



**Swiss Gables, Dyffryn,
Neath, Neath Port Talbot, SA10 7AZ**

Bat Survey Report for Mrs J. Pickin



***A European Protected Species Licence will not be required
for this development to be undertaken***

Report type	Bat Survey Report
Report reference	IG2022SwissGables
Site	Swiss Gables, Dyffryn, Neath, Neath Port Talbot, SA10 7AZ
Grid reference	SS 73797 99919
Client	Mrs J. Pickin
Date(s)/time(s)/type(s) of survey(s)	Scoping survey: 11 th August 2022 Dusk activity survey: 11 th August 2022 between 20:35 and 22:55
Surveyor details	Scoping survey: Mr Glyn Lloyd-Jones, Natural Resources Wales Licence number S091520/1 Activity survey: as above with assistance from Mr Pete Watts, Mr Greg Evans, Ms Sharon Doherty, Mr Lewis Jones, and Ms Bonnie Illingworth
Architect	Mr N. Goss, Nathan Goss Conservation

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Executive summary

- ✦ Swiss Gables (the property) is a north-east facing Grade II listed detached three storey period dwelling that is subject to proposed plans for repairs, including to the roof and chimneys (including re-roofing the small brick outbuilding). It is of half-timber framed brick construction with a decorative tile roof (there is a small flat section) and is generally in good condition, well maintained, and well-sealed. The walls are intact with no potentially exploitable cracks or crevices, although it was noted that there is vegetation growing out of some parts of the chimneys as well as ivy coverage on the building which could both create and obscure any cracks that may be present. In addition, while the timber soffits/fascia/barge boards on the main dwelling are in very good condition and tight to the walls they are rotting on the outbuilding which has created some small gaps, but the timber framed windows and doors are intact and remain closed when not in use with no potentially exploitable gaps around any of the frames. While the roofs are intact as a whole there are some missing tiles which are to be replaced as well slipped and damaged tiles that are to be re-dressed and small gaps under the flashing which are to be addressed. This has created some small but potentially exploitable gaps with the main areas of potential being at the verges. However, there is no damage to the flat roof section and while the roof on the outbuilding is sagging and needs replacing, there are no gaps which could be exploited on this part of the property.
- ✦ On 11th August 2022, I&G Ecological Consulting Ltd undertook a daytime bat scoping survey of the property. To provide extra confidence a dusk activity survey was undertaken on 11th August 2022. The weather conditions present at the property were conducive to bat activity and access was available to all parts of the property.
- ✦ 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. They were conducted by an experienced, licensed ecologist and assistants.
- ✦ The property is located in a rural setting, to the west of the suburb of Dyffryn and approximately 2.5km north-west of the town of Neath. It is within favourable bat habitat but is not **within 2km of any site which is designated for its bat interest.**
- ✦ As part of the scoping survey, no bats or their signs were found. The property is considered to have **low** potential to support roosting bats (in the area where works are needed), and a **low** risk of bats using the features present. During the activity survey **Soprano pipistrelle, Common pipistrelle, Noctule, and Myotis species** were using the surrounding environment for foraging and commuting, but no bats were seen to leave or enter. **There are therefore currently no bats using the building**, it receives no ecological protection under wildlife legislation and there are no ecological constraints to the proposed works. **The majority of the planned works involves simply re-bedding/re-dressing the existing tiles to prevent them from falling from the roof.**
- ✦ **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 are as follows and all locations will be provided on the plans to be submitted (see **appendix 5 for recommended locations and appendix 7 for examples**):
 - ✦ **Recommendation 1 (Enhancement):** Prior to works commencing 2 x Harlech Woodstone, 2 x Kent Style, 2 x Vincent Pro, 1 x Improved Cavity, and 1 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 property. See [Where To Put A Bird Box | Nestboxes - The RSPB](#) for siting advice.
 - ✦ **Recommendation 3 (Broadscale Enhancement):** Wider ecological benefit could be maintained by ensuring (where possible) that all boundaries are planted with native species to retain connectivity to the surrounding habitat as well as retaining (where possible) any mature trees on site. See [17 bats & hedges leaflet.pdf \(hedgelink.org.uk\)](#). The owners are keen to maintain a 1m wide wildflower strip around the boundary to be mown once a year from September 1st onward.

