear that could enable access for all bat species. **Building 3** is a single storey, detached, east facing structure that is subject to proposed plans for conversion to provide a one bedroomed holiday let. It is constructed of brick walls, currently has no roof and is generally in a dilapidated state. **Building 4** is a single storey, detached, east facing structure that is subject to proposed plans for demolition. It is constructed of a timber frame with corrugated metal sheet walls on three sides and a corrugated metal sheet roof and is generally in fair condition. The walls are predominantly intact but there are some damaged sheets with gaps underneath them, although the nature of the metal sheets means that they are subject to fluctuations in temperature and, therefore, not ideal for roosting.
- On 6th January and 12th July 2022, I&G Ecological Consulting Ltd undertook scoping surveys of the property. To provide extra confidence a dawn survey was undertaken on the **Outbuildings** on 12th July 2022 while a dusk survey was undertaken on 31st July. The weather conditions were conducive to bat activity; access was available to all parts, and surveys conducted by licensed ecologists and assistants.
- This report confirms the findings of these surveys, completed in accordance with current best practice (Collins, J. (Ed.) 2016) and current government and CIEEM guidelines in relation to the COVID-19 pandemic. It is to be read in conjunction with the Preliminary Ecological Appraisal (PEA) produced by I&G Ecological Consulting in 2022.
- The property is located in a rural area 680m south of the village of St Nicholas and 9km south-west of the centre of the city of Cardiff. It is within favourable bat habitat but is **not within 2km of any sites which are designated for their bat interest.**
- As part of the scoping survey undertaken by I&G Ecological Consulting Ltd, no bats or their signs were found. Collectively the **Outbuildings** are considered to have **moderate** potential to support roosting bats, and a **moderate** risk of bats using the features present. During the activity surveys up to four bat species: **Common pipistrelle, Soprano pipistrelle, Noctule** and **Myotis species** were using the surrounding environment for foraging and commuting, but no bats were seen to leave or enter any part of the buildings. **There are therefore currently no bats using the Outbuildings,** they receive no ecological protection under wildlife legislation and there are no ecological constraints to the proposed works.
- **No evidence of bats, nesting birds, or signs of owl activity** were discovered. However, biodiversity enhancement measures are required to be submitted to ensure the development complies with the Environment (Wales) Act 2016, Future Wales 2040, and PPW (Edition 11, February 2021). Recommendations for bats and birds are as follows (**see appendix 7 for examples**) while measures for other species and for broadscale enhancement are included in the PEA:
  - ***Recommendation 1 (Enhancement)*****:** Prior to works commencing 2 x Harlech Woodstone, 2 x Kent Style, 2 x Vincent Pro, 2 x Improved Cavity, and 2 x Improved Maternity (or similar) bat boxes to be affixed to mature trees within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk)
  - ***Recommendation 2 (Enhancement)*****:** Prior to works commencing 3 x Small-holed nest boxes and 3 x Open-fronted nest boxes to be affixed to mature trees within the curtilage of the proposed development site. See Where To Put A Bird Box | Nestboxes - The RSPB for siting advice.
  - ***Recommendation 3 (Enhancement)*****:** 1 x double House martin nest cup and 1 x Sparrow terrace to be affixed to the north elevation of Building 1 and Building 3, respectively.
  - ***Recommendation 4:*** Measures to support bumblebees are to be implemented on site. See Bee The Change | Bumblebee Conservation Trust for actions that can be taken in relation to providing the right habitat and nesting sites.

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1.1 Scope and purpose of survey

1.1.1 Any sign of use of a site by bats is enough to confirm that the space has 'bat interest' and is enough to confirm the importance of the location to bat species. All species, as well as their resting places, are protected by law and the site is protected even when bats are not present. See appendix 1 for an introduction to bat surveys, including the aims of the scoping survey, appendix 2 for an overview of the legislation, and appendix 3 for information on roost types and survey timings. Appendix 4 lists all surveyors who undertake work for I&G Ecological Consulting Ltd and includes their experience.

1.1.2 This report confirms the results of, and conclusions and recommendations from, the surveys undertaken. It aims to provide the local planning authority with sufficient information to enable a full assessment of the potential ecological impacts of the proposed development. The CIEEM Guidelines for Ecological Report Writing (2017) state that it is important that the structure and content of a report should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development. This report has therefore been written in line with these guidelines.

1.1.3 For the purposes of this survey report, the site boundary is defined as the building(s) and surfaces within the overall site footprint.

1.2 Site characteristics and proposed works

1.2.1 Wild Rose Cottage (the property) is located in a rural area 680m south of the village of St Nicholas and 9km south-west of the centre of the city of Cardiff. It is within favourable bat habitat with the **Outbuildings** sitting within the development area of approximately 0.675ha which comprises tall ruderal, semi-improved grassland, hedgerow, scattered broadleaf, scrub and a stream. Beyond the boundary itself are small agricultural fields which while predominantly semi-improved and improved do have some mature hedgerows that provide good connectivity. In addition, 1km to the south are Dyffryn Gardens and there are a small number of woodlands – including ancient woodland – within 2km. In relation to additional waterbodies and watercourses, Nant Brân is 750m to the east, the River Waycock is 750m to the south-west, and the partially wooded stream corridor of Nant Whitton is 2km to the south-west.

1.2.2 The **Outbuildings** are subject to proposed plans for part demolition and part re-purposing as part of a mixed unit holiday accommodation scheme. Figure 1 is an aerial view of the property, figure 2 on the following page is of the wider environment around the property, and figure 3 is a location plan. Additional plans are included in Appendix 5.

Figure 1 (left): Aerial view of the property – the **Outbuildings** are outlined in red (from Google® Maps)

Figure 2 (below): Map showing the wider environment. The property is indicated by a blue dot (from Apple® Maps)

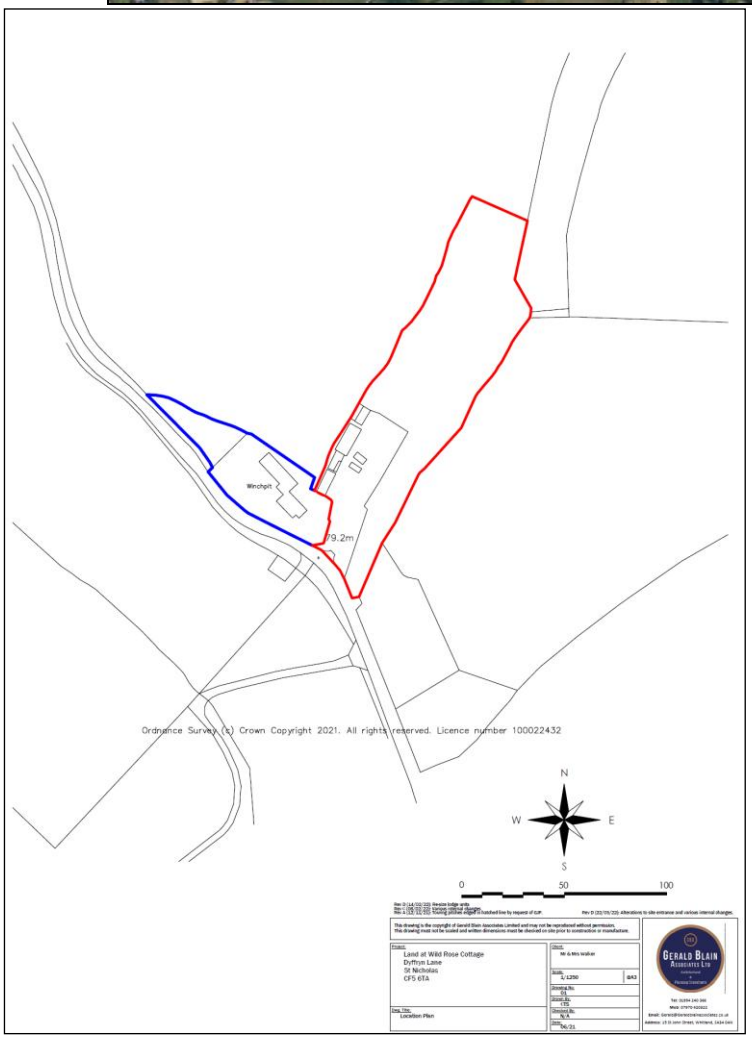


Figure 3 (left): Location plan (provided by the client)

2. Desk study methods and results

2.1 Methods

2.1.1 A 2km search area is used which covers the predicted zone of influence of the proposed development. Multi-Agency Geographic Information for the Countryside (MAGIC) and Lle are both used to establish the proximity of National and International Statutory Designations, particularly in relation to designations for bat interest. Species searches are also conducted through the Local Records Centre (LRC) where appropriate. An online search of planning applications at the property is undertaken to understand its planning history, especially relating to bats.

2.2 Results

2.2.1 No statutory or non-statutory protected features of ecological significance are present within, adjacent to, nor within 2km of the property. Within 2km, there are 23 areas of Ancient Semi Natural Woodland, 19 Restored Ancient Woodland Sites (RAWS), four Plantations on Ancient Woodland Sites, and one Ancient Woodland Site of Unknown Classification; the closest being a RAWS 110m north of the **Outbuildings**. There are 26 Sites of Importance for Nature Conservation within 2km (five of which are within 1km) (details within the data search), but there are no Wildlife Trust Sites, Local or National Nature Reserves within 2km.

