Arvonia Building

Machynlleth

Bat Survey Report

Version 1

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12th September 2022

EXECUTIVE SUMMARY

Laura Cottrell MSc MCIEEM was employed to undertake a suite of bat surveys at the property that is known as the Arvonia Building, Machynlleth, Powys (behind no. 14 Heol Maengwyn). Planning permission is sought to demolish the existing building and replace with a terrace of three two bedroomed houses.

A desk study to identify any statutory sites designated for their bat interest within 10km of the development was undertaken. This was combined with a preliminary roost assessment (PRA) of the building and immediate surrounds, as well as review of aerial photography for identification of suitable wooded habitat links and water features to the property. The results of the PRA suggested that the building is of high potential to support bats as there are many features which may provide some opportunity for roosting bats, however no visible evidence of bats was found around these features or within the building.

The two dusk and one dawn activity surveys recorded activity from two species, which included foraging, commuting, and social behaviour. Eight soprano pipistrelle bats were confirmed as present in the building as they were seen emerging from and entering access points in two locations. The automated detector recorded soprano pipistrelle using the interior of the building, due to the timings of the recordings, it is assumed that this species uses the building as a night roost.

Appropriate mitigation measures relative to the predicted impacts to these roosts are known and readily able to be applied to the development in question. A European Protected Species Licence (EPSL) will be required to proceed with the development. Licence documentation will include measures such as roost modification and new roosting opportunities created.

To help facilitate the development the following recommendations are made:

- An EPSL is to be in place before the start of works.
- An experienced Ecological Clerk of Works (ECoW) is to be appointed to provide guidance and ecological input into the works.
- Erection of two bat boxes to act as temporary roost provision, to be retained post development.
- Toolbox talk by ECoW to all site contractors before commencement of works.
- Hand-strip of roof coverings where known bat roosts are located under supervision of ECoW, who will capture and relocate any bat encountered to the bat boxes.
- Seven bat boxes will be sited, with two at the west gable end, three on the east gable end, and two along the east façade of the new cottages. Three ridge tile roosts will be created.
- A sensitive lighting plan is to be produced, with input from an experienced ecologist.

Contents

Introduction

Laura Cottrell MSc MCIEEM was commissioned to undertake a suite of bat surveys at the property known as the Arvonia buiding; National Grid Reference (NGR) SH 74616 00772.

This report contains the results from the Preliminary Roost Assessment (PRA) and activity surveys, as well as an assessment of the impact that the proposed development is likely to have on the bat interest at the site. The report has been prepared with recommendations for mitigation measures to reduce these impacts.

Proposed works

The proposed works are to demolish the existing dilapidated building and to build a terrace of three two-bedroomed houses. These will be clad with the stone salvaged from the demolition of the existing building and the roof will be slated which will be an improvement on the current fibre cement / metal profiled coverings.

The dwellings will all be built to a high standard and sustainable in both materials and energy efficiency and will be made available as affordable rental properties through a scheme run by Powys council.

Site/habitat description

The Arvonia building is situated within the town of Machynlleth. In the immediate vicinity there are residential and commercial buildings including the Wynnstay Arms Hotel with limited green links to the north, east and west. There are green links to the south via residential gardens, that then lead to the wider landscape that consists of improved grassland bound by hedgerows and trees. There is also stand of deciduous woodland within 800m of the building.

Habitats within the immediate vicinity of Arvonia have low suitability for commuting and foraging bats, however the wider landscape of Arvonia can be described as having **high** suitability for commuting and foraging bats for the majority of UK bat species.

Policy and Legislation

Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

Bats are specifically protected by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (The Habitat Regulations). The Habitat Regulations are the way in which EU legislation is transposed into UK law. All species protected via this legislation are defined as 'European Protected Species'.

The Habitat Regulations make it an offence to deliberately capture, kill, disturb, or trade in European Protected Species (i.e. those listed on Schedule 2), of which all UK bats are included. However, these actions can be made lawful through the granting of a license by Natural Resources Wales (NRW). Licenses may be granted for a number of purposes but only after the Local Planning Authority (LPA) and NRW is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the wild populations of bats.