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1. Introduction

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 Swiss Gables (the property) is located within favourable bat habitat in a rural setting, to the west of the suburb of Dyffryn and approximately 2.5km north-west of the town of Neath. It was formerly the vicarage to the adjacent church with its churchyard including mature trees and sits within 1.7 acres of its own mature gardens (including mature trees) while within 60m to the north-west are the ancient woodlands of Dyffryn Wood, and there are further small woodlands (including ancient woodland) within 2km in all directions. In addition, within 2km are small agricultural fields which while predominantly improved and semi-improved do have some mature hedgerows that provide good connectivity as well as more unimproved upland areas of Mynydd Drummau to the west and Mynydd Marchywel to the north-east. In relation to waterbodies and watercourses, the partially wooded corridor of the River Clydach is 290m to the east, and both the River Neath and the Neath Canal are just over 2km to the south-east.



1.2.2 The property is subject to proposed plans for extension and a loft conversion. 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: Aerial view of the property which is outlined in red (from Apple® Maps)



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

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

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 The property is not within or adjacent to any statutory or non-statutory protected features of ecological significance. Within 2km, 1.9km to the north is Fforest Goch Bog Site of Special Scientific Interest which is not designated for its bat interest. In addition, within 2km are 29 areas of Ancient Semi Natural Woodland, 24 Restored Ancient Woodland Sites (RAWS), 14 Plantations on Ancient Woodland Sites, and four Ancient Woodland Sites of Unknown Classification; the closest being a RAWS 60m to the north-west of the building. These woodlands include the Woodland Trust owned Dyffryn Woods. There are no Wildlife Trust Sites, Local or National Nature Reserves within 2km while details of Sites of Importance for Nature Conservation are only available through a species search and this was not undertaken (see 2.2.2).

2.2.2 A formal LRC data search was not undertaken due to the small size, low predicted impact, and nature of the development. The overall impact on biodiversity is likely to be localised and of low significance and current proposals suggest no land will be lost or linear features severed. It is considered very unlikely that the development will have any impact outside the footprint of the works. The data search results would be considered unlikely to impact on the decision-making process as appropriate well-staffed surveys were undertaken at optimum times of year. This approach is consistent with the CIEEM Guidelines for Accessing and Using Biodiversity Data (2020). **An online search revealed records for the following bat species within 2km of the property: Serotine (*Eptesicus serotinus*), Noctule (*Nyctalus noctula*), Common pipistrelle (*Pipistrellus pipistrellus*), and Soprano pipistrellus (*Pipistrellus pygmaeus*).**

2.2.3 An online search found one current planning applications for the property. Application P2022/0317 for Listed Building Consent for the following work: Remove and repair/replace all cast iron guttering/downpipes/hoppers to building; Remove plastic and aluminium gutters and replace with cast iron; Replace broken cast iron gutters, downpipes; Replace door and frame in north elevation; Replace missing roof tiles; Repoint lime; Replace internal lead valleys of chimneys; New heating system in place of existing heating system within chimney; Remove existing kitchen and fit with new in same location; Remove existing bathroom and fit with new in same location; New external electrical fuse box; Create wider door opening to pantry with architrave; Move internal bathroom door and frame, refit into hallway; and re-roof outbuilding was validated on 23rd May 2022. In addition, a search of applications within the postcode found no applications for which a Bat Survey Report that included activity surveys is known to have been produced.

3. Field survey methods and results

3.1 Methods

3.1.1 A Preliminary Roost Assessment (PRA) was undertaken on 11th August 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 survey was undertaken by Glyn Lloyd-Jones.

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 while internally, access was available to all

areas. In addition, one activity survey was 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 dusk activity survey was undertaken on 11th August 2022, and the surveyors were Glyn Lloyd-Jones, Pete Watts, Greg Evans, Sharon Doherty, Bonnie Illingworth, and Lewis Jones. Sunset was at 20:46 the survey started at 20:35 and ended at 22:55. The weather remained dry throughout with light cloud (<10%) and sunny spells at the start, humidity was 45%, there was a light north-westerly wind of 5mph, and the temperature started at 27.9°C and ended at 23.7°C.