2.2.2 As noted in the Preliminary Ecological Appraisal (PEA) a data search was requested 4th January 2022. The records are not listed either in the PEA or within this Bat Survey Report but the full data are available upon request to those nominated on the request form, as some data may be classified as sensitive. In relation to bats, there were 50 entries within 2km including **Common pipistrelle (*Pipistrellus pipistrellus*), Soprano pipistrelle (*Pipistrellus pygmaeus*), Noctule (*Nyctalus noctula*), Serotine (*Eptesicus serotinus*), Lesser horseshoe (*Rhinolophus hipposideros*), Brown long-eared (*Plecotus auritus*), Whiskered (*Myotis mystacinus*), and *Myotis* species.**

2.2.3 An online search found one current planning application for the **Outbuildings** at the property. Application 2022/00449/FUL for a proposed mixed unit holiday accommodation scheme was validated on 5th April 2022. A consultee response letter from NRW dated 25th May 2022 stated 'It appears that no targeted survey for bat presence has been undertaken of any building affected by the proposals'. This Bat Survey Report was subsequently commissioned. An online search of other applications within the postcode found two applications for one property for which a Bat Survey Report had been produced. A 2013 report confirmed the presence of maternity roosts for ***P. pipistrellus***, ***M. mystacinus***, and ***P. auritus*** which were subsequently destroyed under licence and foraging and commuting records were also reported for ***P. pygmaeus***, **Natterer's (*Myotis nattereri*), *N. nyctalus***, and ***E. serotinus***. A 2018 report for a different building at that property found no bats or their signs within the building but there were foraging and commuting records on site for ***P. pipistrellus, P. pygmaeus, N. nyctalus,*** and ***Myotis species.***

3. Field survey methods and results

3.1 Methods

3.1.1 A Preliminary Roost Assessments (PRA) were undertaken on 6th January and 12th July 2022 to identify Potential Roost Features (PRF). Details of the equipment used by I&G Ecological Consulting Ltd can be found in appendix 1, and the surveys were undertaken by Glyn Lloyd-Jones and Iestyn Evans.

3.1.2 In relation to survey limitations, many of the UK species of bat are crevice dwelling, and bats or signs of bats can be difficult to find within a building. In addition, there may be areas that are inaccessible to the surveyor. Externally, sufficient access was available to enable a thorough survey from ground level, noting that there is vegetation coverage in places while internally, access was available to all areas. In addition, two activity surveys were undertaken in good weather conditions to provide confidence in the results, and to

understand how bats are using the surroundings. Therefore, using the equipment available to them all areas were thoroughly surveyed by the surveyors to maximise effectiveness.

3.1.3 The dawn activity survey was undertaken on 12th July 2022, and the surveyors were Glyn Lloyd-Jones, Iestyn Evans, Greg Evans, Pete Watts, Bonnie Illingworth, Sharon Doherty, Lewis Jones, and Ceri Daugherty. Sunrise was at 05:10, the survey started at 03:10 and ended at 05:15. The weather remained dry throughout the survey with 75% cloud at the end, humidity was 75%, there was a light easterly breeze of 2mph, and the temperature started at 19.3°C and ended at 18.1°C.

3.1.4 The dusk activity survey was undertaken on 31st July 2022, and the surveyors remained as for the dawn survey. Sunset was at 21:02, the survey started at 20:50 and ended at 23:05. The weather remained dry throughout the survey with 65% at the start, humidity was 85%, there was a light northerly-westerly breeze of 2mph, and the temperature started at 18.8°C and ended at 15.4°C.

3.1.5 Figure 4 shows the position of surveyors during the activity survey. Each surveyor had a Magenta 5 or an Elekon Batscanner bat detector to assist in identification and detection of bats and their behaviour.

Figure 4: Surveyor positions during the activity survey (from Apple® Maps)

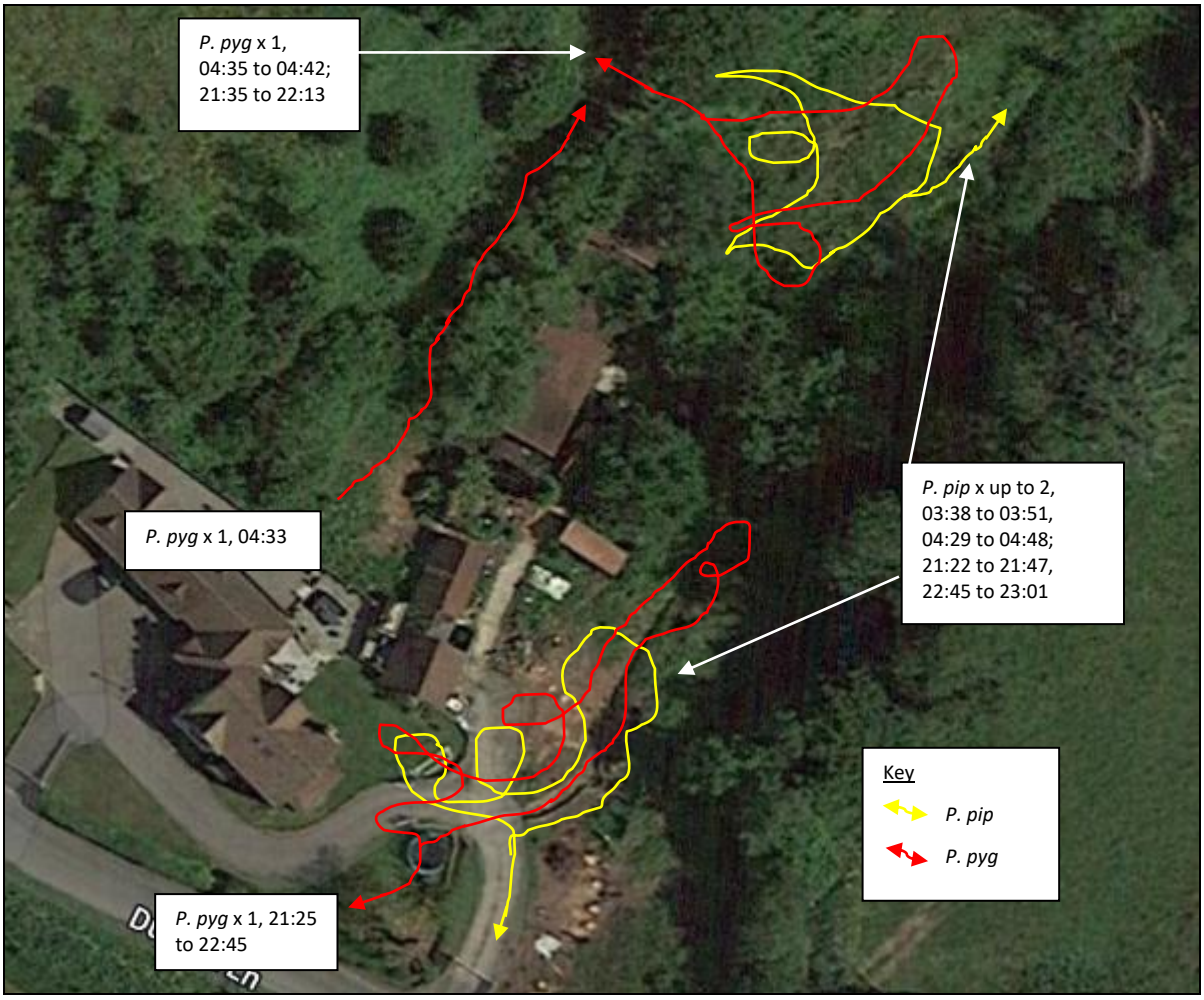
3.2 Survey results

3.2.1 The PRA found that at the property the **Garage (Building 1)** is a single storey, east facing structure that sits on the southern end of the **Outbuildings** and adjoins **Building 2**. It is constructed of part painted brick walls with a pitched tile roof and is generally in good condition, has been well maintained and is well-sealed. The walls are intact with no potentially exploitable cracks or crevices and while the timber soffit/fascia/barge boards are beginning to rot, there are no gaps present which could offer roosting potential. In addition, the timber garage doors to the front only have small gaps around the frames; however, while there are no missing/slipped/damaged tiles on the roof, there are some small (but potentially exploitable) gaps under the tiles at the edges. Within the **Garage** (currently used for storage) there is no enclosed loft space, and the bitumastic felt lining is in good condition with no natural light entering via the roof or wall tops. However, the glazing on the double doors does allow natural light to enter the building; thus, reducing any potential

for day roosting, but there are dark, sheltered areas with crevices that could provide roosting opportunities as well as timbers which could provide purchase for free hanging bats. Nonetheless, all areas were carefully examined with the items and surfaces having only undisturbed cobwebs and dust one them, and **no live or dead bats or their signs (e.g., droppings, urine stains, smells) were found anywhere. Building 2** is a single storey, east facing structure that adjoins the **Garage** on its northern elevation and is constructed of brick walls with a pitched part corrugated metal sheet (with one transparent sheet to the rear)/part corrugated cement fibre or asbestos sheet roof. It is generally in good condition and has been well maintained. The walls are intact with no potentially exploitable cracks or crevices but the timber soffit/fascia/barge boards (where present) are beginning to rot and offer potentially exploitable gaps in places. In addition, while the timber framed window and timber door on the main part are intact and remain closed when not in use, the smaller section which adjoins the **Garage** is open to the front and could offer potential as a night roost/feeding perch. Further, while the roofs are predominantly intact, there is a hole in the transparent sheet to the rear that could enable access for all bat species. Within **Building 2** (currently used for storage) there is no enclosed loft space, and while the unlined roofs are in fairly good condition, natural light enters through the gaps in the transparent sheet as well as through the window. In addition, shafts of light are visible along the ridge line of the smaller section; thus, reducing any potential for day roosting. However, there are some dark, sheltered areas with crevices that could provide roosting opportunities as well as timbers which could provide purchase for free hanging bats. Nonetheless, all areas were carefully examined with the items and surfaces having only undisturbed cobwebs and dust on them, and **no live or dead bats or their signs (e.g., droppings, urine stains, smells) were found anywhere.** However, a bumble bee nest was found within the building. **Building 3** is a single storey, detached, east facing structure that sits on the northern side of **Building 2** and is constructed of brick walls and currently has no roof while all the apertures are open and is generally in a dilapidated state and open to the elements with a lot of vegetation coverage. **Building 4** is a single storey, detached, east facing structure that sits on the northern side of the other outbuildings and is subject to proposed plans for demolition to create space for lodges as part of the proposed development. It is constructed of a timber frame with corrugated metal sheet walls on three sides and a corrugated metal sheet roof and is generally in fair condition. The walls are predominantly intact but there are some damaged sheets with gaps underneath them, although the nature of the metal sheets means that they are subject to fluctuations in temperature and, therefore, not ideal for roosting. However, the open nature means it could possibly offer potential as a night roost/feeding perch. Internally, **Building 4** (currently used for storage) is open to the roof as well as being open to the front and is, therefore, very light internally; thus, reducing any potential for day roosting. However, there are some timbers which could provide purchase for free hanging bats to use it as a night feeding perch. Nonetheless, all areas were carefully examined with the items and surfaces having only undisturbed cobwebs and dust on them, and **no live or dead bats or their signs (e.g., droppings, urine stains, smells) were found anywhere.** As a result of the findings, it is considered that the **Outbuildings** at the property have **moderate** potential to support roosting bats, and a **moderate** risk of bats using the features present. There are currently **no bats** using any building. Site survey images are within appendix 6.