The Environment (Wales) Act 2016

Section 7 of the Environment (Wales) Act 2016 requires all statutory authorities including Local Planning Authorities (LPA) to have due regard for living organisms and types of habitat that are of key significance to sustain and improve biodiversity in relation to Wales. Furthermore, the LPA have a duty under the Act to take all reasonable steps to maintain and enhance the living organisms and types of habitat included on any list published under Section 7 and to encourage others to take such steps.

Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) (The WCA 1981) is the principal legislation by which most species are protected in Wales. Bats are protected under Schedule 5 of the WCA 1981, which makes it an offence to damage or destroy a bat roost; intentionally or recklessly disturb a bat or a roost; or intentionally or recklessly obstruct access to a roost. The interpretation of a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". Because bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time (Bat Conservation Trust, 2020).

In relation to birds, the WCA 1981 makes it an offence to intentionally kill, injure or take any wild bird; take, damage or destroy the nest of any wild bird while that nest is in use or being built. Schedule 1 of the WCA Act 1981 includes bird species for which addition the additional offence of disturbing these species at their nests or their dependent young.

Powys Local Development Plan

The adopted Powys Local Development Plan (2011-2026) details policies which relate to biodiversity by which all planning applications must comply. In this case, policy DM2: The Natural Environment is relevant, which details how development proposals must demonstrate how it will protect, positively manage and enhance biodiversity of the site. This includes European Protected Species, such as bats. Policy DM13: Design and Resources is also relevant, which specifies that the 'needs of biodiversity should be considered through the incorporation of measures to encourage it, such as swift nesting bricks and bat and other wildlife access points in buildings.

Objectives of the survey

The objectives of the survey were as follows:

- Determine the species of bat currently using the area;
- Identify whether the buildings on the site have the potential for use as bat roosts;
- Establish the type of roosts present, in particular whether or not the building is being used as a maternity roost;
- Identify foraging areas and flight corridors; and
- Determine whether the works will affect the bat species present and inform mitigation and licensing.

Methodology

Desk Study

A review of aerial photography was undertaken to assess the provision of suitable foraging and commuting habitat within close proximity to the site. This information was used in combination with a review of statutory designated sites, via the MAGIC website, including Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) to help in confirming the presence of bat species locally.

Bats are often considered cryptic species which can be difficult to confirm whether they are present or not. Although provision of a Local Environmental Records Centre data search would provide a range of information, such records can only be relied upon as relative where they are reasonably recent and when supplied by an experienced bat surveyor. It was therefore considered necessary to undertake detailed survey regardless data search results as this is most likely to be beyond the acceptability of current data as defined in BS42020:2013 Biodiversity: Code of practice for planning and development, and will not be as effective as spending time monitoring the building for the presence of bats.

Preliminary Roost Assessment

A PRA was carried out on the 23rd of February 2022 by Laura Cottrell MSc MCIEEM, who is an NRW-licensed bat worker. Laura has over 14 years' experience in surveying bats throughout the UK on projects from barn conversions, home extensions, church renovations, to industrial and factory redevelopments and major infrastructure such as wind energy developments.

The external fabric of the building was studied using close focussing binoculars and an endoscope, along with features such as gaps within the masonry, between the wall plate and roof, behind fascia and bargeboards. Smudge marks and droppings on walls and gables etc. were searched for. A description of the building including construction material and current condition was recorded. The building was searched internally to identify possible links to exterior roost entrances and clear signs of presence via urine staining, feeding remains, odour, piles of droppings, live bats and bat carcasses.

The results of the assessment were used to categorise the sites' potential to support roosting bats.

Presence/ Likely Absence Survey

Two dusk emergence surveys and one dawn re-entry survey was conducted at the Arvonia building. Present on the surveys were Laura Cottrell and Fiona Moran. Fiona has a first-class honours BSc in Ecology, has over nine years of surveying for bats, and is currently working towards applying for her NRW bat survey license.