3.1.4 Figure 4 shows the position of surveyors during the activity surveys. 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 surveys (from Apple® Maps)

3.2 Survey results

3.2.1 The PRA found that the property is a north-east facing Grade II listed detached three storey period dwelling. It is of half-timber framed brick construction with a decorative tile roof (there is a small flat section) and is generally in good condition, well maintained, and well-sealed. The walls are intact with no potentially exploitable cracks or crevices, although it was noted that there is vegetation growing out of some parts of the chimneys as well as ivy coverage on the building which could both create and obscure any cracks that may be present. In addition, while the timber soffits/fascia/barge boards on the main dwelling are in very good condition and tight to the walls they are rotting on the outbuilding which has created some small gaps, but the timber framed windows and doors are intact and remain closed when not in use with no potentially exploitable gaps around any of the frames. While the roofs are intact as a whole there are some missing tiles which are to be replaced as well slipped and damaged tiles that are to be re-dressed and small gaps under the flashing which are to be addressed. This has created some small but potentially exploitable gaps with the main areas of potential being at the verges. However, there is no damage to the flat roof section and while the roof on the outbuilding is sagging and needs replacing, there are no gaps which could be exploited on this part of the property. Internally, no works will be undertaken that will affect the loft spaces as the roof is not to be replaced but repaired and the rear of the tiles have all been lime torched. As a result, no natural light enters the spaces either through

the slates or at wall tops. In addition, the internal walls offer no potential in-wall gaps but there are some crevices in the timber frames that could be exploited by crevice dwelling bats, and the timber frames themselves could provide purchase for free hanging bats, although access would not be possible as there are no suitable access points. **None of the items or surfaces within had any signs indicating the presence of bats (e.g., live or dead bats, droppings, urine stains, smells).** As a result of the findings, it is considered that the property has **low** potential to support roosting bats, and a **low** risk of bats using the features present. There are currently **no bats** using the building. Site survey images are included in appendix 6. *The vast majority of the work involves re-bedding/ re-dressing the roof tiles are many have slipped after winter storms etc and if they were to fall on the owners' children, real harm could result. There are also gymnosperm saplings growing from the chimneys that also need removing for safety and structural reasons. Any gaps in timber or shingles around the house that exist are being left "as is" and will be free for bat and bird use.*

3.2.2 Figure 5 shows the flight lines of bats detected and the times they were detected. The species of bats detected during the surveys, and the nature of their activity follows:

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



11/08/2022: Sunset was at 20:46 the survey started at 20:35 and ended at 22:55

- ***P. pygmaeus*:** Bats were detected foraging and commuting on all elevations of the property, with the focus of activity being within the gardens to the south and tree line to the east. The earliest activity was to the south of the property at 21 minutes after sunset but the majority of activity was between 36 and 56 minutes after sunset.

- ***P. pipistrellus***: No bats were detected on site but calls were heard to the south by surveyors X₂ and X₃ from 23 minutes after sunset and sporadic calls were heard to the south and west during the rest of the survey.
- ***Myotis species***: No bats were detected on site but calls were heard to the north by surveyors X₅ and X₆ from 53 minutes after sunset and sporadic calls were heard to the north, south and west until just after 100 minutes after sunset.
- ***N. noctula***: No bats were detected on site but calls were heard to the north-west by surveyor X₅ at 42 and 49 minutes after sunset.

3.2.3 Activity summary: No bats were seen to leave or enter any part of the property, nor fly across any part of it (there may be far more suitable roosting opportunity within St. Matthews Church, a short distance away) and activity on site was much lower than might be expected given the favourable habitat. However, while only one species (*P. pygmaeus*) was detected foraging and commuting on site calls were heard from *P. pipistrellus*, *N. noctula*, and *Myotis species* towards the woodland to the north and west as well as the churchyard to the south.

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. pygmaeus***: There are no sites within 2km that are designated for this species, but there are publicly accessible records within 2km. 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 on all elevations of the property, with the focus of activity being within the gardens to the south and tree line to the east. The earliest activity was to the south of the property at 21 minutes after sunset but the majority of activity was between 36 and 56 minutes after sunset 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 to the south.
- ***P. pipistrellus***: There are no sites within 2km that are designated for this species, but there are publicly accessible records. 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 no bats were detected on site but calls were heard to the south by surveyors X₂ and X₃ from 23 minutes after sunset and sporadic calls were heard to the south and west during the rest of the survey. 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, and there are no publicly accessible records. 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 no bats were detected on site but calls were heard to the north by surveyors X₅ and X₆ from 53 minutes after sunset and sporadic calls were heard to the north, south and west until just after 100 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.