3.2.2 Figure 5 on the following page shows the flight lines of bats detected and the times they were detected. The species of bats detected during the survey, and the nature of their activity follows.

Figure 5: Aerial map showing the flight lines of bats detected (from Apple® Maps)



12/07/2022: Sunrise was at 05:10, the survey started at 03:10 and ended at 05:15
31/07/2022: Sunset was at 21:02, the survey started at 20:50 and ended at 23:05

- ***P. pipistrellus:*** Bats were detected foraging and commuting to the south, east and north of the **Outbuildings** on both surveys, with a similar level of activity being observed. In addition, calls were also heard to the west on the dusk survey between 55 and 68 minutes after sunset. The latest activity on the dawn survey was 22 minutes before sunrise while the earliest activity on the dusk survey was 20 minutes after sunset.
- ***P. pygmaeus:*** An individual bat was seen commuting to the north along the western side of the **Outbuildings** at 37 minutes before sunrise on the dawn survey and a brief bout of activity was detected on the northern side between 35 and 28 minutes before sunrise. During the dusk survey activity on site was greater with bats being detected to the south from 23 minutes after sunset and sporadic activity continuing for around 80 minutes.
- ***Myotis* species:** No activity was detected on site during either survey but calls were heard to the south on both surveys and were also heard to the north and west on the dusk survey. Calls during the dawn survey were between 101 and 94 and 85 and 80 minutes before sunrise while those on the dusk survey were between 69 and 77 and 104 and 109 minutes after sunset.
- ***N. noctula*:** No activity was detected on the dawn survey but during the dusk survey calls were heard to the north-east by surveyors X_1 and X_2 between 44 and 48 minutes after sunset.

3.2.3 **Activity summary:** No bats were seen to neither leave or enter the **Outbuildings** at the property, nor fly across any part of them but up to four species (***P. pipistrellus. N. noctula, Myotis* species,** and ***P. pygmaeus***) were using the surroundings for foraging and commuting, with the focus of activity being towards the northern side of the site.

3.2.4 **No evidence of nesting birds** was found and **no signs of owl activity** were discovered.

4. Interpretation, conclusions and recommendations

4.1 Interpretation and conclusions

4.1.1 The results for each at species were interpreted as follows:

- ***P. pipistrellus:*** There are no sites within 2km that are designated for this species, but there are publicly accessible records within 2km. However, no bats or their signs were found either externally or internally, and no bats were seen to either enter or leave the property. During the activity survey bats were detected foraging and commuting to the south, east and north of the **Outbuildings** on both surveys, with a similar level of activity being observed. In addition, calls were also heard to the west on the dusk survey between 55 and 68 minutes after sunset. The latest activity on the dawn survey was 22 minutes before sunrise while the earliest activity on the dusk survey was 20 minutes after sunset. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat.
- ***P. pygmaeus:*** There are no sites within 2km that are designated for this species, but there are publicly accessible records within 2km. However, no bats or their signs were found either externally or internally, and no bats were seen to either enter or leave the property. An individual bat was seen commuting to the north along the western side of the **Outbuildings** at 37 minutes before sunrise on the dawn survey and a brief bout of activity was detected on the northern side between 35 and 28 minutes before sunrise. During the dusk survey activity on site was greater with bats being detected to the south from 23 minutes after sunset and sporadic activity continuing for around 80 minutes. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat.
- ***Myotis* species:** There are no sites within 2km that are designated for this species, but there are publicly accessible records within 2km. However, no bats or their signs were found either externally or internally, and no bats were seen to either enter or leave any of the Outbuildings at the property. no activity was detected on site during either survey but calls were heard to the south on both surveys and were also heard to the north and west on the dusk survey. Call during the dawn survey were between 101 and 94 and 85 and 80 minutes before sunrise while those on the dusk survey were between 69 and 77 and 104 and 109 minutes after sunset. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat, with the focus being away from the site itself.
- ***N. noctula*:** There are no sites within 2km that are designated for this species, but there are publicly accessible records within 2km. However, no bats or their signs were found either externally or internally, and no bats were seen to either enter or leave any of the Outbuildings at the property. No activity was detected on the dawn survey but during the dusk survey calls were heard to the north-east by surveyors X_1 and X_2 between 44

and 48 minutes after sunset. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat, with the focus being away from the site itself.

4.1.2 Using the findings of the desk study and field surveys, it is concluded that the property is within close proximity to favourable bat habitat but the **Outbuildings** currently have **moderate potential** to support roosting bats. During the activity surveys up to four bat species (***P. pipistrellus, P. pygmaeus, N. noctula,*** **and** ***Myotis*** **species**) were using the surroundings for foraging and commuting, **but bats are not currently using any part of the Outbuildings. It is therefore considered that proposed development will not have a negative impact upon the favourable conservation status of the bat species using the area.** The localised scale of the proposed development also suggests that the impact on the local ecology and it is anticipated that the proposed enhancements detailed in 4.2 will result in a positive impact and net gain for biodiversity.

4.1.3 There are not considered to be any survey limitations which would impact upon the findings and recommendations of this report.

4.2 Recommendations

4.2.1 Enhancement measures will be required to help meet obligations within the Environment (Wales) Act 2016, Future Wales 2040, and Planning Policy Wales 11th Edition (February 2021); as well as to compensate for the loss of roosting opportunity. Excellent long-term enhancement can be delivered by implementing measures outlined within appendix 7. Proposed enhancements are as follows:

- ***Recommendation 1 (Enhancement)*****:** Prior to works commencing 2 x Harlech Woodstone, 2 x Kent Style, 2 x Vincent Pro, 2 x improved Cavity, and 2 x Improved Maternity (or similar) bat boxes to be affixed to mature trees within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk)
- ***Recommendation 2 (Enhancement)*****:** Prior to works commencing 3 x Small-holed nest boxes and 3 x Open-fronted nest boxes to be affixed to mature trees within the curtilage of the proposed development site. See Where To Put A Bird Box | Nestboxes - The RSPB for siting advice.
- ***Recommendation 3 (Enhancement)*****:** 1 x double House martin nest cup and 1 x Sparrow terrace to be affixed to the north or elevation of Building 1 and Building 3, respectively.
- ***Recommendation 4:*** Measures to support bumblebees are to be implemented on site. See Bee The Change | Bumblebee Conservation Trust for actions that can be taken in relation to providing the right habitat and nesting sites.

4.2.2 This ecological report will remain valid for a period of 18 to 24 months from the date of the last survey **i.e. until the period 31/01/2024 to 31/07/2024 *(*CIEEM, 2019).** A further scoping survey may be required to update the site information if planning is not obtained or works do not commence within a two year period following the survey, especially if the property has fallen into disrepair.

5. Outline method statement for planning

5.1 Outline method statement for planning

5.1.1 **No bats** were detected utilising the **Outbuildings** at the property and there are no restrictions on the timing of the work in relation to bats. Where proposed plans involve works to the roof(s) extra care will be taken at wall tops and when stripping any part of the roof(s). All materials are to be lifted and not slid as – despite a negative survey – bats can still be found in these areas. **If bats are found at any stage, all works will stop and a qualified ecologist called for advice and guidance**. As no bats or bat signs were detected at the property, no monitoring is proposed (Mitchell-Jones, 2004 – figure 4, page 39).

5.1.2 Current **lighting** plans for the site are not known but should any be proposed they must ensure that exterior lighting is kept to a minimum to prevent any adverse impacts on bats. In particular, external lighting around the recommended enhancement must be carefully designed to avoid any impact upon bats (Institution of Lighting Professionals, 2018). If an external lighting scheme is proposed for this application a plan will be produced that demonstrates compliance with the guidance referenced above.

5.1.3 Where **external lighting** is necessary, this should utilise a number of key design points to limit any impact, as follows: Low level lighting pointed towards the ground; LED bulbs to be used of 2700 Kelvin (*p.18 of the lighting guidelines referenced above*) and below (warm white light and not daylight); use of light shields and hoods to direct the light downwards and prevent vertical and horizontal light spill; and use of passive infrared (PIR) motion sensors on timers to ensure lights only come on when necessary.

Appendix 1: An introduction to bat surveys

A note on bat surveys

- All bats and their roosts, irrespective of the number of bats, species, and whether bats are present or not, are fully protected by the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). Bats are the only mammal capable of true flight. They are notoriously difficult to survey for as they cannot be heard unaided and are difficult to see due to their nocturnal behaviour. They are also small and can live in the smallest of crevices, so may often be overlooked because of their size.

- Wales has relatively high numbers of most of the species that occur in Britain; the rural landscape with its abundance of wooded areas, river valleys and hedgerows means that buildings are commonly used as roosting sites by bats. This is particularly the case for older buildings (typically with stone walls and slate roofs) that are located close to good feeding areas, on the edge of settlements, or that are rarely disturbed.

- Bats may also change their resting and feeding places regularly throughout the year, depending on the time of year and weather conditions. Thus, other signs of use are also looked for such as their droppings or signs of feeding.

- To gain an understanding as to how bats are using a building, a survey may also involve dusk and/or dawn observations which may need to be repeated at different times throughout the year.

- The search buffers implemented as part of the survey are considered to more than adequately cover the predicted zone of influence of the proposed development. The reasons for the site designations have also been considered when discussing potential impacts on the biodiversity of these sites. If the sites are designated for their bat or bird interest, this will be mentioned.