The survey was conducted using Anabat Scout full-spectrum bat detectors. The detectors provide recordings of bat passes and calls which were analysed using Anabat Insight. Details of the date, time, sunset time and weather information was noted on all survey occasions. Survey details are provided in Table 0-1.

Table 0-1: Survey details

Date	Time of Survey		Sunset/ Sunrise	Temperature °C		Precipitation		Cloud cover (Oktas)		Wind speed (BFT)	
16/06/2021	21:15	22:50	21:34	17	14	0	0	8	7	1	0
21/07/2021	03:17	05:22	05:18	15	13.5	0	0	0	2	1	1
04/08/2022	19:15	21:19	19:34	18	14.5	0	0	4	3	1	2

Surveyor positions were identified as the north-east and south-west corners, in order to observe all facades of the structure at all times.

Automated Detector Survey

Two Anabat Swift detectors were installed inside the building, one in the first floor to the south of the building and one on the ground floor to the north. The microphones were directed internal space, and left to record between 16th June and 26th August 2022. The detectors were set to record 30 minutes before sunset and 30 minutes post sunrise with the aim of capturing bats known to use internal areas of unused derelict buildings such as horseshoe, long-eared and some myotis species.

Limitations

The surveys were undertaken in suitable weather conditions and are not seen as a constraint to the survey results. Equipment, surveyor positions and experience are considered proportionate to the level and type of survey required to ascertain presence or likely absence and to characterise any roosts.

Results

Desk Study Results

There are 10 Sites of Special Scientific Interest and three Special Areas of Conservation within 10km of the Arvonia Building. Of these sites, one is designated for its role in bat conservation. A population of the lesser

horseshoe bats *Rhinolophus hipposideros* use the mines on Cadair Idris SSSI for hibernation, Cadair Idris SSSI is approximately 8.4km to the northwest of the Arvonia Building. The mines are all in relatively close proximity to each other and to the maternity roosts of Bryn y Gwin Isaf SSSI and Penmaenuchaf Hall SSSI. The hibernacula at Pandy mine supports approximately 100 lesser horseshoe bats and although the other mines may support smaller numbers, they all form an intricate part of the larger bat population in this area. The frequent woods and trees around the site provide them with areas over which to forage and are important links between the maternity roosts and hibernacula.

The remainder of the sites are designated for their rare or unusual floral assemblages, water courses, presence of unimproved habitats and ancient woodlands; these are likely to support bats in a secondary manner through provision of roosting locations and prey items.