- ***N. noctula***: There are no sites within 2km that are designated for this species, but there are publicly accessible records. 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 no bats were detected on site but calls were heard to the north-west by surveyor X₅ at 42 and 49 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.

4.1.2 Using the findings of the desk study and field surveys, it is **concluded that the property is located within favourable bat habitat** and presently (despite initial appearances) has **low** potential to support bats. One bat species (*P. pygmaeus*) was detected foraging and commuting on site and calls from an additional three species (*N. noctula*, *Myotis* species, and *P. pipistrellus*) were heard during the survey. However, **bats are not currently using the property. 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 multiple 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, 1 x Improved Cavity, and 1 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 \(bats.org.uk\)](https://bats.org.uk/putting-up-your-box-bat-boxes-bat-conservation-trust/)
- ✦ **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 property. See [Where To Put A Bird Box | Nestboxes - The RSPB](#) for siting advice.
- ✦ **Recommendation 3 (Broadscale Enhancement)**: Wider ecological benefit could be maintained by ensuring (where possible) that all boundaries are planted with native species to retain connectivity to the surrounding habitat as well as retaining (where possible) any mature trees on site. See [17 bats & hedges leaflet.pdf \(hedgelink.org.uk\)](#). The owners are keen to maintain a 1m wide wildflower strip around the boundary to be mown once a year from September 1st onward.

4.2.2 This ecological **report will remain valid** for a period of 18–24 months from the date of the last survey **i.e. until the period 11/02/2024 to 11/08/2024 (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 activity 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 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 lighting principles outlined within 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 fascia 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;
- ✧ 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.

✧ 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.

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).

✧ 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***).

✧ 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.

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

^aStructures 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.

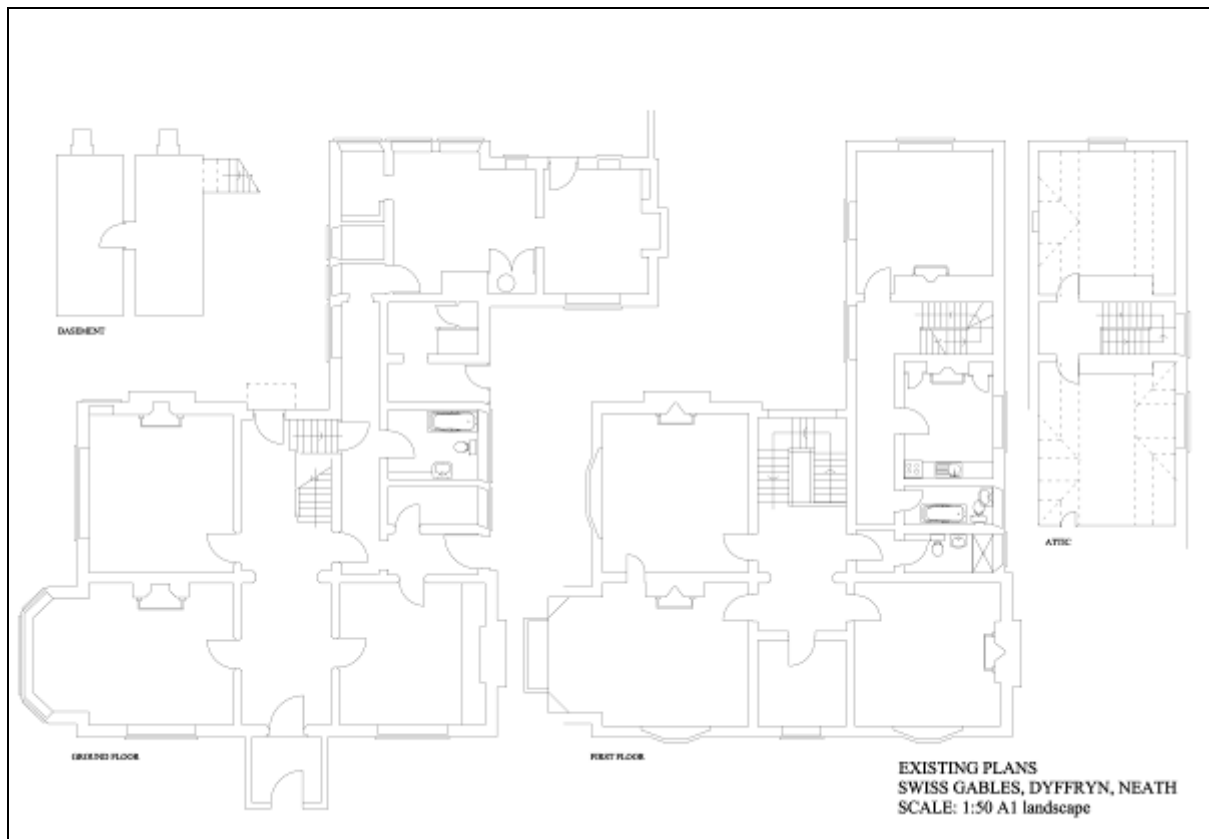
Access, size of roost space and structure

- *Crevise-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 1m² 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.