- Survey methodologies are implemented as appropriate, based on the surveyors' assessment of the site features and with particular reference to the advice in Bat Surveys for Professional Ecologists: Good practice guidelines, 3rd edition (Collins, J. (Ed.), 2016) & The Bat Workers' Manual, 3rd edition. (Mitchell-Jones, A.J., & McLeish, A.P. (Ed.), 2004). Reports are written with reference to the CIEEM (2015) Guidelines as well as BS42020.

- A PRA visit (scoping survey) is used to identify all potential access and egress points for bats in the building, and to identify crevices and possible dwelling places. Internal and external inspections are aided using powerful binoculars and close-focussing monoculars, as well as ladders, high powered Cree flashlights and head-torches. We also have thermal imaging cameras and night vision devices at our disposal as well as full spectrum photographic cameras which can photograph a bat in complete darkness with an infrared flash. Exploitable crevices are also endoscoped with either a hand-held digital scope or a smart phone compatible scope. Digital thermometers and hygrometers are also at our disposal.

- The survey consists of a visual inspection of the interior and exterior of the building for evidence of bat use, including droppings, smells, feeding remains, staining, and scratching around roost exit and entry points. Potential features conducive (but not necessarily predictive) to bat presence include voids in the stonework, wooden beams, any associated rot holes, gaps behind soffits or within walls and facia boards, raised tiles, any raised render, and any sufficiently large crevices. The general condition of the building is

examined, including the structure of the roof, condition of walls, the potential for disturbance, and the position of the building in relation to connectivity to good bat habitat.

- If positive bat signs are discovered, or the construction style suggests cryptic bats *may* be present, an Anabat SDII or Anabat Express is deployed within the space of the building surveyed. These commonly record all bats from within and to the exterior of a building as they have extremely sensitive microphones so clusters of calls or high frequency of calls over short periods that are repeated (not just a vocal (Chatty) bat passing the microphone once on a foraging /socialising expedition) may indicate a presence within the building. Supporting evidence is then needed to make a decision, such as bats seen during surveys, droppings and feeding signs as well as building suitability for a given species. For example, we have had clear sonograms for Serotine bats (*Eptesicus serotinus*) from a loft space deployed recorder where no gaps existed anywhere and no droppings from serotines were present. These large bats must have been present elsewhere on site or use the site for foraging.

- The outcomes have been used to specify whether further surveys are required, or to establish the need for, and extent of, any mitigation or compensation measures required as part of the proposed works.

- If positive signs of bat activity are found then it will be necessary to assess whether a licence is needed at all (damage and disturbance to the roost and harm to bats can be avoided through thoughtful and planned working practices), or whether a licence is recommended as damage, disturbance or harm are unlikely to be avoided.

Appendix 2: Overview of the legislation

- All bats and their roosts, irrespective of the number of bats, species, and whether bats are present or not, are fully protected by the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended).
- There is a risk that works could result in the damage or destruction of a bat roost or roosts, the disturbance of bats, and the potential killing or injury of bats, sufficient survey effort (where indicated) helps to minimise this risk.
- All wild birds, their nests, eggs, and dependent young are afforded protection under the Wildlife and Countryside Act 1981 (as amended), with the bird nesting season generally from 1st March until 31st August.
- Technical Advice Note (TAN) 5 (Welsh Government, 2009) specifically provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN provides advice for local planning authorities on the key principles of positive planning for nature conservation; nature conservation and Local Development Plans; nature conservation in development management procedures; development affecting protected internationally and nationally designated sites and habitats; and development affecting protected and priority habitats and species. Under Section 2.4 within the TAN 5, 'when deciding planning applications that may affect nature conservation local planning authorities should':
    - Pay particular attention to the principles of sustainable development, including respect for environmental limits, applying the precautionary principle, using scientific knowledge to aid decision making and taking account of the full range of costs and benefits in a long- term perspective;
    - Contribute to the protection and improvement of the environment, so as to improve the quality of life and protect local and global ecosystems, seeking to avoid irreversible harmful effects on the natural environment;
    - Promote the conservation and enhancement of statutorily designated areas and undeveloped coast;
    - Ensure that appropriate weight is attached to designated sites of international, national and local importance;
    - Protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans;
    - Ensure that all material considerations are taken into account, and decisions are informed by adequate information about the potential effects of development on nature conservation;
    - Ensure that the range and population of protected species is sustained; and
    - Adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered.

- Bats are listed under Schedule 5 and 6 of the Wildlife and Countryside Act 1981 and protected under sections 9 and 11 (as amended by the Countryside and Rights of Way (CRoW) Act 2000).

- The Environmental Damage (Prevention & Remediation) Regulations 2009 – A protected species and its habitat are protected under this legislation as well as others.

- The Conservation of Habitats and Species Regulations 2017 – (regulation 43) fully protects all bats and their roosts, making it **an offence** *to deliberately kill*, *injure or capture* (take) bats; *to* deliberately *disturb bats; damage or destroy bat roosts* or resting places (this is considered an 'Absolute Offence' as damage and destruction may detrimentally effect the Continuous Ecological Functionality of that roost/resting place); possess or transport a bat or any part of a bat; sell (or offer for sale) or exchange bats or parts of bats.

- Bats are also protected by: Appendix III of the Bern Convention; Appendix II of the Bonn Convention (including the Convention's Agreement on the conservation of Bats in Europe); Natural Environment and Rural Communities Act 2006 (in England); and The Environment (Wales) Act 2016: specifically, Sections 6 (*places a duty upon Local Authorities to enhance biodiversity and the* ***resilience of ecosystems***) and 7 (*Creating local biodiversity lists and a duty to take steps to* ***maintain and enhance biodiversity***).

- For any offence to occur a derogation or **European Protected Species (EPS) licence** must be gained from Natural Resources Wales. To gain an EPS Licence, they must be satisfied that;

  i. granting the licence would not be detrimental to the Favourable Conservation Status (FCS) of the populations of species concerned within its natural range;

  ii. the derogation (licence) is in the public interest of Health and Safety or for other reasons of over-riding public interest, including those of a socio-economic nature or will have a benefit of primary importance to the environment; and

  iii. there is no satisfactory alternative to the derogation which would allow the described development to proceed but which would avoid or reduce, the need for any adverse impact to the species.

- All bats are listed in Annex IV of The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and are therefore designated as *European Protected Species*. These *protected* species are afforded enhanced protection and more stringent licensing provisions than those protected by the Wildlife and Countryside Act (WACA) alone. There are also biodiversity obligations to be met within the Well-being of Future Generations (Wales) Act 2015 [WFG] and the seven well-being goals which include an emphasis on socio-economic resilience as well as protecting culture, heritage and the Welsh language. One Act does not take precedence over the other.

- Planning Policy Wales (11th Ed.) also emphasises the importance of ensuring – wherever possible – a net gain to biodiversity from any development. Future Wales (The National Plan 2040) highlights in the 10th of 11 outcomes that the aim is for a "Wales where people live…in places with biodiverse, resilient and connected ecosystems". Highlighting the importance for creating and enhancing resilient and diverse eco-systems.

- Future Wales – the National Plan 2040 states the following:
  - Outcome 10 focuses on places with biodiverse, resilient and connected ecosystems. As such, the variety of flora and fauna found across Wales make Wales a special place. Biodiversity underpins the functioning of healthy, resilient ecosystems and the multiple benefits they provide. While biodiversity has declined in recent decades, we will reverse these losses and enhance the resilience of ecosystems. The planning system will ensure wildlife is able to thrive in healthy, diverse habitats, both in urban and rural areas, recognising and valuing the multiple benefits to people and nature.
  - Policy 9 is about Resilient Ecological Networks and Green Infrastructure. To ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure, the Welsh Government will work with key partners to: • identify areas which should be safeguarded and created as ecological networks for their importance for adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and • identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being. Planning authorities should include these areas and/or opportunities in their development plan strategies and policies in order to promote and safeguard the functions and opportunities they provide. In all cases, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.

Appendix 3: Types of bat roost and survey timings

As the mitigation guidelines state: The presence of a significant (important) bat roost… can normally be determined on a single visit at any time of year; providing that the entire structure is accessible and that any signs of bat activity have not been removed by others. The table below shows the applicability of survey methods. The table has been reproduced from Bat Mitigation Guidelines (table 5.2) (2004).

Season	Roost type	Inspection	Bat detectors and emergence counts
Spring (Mar – May)	Building	Suitable (signs, perhaps bats)	Limited, weather dependent
	Trees	Difficult (best for signs before leaves appear)	Very limited, weather dependent
	Underground	Suitable (signs only)	Static detectors may be useful
Summer (June – August)	Building	Suitable (signs and bats)	Suitable
	Trees	Difficult	Limited: use sunrise survey
	Underground	Suitable (signs only)	Rarely useful
Autumn (September – November)	Building	Suitable (signs and bats)	Limited, weather dependent
	Trees	Difficult	Rather limited, weather dependent; use sunrise survey?
	Underground	Suitable (signs, perhaps bats)	Static detectors may be useful
Winter (December – February)	Building	Suitable (signs, perhaps bats)	Rarely useful
	Trees	Difficult (best for signs after leaves have gone)	Rarely useful
	Underground	Suitable (signs and bats)	Static detectors may be useful

The table below shows the recommended survey timings and is reproduced from the Good Practice Guidelines (table 7.1) (3rd Edition, 2016). This is for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).

Low roost suitability	Moderate roost suitability	High roost suitability
May to August (structures) No further surveys required (trees)	May to September[a] with at least one of the surveys between May and August[b]	May to September[a] with at least two of the surveys between May and August[b]

[a] September surveys are both weather and location dependent. Conditions may become more unsuitable in these months, particularly in more northerly latitudes, which may reduce the length of the survey season.

[b] Multiple survey visits should be spread out to sample as much of the recommended survey period as possible; it is recommended that surveys are spaced at least two weeks apart, preferably more, unless there are specific ecological reasons for the surveys to be closer together (for example, a more accurate count of a maternity colony is required but it is likely that the colony will soon disperse). If there is potential for a maternity colony then consideration should be given to detectability. A survey on 31 August followed by a mid-September survey is unlikely to pick up a maternity colony. An ecologist should use their professional judgement to design the most appropriate survey regime.