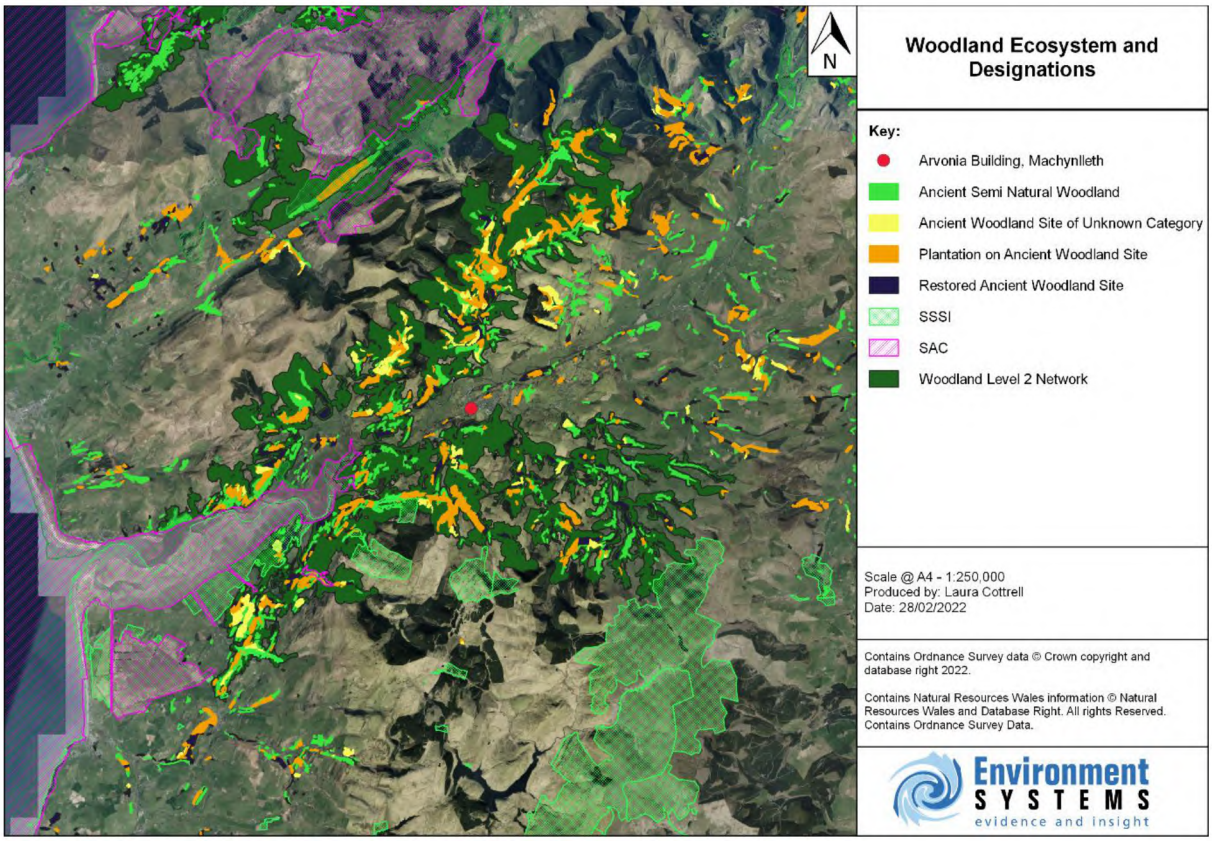

Figure 1: Woodland Ecosystems and Designations

Preliminary Roost Assessment (PRA)

A PRA was conducted by Laura Cottrell on the 21st of February 2022. The Arvonia building was deemed as **High** potential for roosting bats due to the features existing on the external fabric of the building for bats to enter and roost within.

The building is on an east/west orientation. The building adjoins the main terraced building to the north, there is a two-storey extension to the south where the roof is on a north/south orientation. The roof to the original building is covered in asbestos. There is a single-storey brick extension running the length of the original building that is also covered in corrugated cement sheeting. The original building is constructed from local stone and shale, the entire building is in a state of disrepair, with many gaps from missing masonry within the stone work that afford single bats areas to roost. The two-storey extension to the south is covered in a plastic corrugated sheeting. Every façade is enclosed in wooden cladding that is warped in places.

The first floor within the two-storey extension was not assessed due to health and safety concerns. The remainder of the building is in state of disrepair, with the first-floor ceiling falling. The entire internal space

has been used for storage. The two-storey building is very dark, with no light penetrating, however, the single storey building is very light, with no obvious areas for bats to roost within.

Figure 2: East façade

Figure 3: Looking to the northeast at the south and south west facades.

Figure 4: West facade

Figure 5: Internal area of the single storey building.

Figure 6: Internal area of the two-storey building to the south (first floor)

No signs of bats were found on the exterior or within the interior of the building during the PRA.

Presence/Likely Absence Surveys

All surveys were conducted during weather conditions considered to be appropriate for bat surveys, with temperatures exceeding 10˚C throughout the survey and with low wind speeds.

16th of June 2022 – First dusk emergence survey.

The first bat recorded was a common pipistrelle *Pipistrellus pipistrellus* at 21:56 which flew in a north to south direction. A further 76 passes were made by this species at the surveyor's location to the southwest of the building. At 22:14, a soprano pipistrelle *Pipistrellus pygmaeus* was recorded by the surveyor positioned in this location, this bat flew from the west to the east, a further six passes were made by this species to the southwest of the property.

At 22:22 a security light was triggered on the opposite building to the south, this illuminates the entire south façade of the target building. The light is set to turn off after four to five minutes.