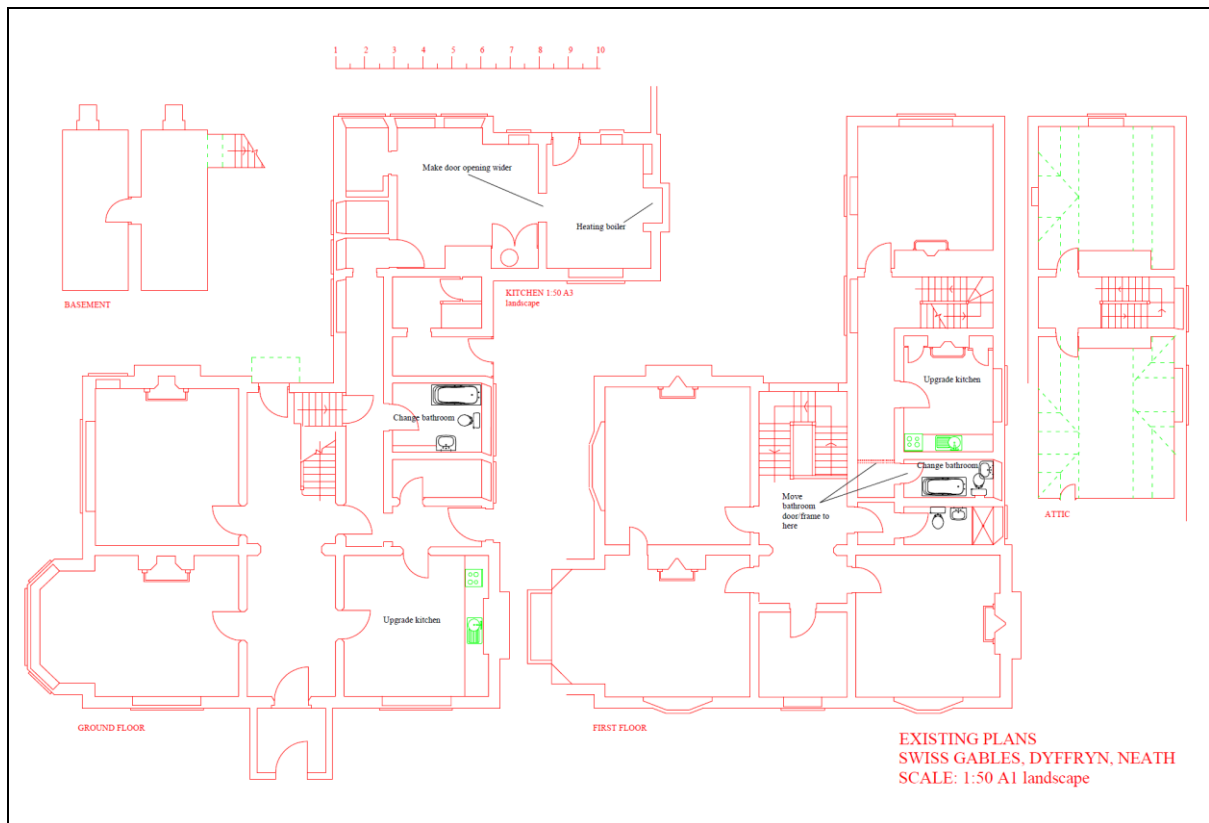
Appendix 4: List of surveyors

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 plans



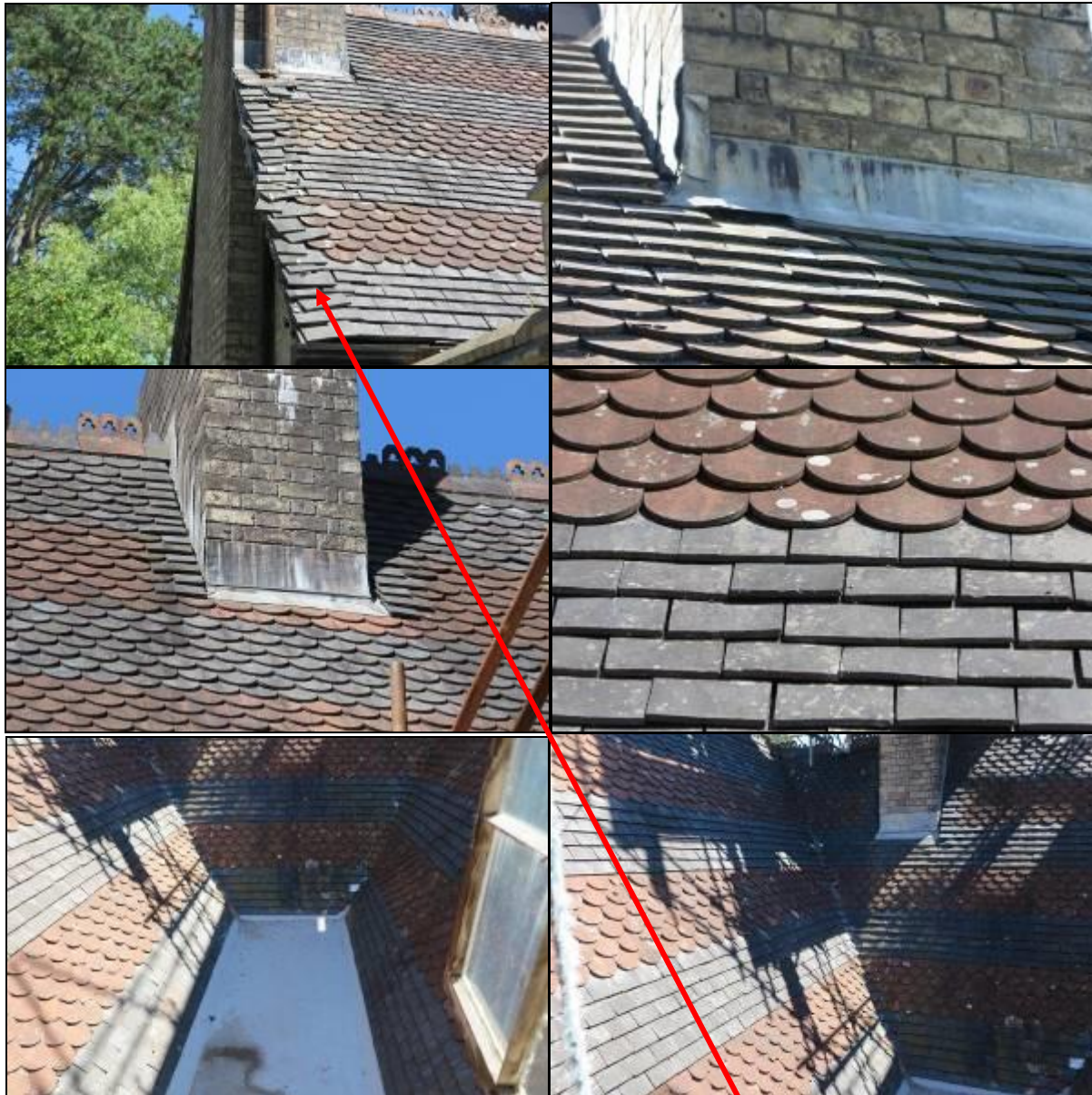
Floor plans



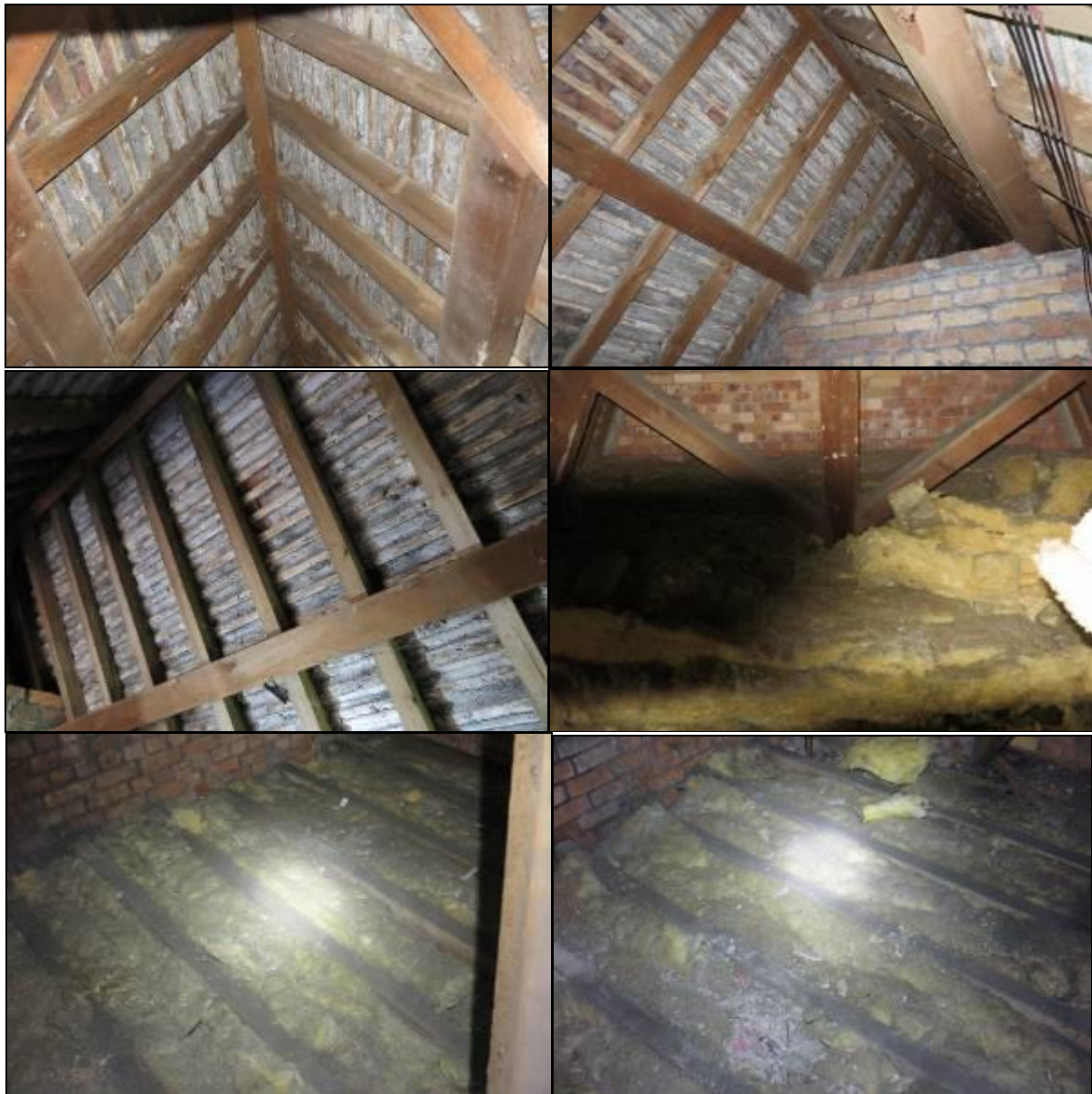
Appendix 6: Site survey images



The property is a north-east facing Grade II listed detached three storey period dwelling that is subject to proposed plans for repairs, including to the roof and chimneys (including re-roofing the small brick outbuilding). It is of half-timber framed brick construction with a decorative tile roof (there is a small flat section) and is generally in good condition, well maintained, and well-sealed. The walls are intact with no potentially exploitable cracks or crevices, although it was noted that there is vegetation growing out of some parts of the chimneys as well as ivy coverage on the building which could both create and obscure any cracks which may be present. In addition, while the timber soffits/fascia/barge boards on the main dwelling are in very good condition and tight to the walls they are rotting on the outbuilding which has created some small gaps, but the timber framed windows and doors are intact and remain closed when not in use with no potentially exploitable gaps around any of the frames.



While the roofs are intact as a whole there are some missing tiles which are to be replaced as well slipped and damaged tiles that are to be re-dressed and small gaps under the flashing which are to be addressed. This has created some small but potentially exploitable gaps with the main areas of potential being at the verges. However, there is no damage to the flat roof section and while the roof on the outbuilding is sagging and needs replacing, there are no gaps which could be exploited on this part of the property.