The table below shows the recommended minimum number of surveys to be carried out according to roost potential. It is reproduced from the Good Practice Guidelines (table 7.3) (3rd Edition, 2016).

Low roost suitability	Moderate roost suitability	High roost suitability
One survey visit. One dusk emergence or dawn re-entry[a] (structures). No further surveys required (trees)	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey[b]	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[b]

[a]Structures that have been categorised as low potential can be problematic and the number of surveys required should be judged on a case-by-case basis (as noted in section 5.2.9 of the guidelines). If there is a possibility that quiet calling, late-emerging species are present then a dawn survey may be more appropriate, providing weather conditions are suitable. In some cases, more than one survey may be needed, particularly where there are several buildings in this category.

[b] Multiple survey visits should be spread out to sample as much of the recommended survey period (see table 7.1 above) as possible; it is recommended that surveys are spaced at least two weeks apart, preferably more. A dawn survey immediately after a dusk one is considered only one visit.

Roosts required by bats

Hibernation sites (hibernacula). Sheltered areas with relatively stable winter temperatures. Underground cavities, caves, mines, cellars, hollow trees and cavities and crevices in buildings or similar structures are examples.

Nursery roosts (maternity roosts). Places usually warm, where adult females of a colony gather to give birth and rear their young. These are often traditional sites with a history of such use and include roof voids, walls, soffit boxes, hollows and cracks/splits in trees and cavities in bridges and similar structures.

Night roosts/feeding perches. Places where bats may gather at night away from the day roost after initial feeding. These places are often quite exposed and may not be suitable for day roosting. They are often recognisable by deposits of droppings and insect remains.

Intermediate/dispersal roosts. Sites where small numbers of bats may gather after hibernation before taking up residence in the nursery roost. Bats may return to these sites after dispersal from the nursery roost and before entering hibernation.

Mating/male roosts. Places that an individual male may defend from other males and to which he will attempt to lure females. These will include small holes/cavities in trees, stonework, caves, mines and buildings.

Access, size of roost space and structure

• *Crevice-dwelling bats* (such as Soprano pipistrelles) can crawl into roosts via small gaps in the range of 15–20mm high by 20–50mm wide. The roost area should maintain a crevice of this approximate size gap that the bats can roost between. The area this roost provision covers can be small but about 1m^2 would be useful for summer nursery roosts. The height of entry can be from 2–7m.

• *Roof-void dwelling bats* require similar dimensions to access the roost but typically need timber joists or beams on which to roost. The height of entry can be from 2–7m.

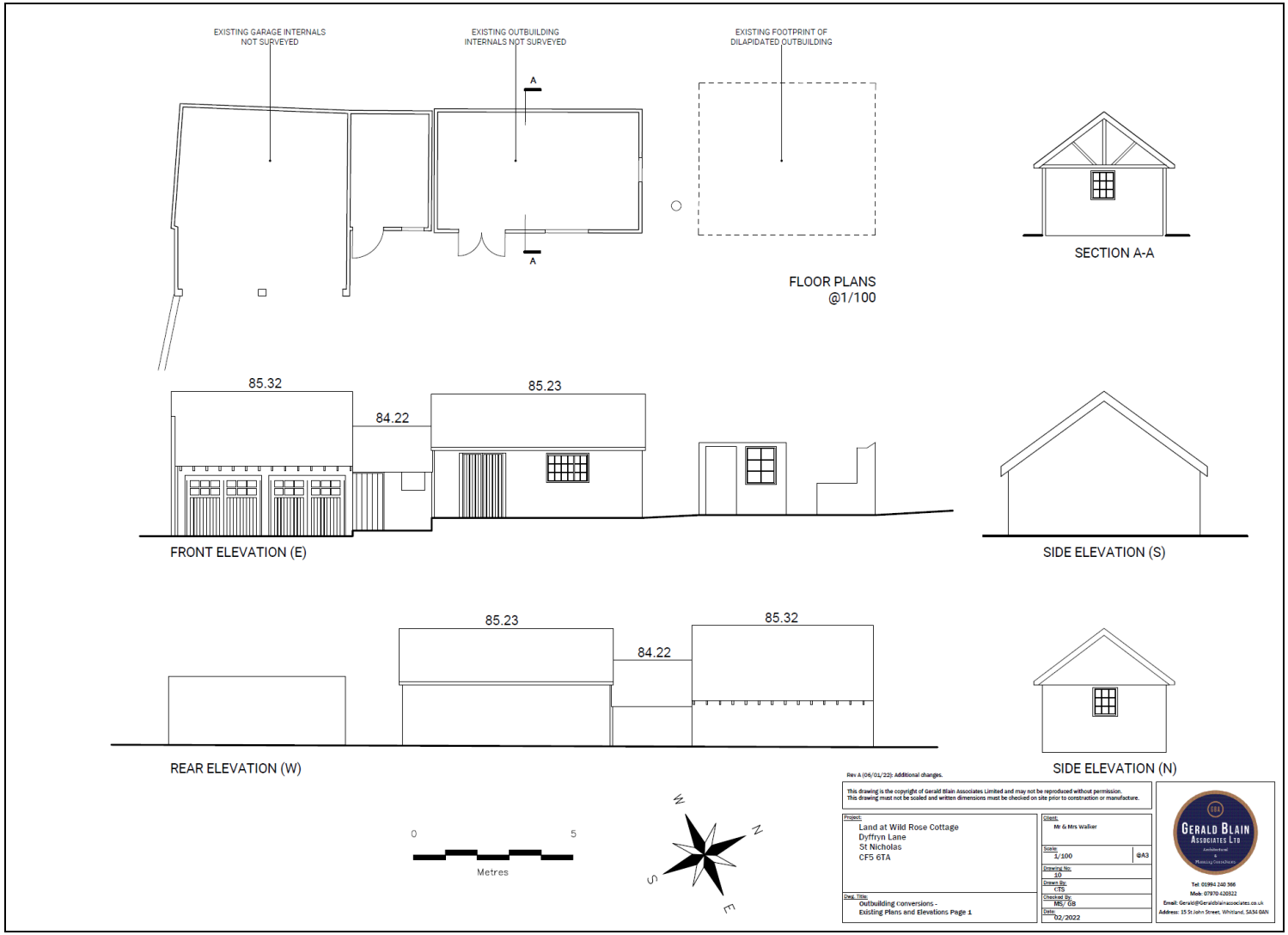
• *Bats needing a flying area* require the same access dimension as mentioned above, 15– 20mm (h) x 20–50mm (w) situated over 2m in height. The roosting area should not be trussed, to allow flight, and should ideally (wherever possible) be of similar dimensions to the roost being replaced.

• *Horseshoe bats* need a larger access so that they can fly (instead of crawl) directly into the roost. Lesser horseshoe bats need an access of 300mm (w) x 200mm (h), while greater horseshoe bats need 400mm (w) x 300mm (h). As above, the roosting area should not be trussed, to allow flight, and should again (where possible) be of similar dimensions to the roost being replaced.