At 22:09 the first common pipistrelle recorded by the surveyor to the northeast of the property was seen to emerge from the northeast corner of the two-storey building (above the wall plate), shortly after a further two bats emerged from the same place. At 22:36, two common pipistrelles emerged from the weather boards on the gable end of the two-storey building. At 22:43, three common pipistrelles emerged from the same place as the first three bats (Figure 8)

A total of eight common pipistrelles were seen to emerge from the two-storey building from two exit points.

21st of July 2022 – Dawn re-entry survey

The first bat recorded was by the surveyor to the southwest of the building, this was a common pipistrelle at 03:41 and was heard but not seen. A further 23 passes were made by this species at this surveyor's location.

At 05:07 the first bat re-entered the building, this was a common pipistrelle and was observed by the surveyor to the northeast of the building, it was seen entering via the weatherboards on the southwest gable end. At 05:10 two common pipistrelles entered the northeast corner of the two-storey building.

Between 05:12 and 05:16 a further five common pipistrelle re-entered the building on the north east corner behind the barge board.

Soprano pipistrelle were recorded by both surveyors, making a total of 36 passes. A total of eight common pipistrelle re-entered the building at the same two locations as the first dusk survey.

04th of August 2022 – Second dusk emergence survey.

The first bat observed by the surveyor located to the northeast of the building was a common pipistrelle at 19:22, which emerged from behind the weather boards. One more common pipistrelle exited the building at this location. A further 59 passes were made by this species at this location. Six more common pipistrelles emerged from the building from the same location as in the first dusk survey on the two-storey building at the northeast corner.

The surveyor to the southwest of the building noted a soprano pipistrelle at 19:52 which flew from the south in westerly direction, a further 12 passes were made by this species.

The majority of activity recorded during the survey was observed to be commuting activity.

Automated Detectors

The automated detector placed within the ground floor did not record any bat activity throughout the entire period of detector deployment.

The automated detector placed within the first floor of the two-storey building recorded bats on 56 days out of the 72 day the detector was deployed.