Internally, no works will be undertaken that will affect the loft spaces as the roof is not to be replaced but repaired and the rear of the tiles have all been lime torched. As a result no natural light enters the spaces either through the slates or at wall tops. In addition, the internal walls offer no potential in-wall gaps. **None of the items or surfaces within had any signs indicating the presence of bats (e.g., live or dead bats, droppings, urine stains, smells).** The vast majority of the unlined roof had lime torching applied to the rear of the tiles, further reducing any chance of bat entry.

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

This report was prepared by I&G Ecological Consulting at the instruction of, and for use by, our client(s) named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. I&G Ecological Consulting excludes to the fullest extent lawfully permitted, all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however, exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

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.

Advice in this report is based on the judgement of I&G Ecological Consulting and the interpretation of data gathered during the course of their survey on the property named in this document. ***Until payment has been received, this report remains the intellectual property of I&G Ecological Consulting and can be withdrawn from the planning process at our request. You are also not covered by any of our indemnity or liability insurance until the report has been paid for in full.***

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The employees of I&G may hold other paid employment but none of their advice, nor work undertaken in respect of producing this report, refers to any roles or responsibilities held in any other employment other than that held at I&G Ecological Consulting.

All work undertaken in this report is the sole responsibility of I&G Ecological Consulting.

Appendix 9: References, bibliography and sources of information

- Bat Conservation Trust, 2010. Bats in Buildings. *Bats and the Built Environment Series: Volume 1*.
- British Standards Institute, BS42020:2013. Biodiversity. Code of practice for planning and development. London, UK.
- British Standards Institute, BS8596:2015. *Surveying for Bats in Trees and Woodland*. London, UK.
- CIEEM (2017) Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins, J (ed.), 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd Ed*. The Bat Conservation Trust. London.
- Council of Europe, 1979. *Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention)*. Strasbourg.
- Council of Europe, 1979. *The Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention)*. Strasbourg.
- Dietz, C., von Helvesen, O., Nill, D., 2009. *Bats of Britain, Europe and Northwest Africa*. A. & C. Black, London.
- HM Government, 2000. *Countryside and Rights of Way (CROW) Act*. HMSO. London.
- HM Government, 2009. *Environmental Damage (Prevention and Remediation) Regulations*. HMSO. London.
- HM Government, 2006. *Natural Environment and Rural Communities Act*. HMSO. London
- HM Government, 2010 (as amended 2017). *The Conservation of Habitats and Species Regulations*. HMSO. London.
- HM Government, 1981. *The Wildlife and Countryside Act 1981 (as Amended)*. HMSO. London.
- Institution of Lighting Professionals, 2018. *Bats and Artificial Lighting: Bats and the Built Environment Series. Guidance Note 08/18*. ILP, Rugby.
- Lle. Retrieved from <http://lle.gov.wales/home>
- MAGIC. Retrieved from <https://magic.defra.gov.uk/>
- Mitchell-Jones, A.J., 2004a. *Bat Mitigation Guidelines*. English Nature, Peterborough.
- Mitchell-Jones, A.J., & McLeish, A.P. Ed., 2004. *3rd Edition Bat Workers' Manual*. English Nature, Peterborough.
- Mitchell-Jones, A.J., Cooke, A.S., Boyd, I.L., Stebbings, R.E., 1989. Bats and remedial timber treatment chemicals a review. *Mammal Rev.* **19**, pp 93–110.
- Morris, P.A., 1993. *A Red Data Book for British Mammals*. The Mammal Society, London.
- Waring, S. D., Essah, E. A., Gunnell, K., Bonser, R. H. C., 2013. Double Jeopardy: The Potential for Problems when Bats Interact with Breathable Roofing Membranes in the United Kingdom. *Architecture and Environment*.

Welsh Government, 2021. Planning Policy Wales. 11th ed. Retrieved from https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

Welsh Government, 2021. Future Wales: the national plan 20:40. Retrieved from https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

Welsh Government, 2016. *Environment (Wales) Act*. Welsh Government. Cardiff.

Welsh Government, 2009. *Technical Advice Note (TAN) 5, Nature Conservation and Planning*. Welsh Government. Cardiff.

Welsh Government, 2003. *List of Species and Habitats of Principal Importance for the Conservation of Biological Diversity*. Welsh Government. Cardiff.

Williams, C., 2010. *Biodiversity for low and zero carbon buildings: a technical guide for new build*. RIBA Pub., London.