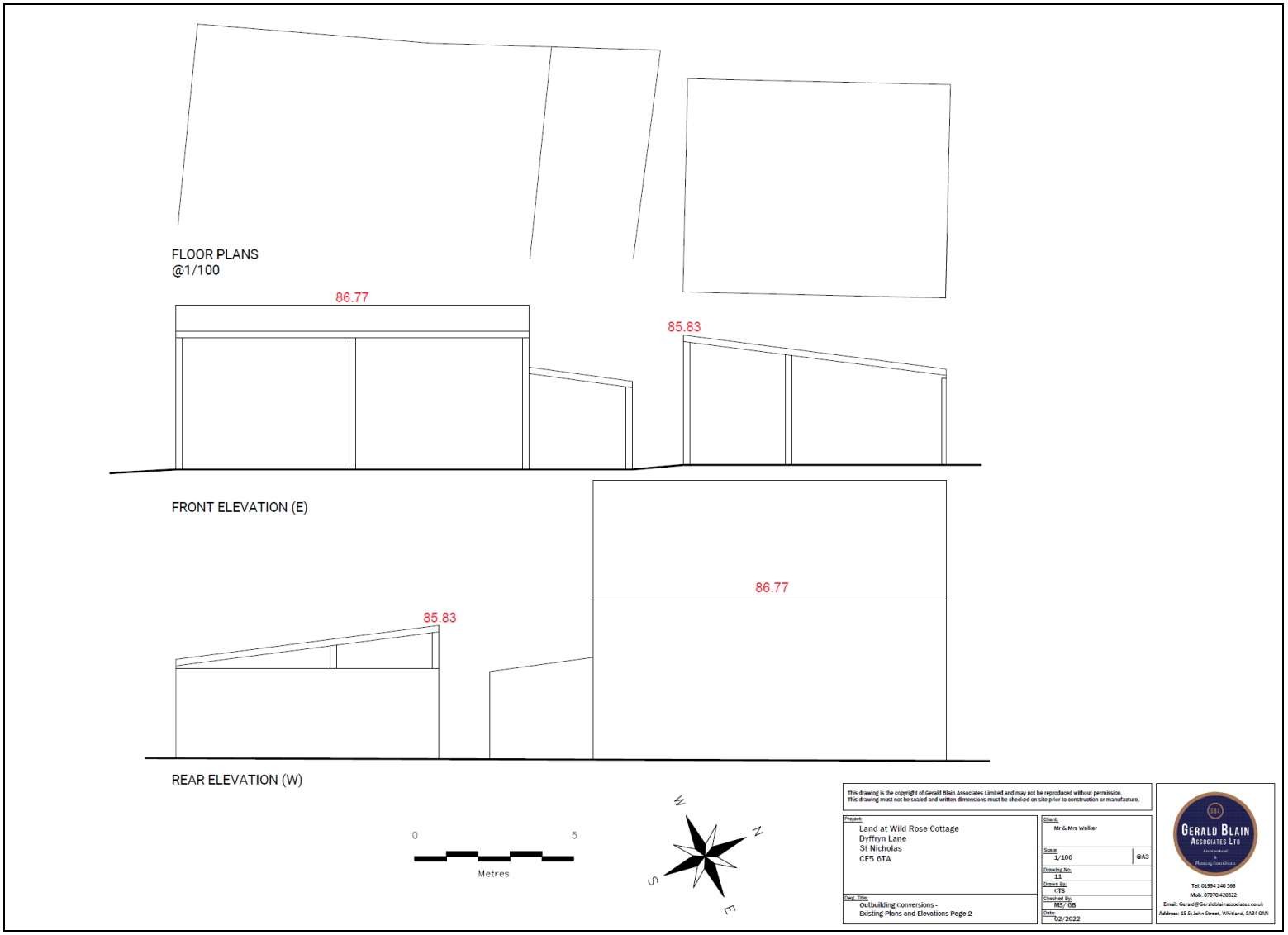
Appendix 4: List of surveyors

Surveyor	Licence	Experience/background
Mr Glyn Lloyd-Jones	Bats	Glyn has significant experience in survey skills and has assisted/worked with many other licensed bat surveyors as well as local bat groups over the past years. He possesses both a Bachelor's (with honours) and Master's degree in the biological sciences and is a Chartered Biologist & member of the Royal Society of Biology. He has worked for EAW, NRW and CCW for over a decade and has gained significant experience of working for regulators and conservation bodies. He also holds a Class 2 bat licence in England and has undertaken many badger, tree and herpetofaunal surveys. Natural Resources Wales Licence number S091520/1. I&G were shortlisted for a BCT roost award in 2021.
Mr Iestyn Evans	Bats	Iestyn has extensive experience in conservation, habitat improvement and management and has also worked with and assisted other licensed bat workers for many years. He has also helped with local bat group surveys and assisted in data gathering for the Beacon for Bats project undertaken by the Vincent Wildlife Trust. Iestyn has also assisted the Glamorgan Bat Group and will also help supervise and mentor (if needed) members of the newly incarnated Carmarthenshire Bat Group. Natural Resources Wales Licence number S090746/1.
Miss Ceri Daugherty	Bats	Ceri worked at Team Leader level within the SNCO for Wales for many years, dealing with customers and negotiating with landowners. She also has practical conservation management experience as both a Countryside Ranger and a conservation volunteer. She possesses a Master's degree in Environmental Impact Assessment and a Bachelor's degree (with honours) in the natural sciences. She is a member of the Carmarthenshire Bat Group. Natural Resources Wales Licence number S089483/1.
Mr Pete Watts	Trainee	Peter provides survey support with his keen eye for detail and vigilance. He has accompanied I&G Ecological Consulting Ltd on many surveys and is becoming a valuable and experienced surveyor.
Mr Greg Evans	Trainee	Greg attends dusk and dawn surveys to provide extra monitoring for possible entry and exit points for bats. He is currently building his experience in this area and is a keen amateur natural historian with an enthusiasm and affinity for bats.
Mr Mike Jones	Assistant	Whenever we need extra assistance in observing and recording bat activity on buildings, Mike provides an excellent and reliable service
Ms Sharon Doherty	Assistant	Whenever we need extra assistance in observing and recording bat activity on buildings, Sharon provides an excellent and reliable service.
Mr Lewis Jones	Assistant	A Graduate with a background in the biological sciences with an aptitude and passion for ecology. Lewis has undertaken courses in herpetology and phase 1 surveys and has a hunger to learn. With a fondness for bats and owls he's also keen to develop his survey skills in this area.
Ms Bonnie Illingworth	Assistant	Bonnie has been a member of the Kent Bat Group for a number of years and has undergone formal training in leading Bat Walks by Shirley Thompson, who set up The Young Batworkers group/magazine etc. She has led several educational sessions for the Scouts and local community groups. She has undertaken many bat activity surveys and has enjoyed conservation work with BCT.
Ms Wendy Larcombe	Assistant	Wendy has an Honours degree in Environmental Biology and over 17 years' experience working in conservation, including as a Planning Ecologist and a freelance Ecologist. She has a wide range of experience, which includes extended Phase 1 habitat surveys, building assessment for bats, bat/barn owl surveys , summer roost counts (Gower), and winter roost counts (Black Mountains. She has undertaken a range of training including bat ecology and surveying and is a valued member of the team.

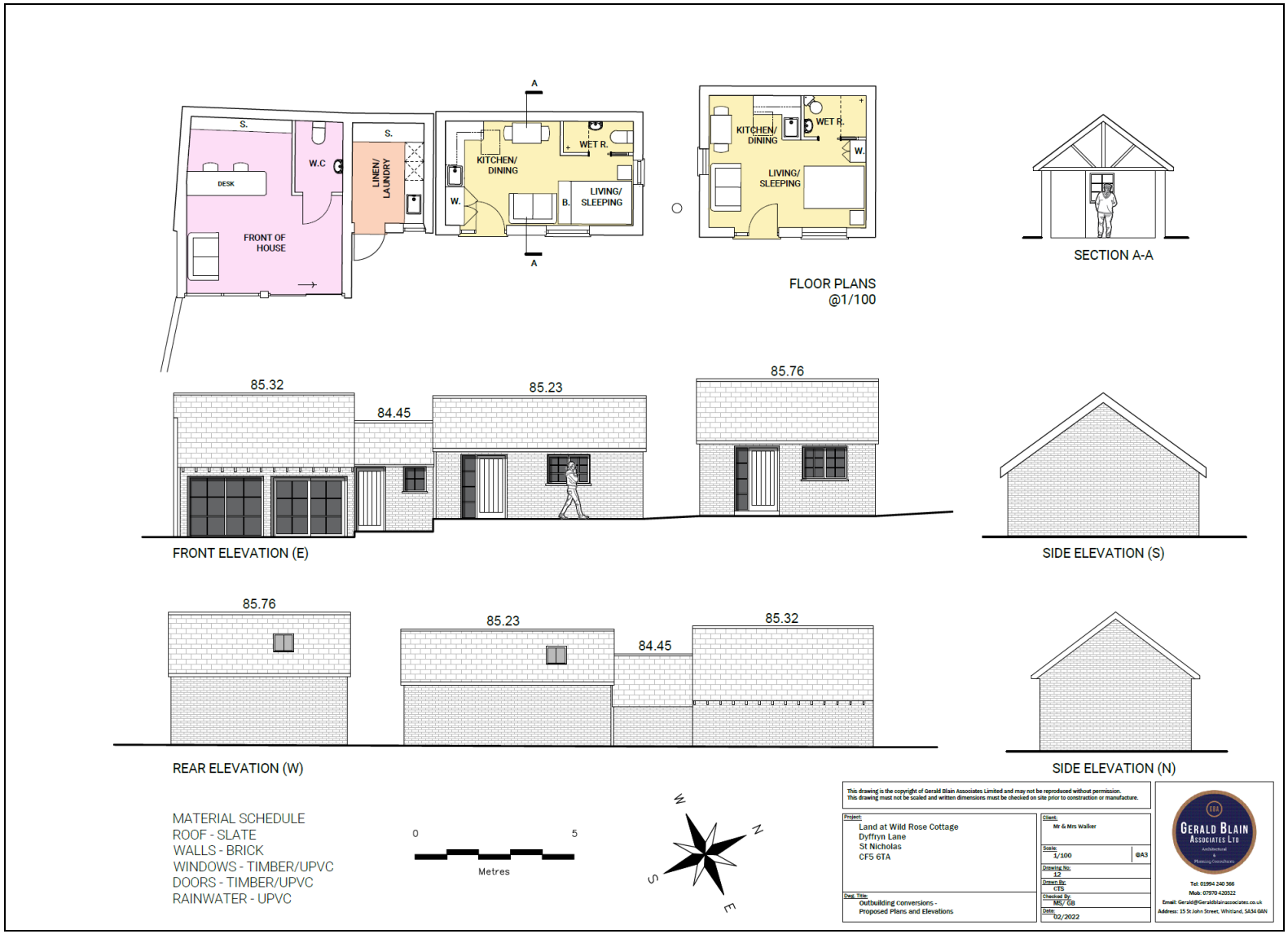
Appendix 5: Site plan



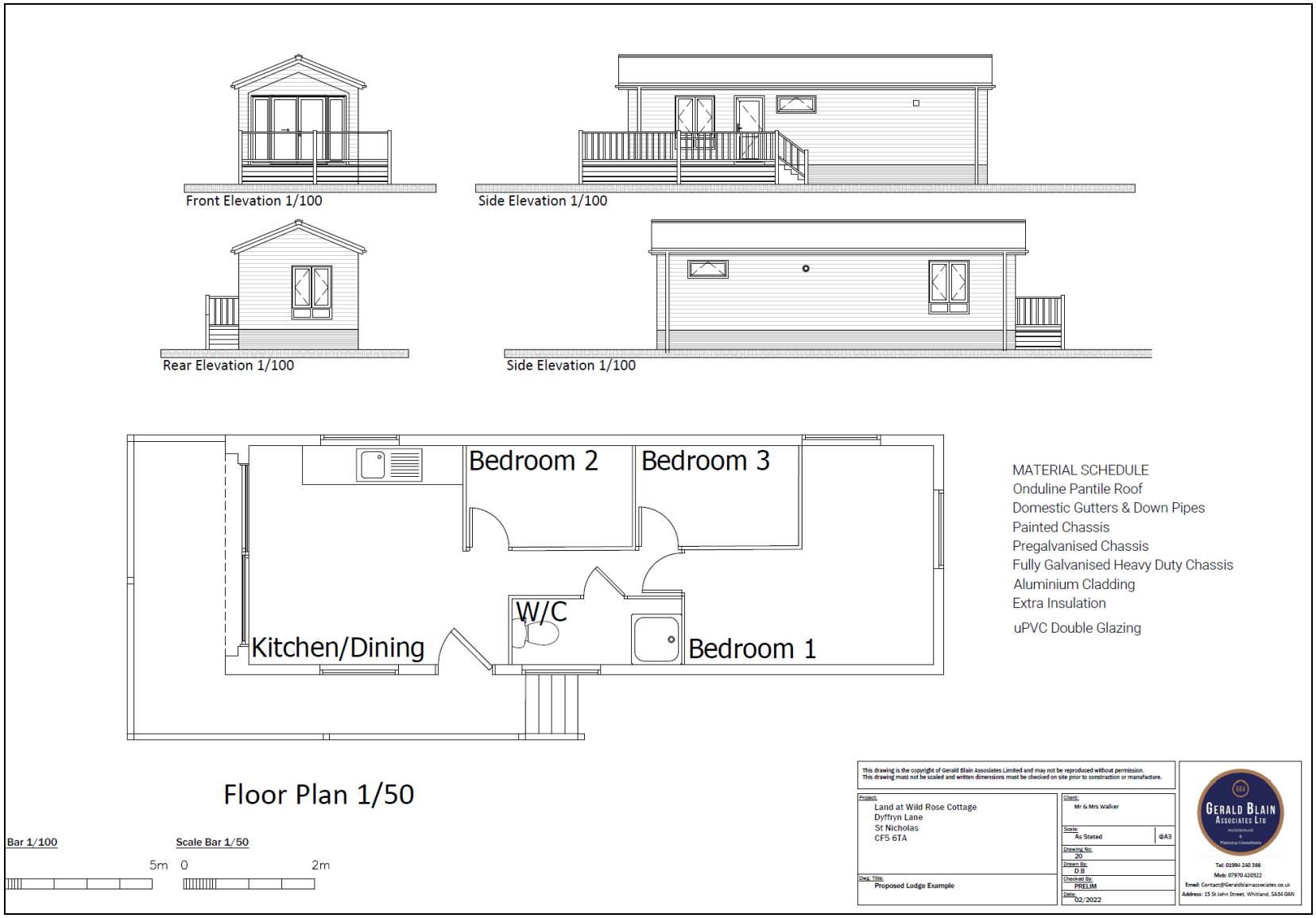
Existing plans and elevations page 1.



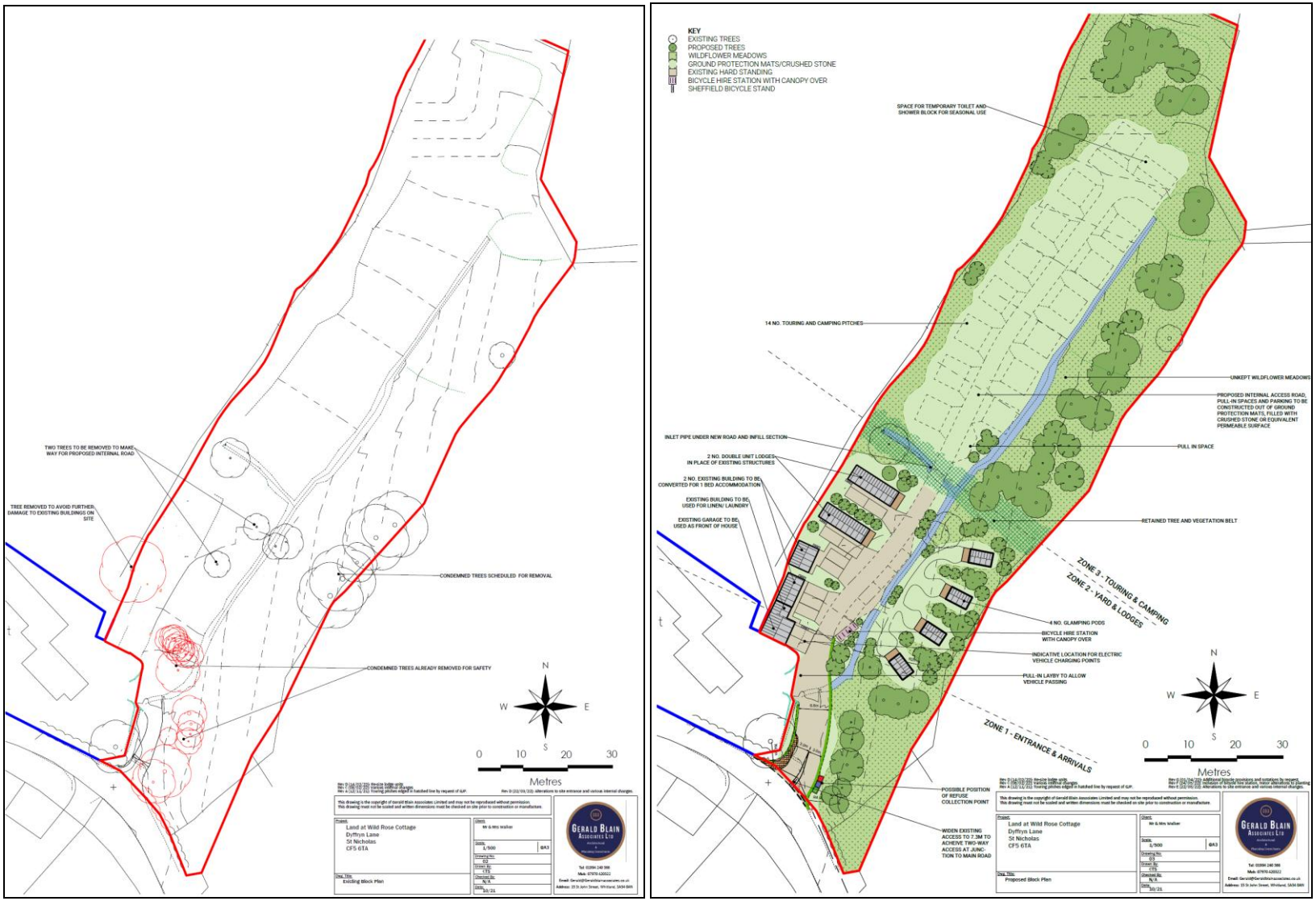
Existing plans and elevations page 2.



Proposed plans and elevations.



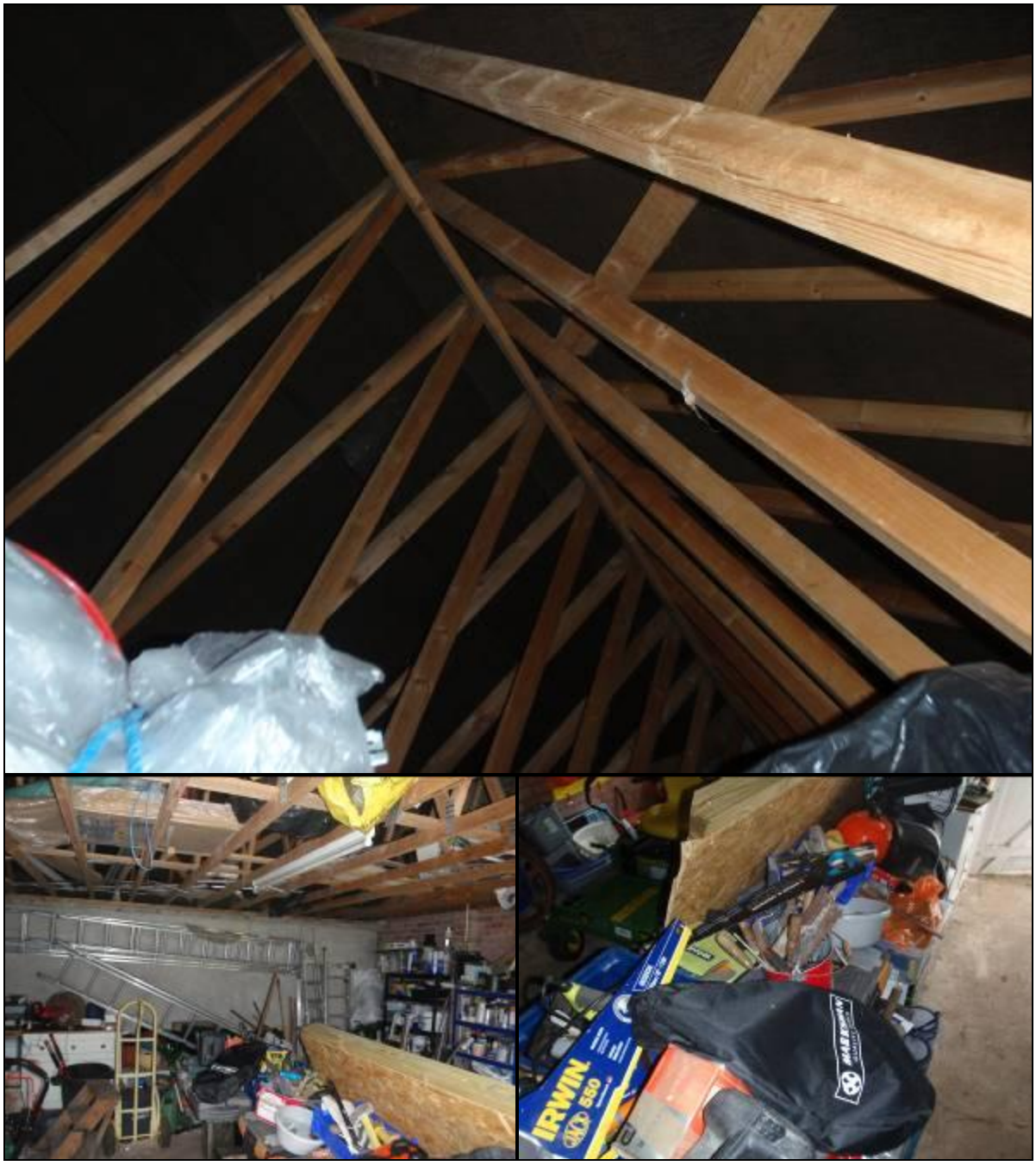
Proposed lodge example.



Left: Existing block plan. **Right:** Proposed block plan.

Appendix 6: Site survey images

The **Garage (Building 1)** is a single storey, east facing structure that sits on the southern end of the **Outbuildings** and adjoins **Building 2**. It is subject to proposed plans for conversion to provide a 'front of house' building for the proposed development and is constructed of part painted brick walls with a pitched tile roof and is generally in good condition, has been well maintained and is well-sealed. The walls are intact with no potentially exploitable cracks or crevices and while the timber soffit/fascia/barge boards are beginning to rot, there are no gaps present which could offer roosting potential. In addition, the timber garage doors to the front only have small gaps around the frames; however, while there are no missing/slipped/damaged tiles on the roof, there are some small (but potentially exploitable) gaps under the tiles at the edges.



Within the **Garage** (currently used for storage) there is no enclosed loft space, and the bitumastic felt lining is in good condition with no natural light entering via the roof or wall tops. However, the glazing on the double doors does allow natural light to enter the building; thus, reducing any potential for day roosting, but there are dark, sheltered areas with crevices that could provide roosting opportunities as well as timbers which could provide purchase for free hanging bats. Nonetheless, all areas were carefully examined with the items and surfaces having only undisturbed cobwebs and dust one them, and **no live or dead bats or their signs (e.g., droppings, urine stains, smells) were found anywhere.**

Building 2 is a single storey, east facing structure that adjoins the **Garage** on its northern elevation and is subject to proposed plans for conversion to provide a one bedroomed holiday let for the proposed development. It is constructed of brick walls with a pitched part corrugated metal sheet (with one transparent sheet to the rear)/part corrugated cement fibre or asbestos sheet roof and is generally in good condition and has been well maintained. The walls are intact with no potentially exploitable cracks or crevices but the timber soffit/fascia/barge boards (where present) are beginning to rot and offer potentially exploitable gaps in places. In addition, while the timber framed window and timber door on the main part are intact and remain closed when not in use, the smaller section which adjoins the **Garage** is open to the front and could offer potential as a night roost/feeding perch. Further, while the roofs are predominantly intact, there is a hole in the transparent sheet to the rear that could enable access for all bat species.

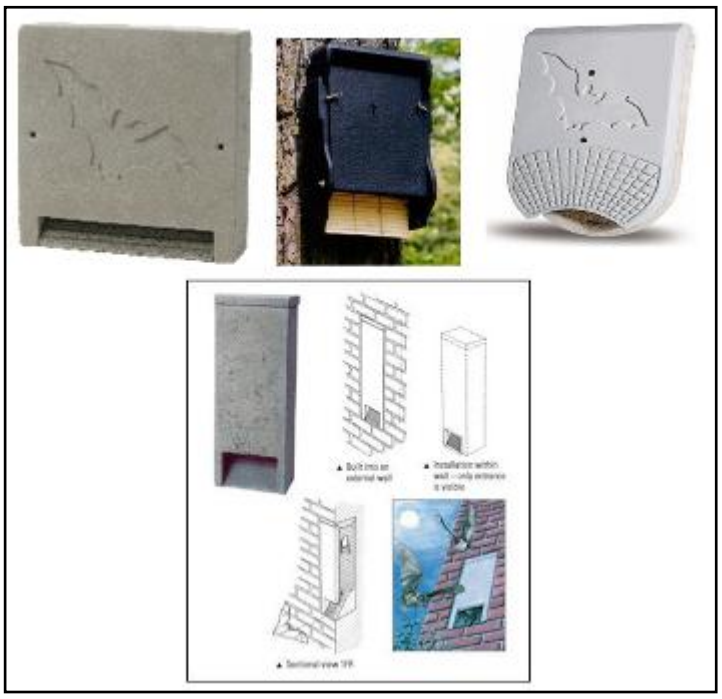
Within **Building 2** (currently used for storage) there is no enclosed loft space, and while the unlined roofs are in fairly good condition, natural light enters through the gaps in the transparent sheet as well as through the window. In addition, shafts of light are visible along the ridge line of the smaller section; thus, reducing any potential for day roosting. However, there are some dark, sheltered areas with crevices that could provide roosting opportunities as well as timbers which could provide purchase for free hanging bats. Nonetheless, all areas were carefully examined with the items and surfaces having only undisturbed cobwebs and dust on them, and **no live or dead bats or their signs (e.g., droppings, urine stains, smells) were found anywhere.** However, a bumble bee nest was found within the building.

Building 3 is a single storey, detached, east facing structure that sits on the northern side of **Building 2** and is subject to proposed plans for conversion to provide a one bedroomed holiday let for the proposed development. It is constructed of brick walls and currently has no roof while all the apertures are open and is generally in a dilapidated state and open to the elements with a lot of vegetation coverage.

Building 4 is a single storey, detached, east facing structure that sits on the northern side of the other outbuildings and is subject to proposed plans for demolition to create space for lodges as part of the proposed development. It is constructed of a timber frame with corrugated metal sheet walls on three sides and a corrugated metal sheet roof and is generally in fair condition. The walls are predominantly intact but there are some damaged sheets with gaps underneath them, although the nature of the metal sheets means that they are subject to fluctuations in temperature and, therefore, not ideal for roosting. However, the open nature means it could possibly offer potential as a night roost/feeding perch.

Internally, **Building 4** (currently used for storage) is open to the roof as well as being open to the front and is, therefore, very light internally; thus, reducing any potential for day roosting. However, there are some timbers which could provide purchase for free hanging bats to use it as a night feeding perch. Nonetheless, all areas were carefully examined with the items and surfaces having only undisturbed cobwebs and dust on them, and **no live or dead bats or their signs (e.g., droppings, urine stains, smells) were found anywhere.**

Appendix 7: Roost compensation & enhancement measures



Top: From left to right, the in-wall Schwegler 1FE, the tree mounted 1FF and the multi season 1WQ. The bottom image shows the 1FR in situ.

Left: The Harlech WoodStone bat box offers excellent insulation with a minimum of condensation for roosting bats. WoodStone® is a mixture of sawdust from FSC wood sources and concrete, and it is designed to last for years. It is breathable so there will be no problems with condensation and Woodstone maintains a consistent temperature inside, providing excellent insulation for roosting bats. Height 24cm x width 19cm x depth 18cm; Weight 4.4kg; Colour: Black with White front panel; Hook for hanging; Removable front panel for inspection/cleaning; and 10 Year Manufacturers Guarantee.

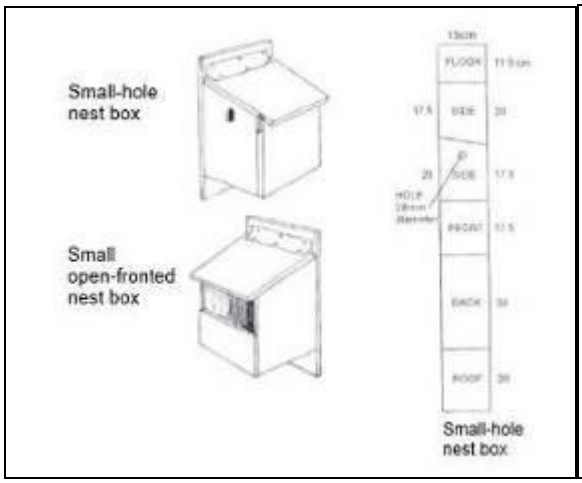
Below: The Vincent Pro bat box (left) and the Eco Kent bat box (right)

Left: The Improved Roost-Maternity Bat box is a large 3 crevice box suitable for larger roosts or maternity groups of the small British crevice-dwelling bats such as Pipistrelles. All external panels precision cut from 12mm Exterior Grade FSC plywood, for improved heat insulation. Exterior surface stained with black water based wood stain for improved thermal input, whilst avoiding any possibility of deterring use by bats due to vapour from the stain. Overhanging roof with additional internal insulation for protection from UK weather, and to seal crevices from internal airflow. 3 separate crevices each with different temperature characteristics. Wide entrance with accurately sized opening. Ideal for Pipistrelles and deters unwelcome birds etc. Internal ceramic heat sinks ensure improved temperature stability in crevices. Improved "Bat Ladder" at base of box facilitates bats landing and climbing into box. Ladder continues inside box, while textured internal surfaces ensure bats find it easy to move around inside box and hang in crevices. Ladder acts as "convector heater" for box - when sun shines on ladder, warm air rises into the box, but does not come out when the outside cools. Easy and safe to erect box on walls or trees - relatively light weight for its size, with 2 screw holes for fixing. Easy (1 screw) to remove roof for cleaning or inspection where permitted. Improved draught-proofing enhances temperature stability inside box. Rectangular back plate facilitates fitting boxes side to side to increase colony size. Improved aesthetics - looks good to humans as well as bats. Suits any building or tree. See Improved Roost-Maternity Bat Box | NHBS Practical Conservation Equipment for an example.

Left: Improved Cavity Bat Box. Suitable for the British cavity-dwelling bats including the Brown Long-Eared, External panels precision cut from 12mm Exterior Grade FSC plywood, for improved heat insulation, Exterior surface stained black with water based wood stain for improved thermal input, whilst avoiding any possibility of deterring the bats due to vapour from the stain, Overhanging apex roof for protection from UK weather, Single large cavity inside, with varying temperature characteristics, Wide entrance with accurately sized opening. Ideal for cavity dwelling bats and deters unwelcome birds etc., Internal ceramic heat sink ensures improved temperature stability, Improved "Bat Ladder" at base of box facilitates bats landing and climbing into box, Ladder continues inside box, while textured internal surfaces ensure bats find it easy to move around inside box and on the walls, Ladder acts as "convector heater" for box - when sun shines on ladder, warm air rises into the box, but does not come out when the outside cools, Easy and safe to erect box on walls or trees – relatively lightweight with 1 keyhole mounting hole and 2 extra screw holes for secure fixing, Floor slides out (after removing 1 screw) for cleaning or inspection where permitted, Improved draught-proofing enhances temperature stability inside box, Improved aesthetics - looks good to humans as well as bats. Suits any building or tree.

Lack of sunlight can cause bat box/house failure, and structures for summer roosting should be positioned where they are unshaded for most of the day. Summer maternity roosts (in the northern hemisphere) should have a southerly or westerly aspect.

Examples of Sparrow terraces, House martin nest cups, Open-fronted nest boxes, and Small-holed nest boxes. Siting advice can be found at [Where To Put A Bird Box | Nestboxes - The RSPB]



Appendix 8: I&G Ecological Consulting Ltd legal disclaimer

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We confirm that in preparing this report, we have exercised reasonable skill and care, taking into account the project objectives, the agreed scope of the work, and prevailing site conditions.

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Appendix 9: References, bibliography and sources of information

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