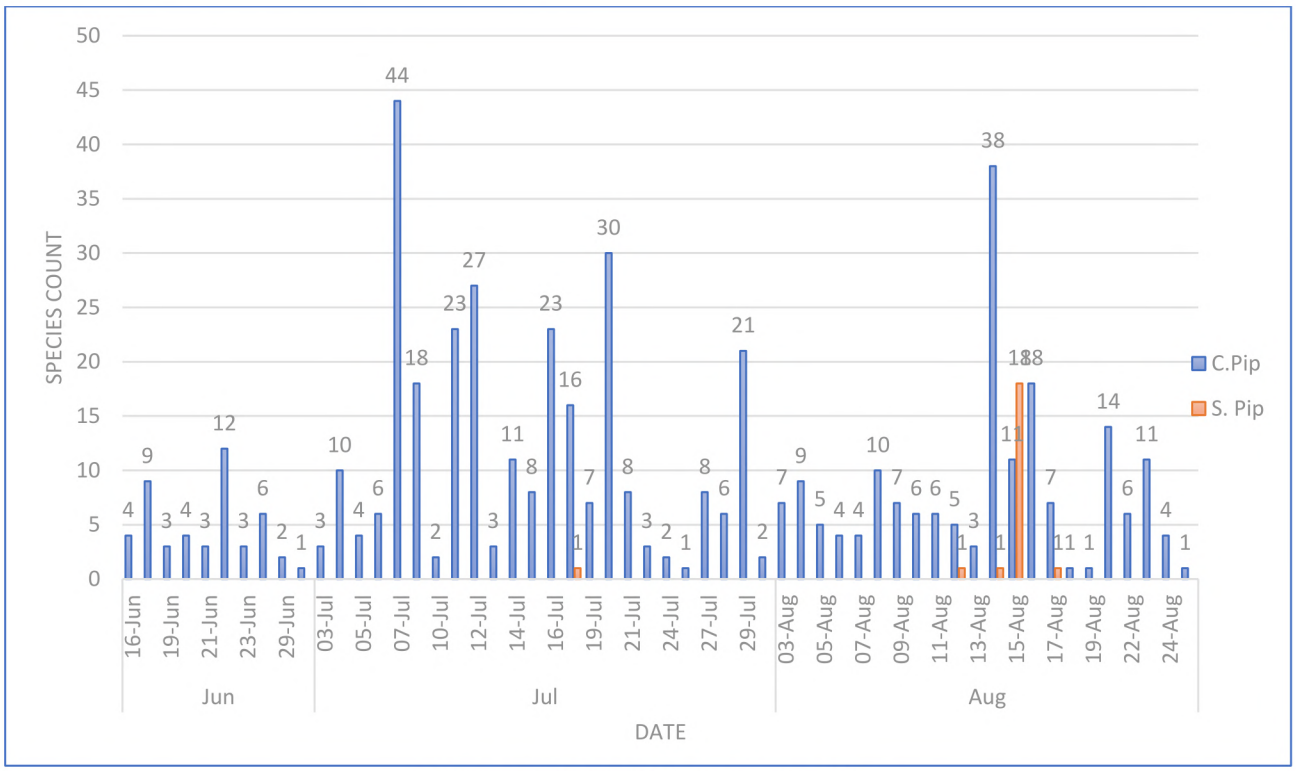

Figure 7: Graph showing bat passes per night.

Survey Summary

A maximum of eight common pipistrelles were recorded to emerge and re-enter from the Arvonia building during the detailed bat surveys. Roost entry and exit locations included within the roof at the eaves on the north elevation of the two-storey building to the south, and the east elevation behind the weather boards of the same building (Figure 8).

Figure 8: Red squares denote where the roost entry and exit points are.

Soprano pipistrelle were also observed and recorded to use the vicinity around the building for foraging, commuting and some social activity. Soprano pipistrelles were recorded by the automated detector deployed on the first floor of the two-storey building.

Discussion

Presence/ Likely absence

The external assessment confirmed a number of potential roost access points on the exterior of the Arvonia building.

Detailed surveys revealed common pipistrelle bats using two exit/entry points into the two-storey building within Arvonia. The automated detector also recorded soprano pipistrelles on five evenings; one evening in July and four in August. The timings of the soprano pipistrelle calls are many hours past their emergent times and prior to the time they return to roost (Russ, 2012). This suggests that the internal space of the first floor may be used as a night roost for soprano pipistrelles, and not used as a day roost.

Two species of bat were recorded commuting and foraging around the site: soprano pipistrelle and common pipistrelle.

Site Population & Conservation Value

Common pipistrelle roost

A maximum of eight common pipistrelles were recorded using the Arvonia building during any one survey, using three access points.

The Bat Conservation Trust website suggests a common pipistrelle summer colony on average consists of approximately 75 bats; the Bristol University bat information webpages suggest a maternity colony size of 25-50 bats. This suggests that the common pipistrelle roost within the Arvonia building is an occasional day roost used by males and non-breeding females, when compared with Figure 4 of the Bat Mitigation Guidelines (Mitchell-Jones, 2004) such roosts are categorised as being of low conservation significance.

Soprano pipistrelle roost

No soprano pipistrelle bats were observed to be roosting in the building during the surveys, although evidence of their presence during the night was gathered during a period of automated monitoring. The roost present is considered to be a night roost for a single animal. The Bat Conservation Trust website suggests a summer colony on average consists of approximately 200 bats and the Bristol University bat information web pages suggest a maternity colony size of 25-50 bats. This suggests that the soprano pipistrelle roost in the Arvonia building does not support a maternity colony, and instead is likely to be a day roost used by males and/or non-breeding females, and is at the lower end of the conservation significance scale.

Predicted Scale of Impact

The proposed works are to demolish and replace the existing building. Common pipistrelle is a species categorised as being common in Wales by Wray *et al*., (2010), who identify day roosts for this species as being of district (local/parish) importance. In the absence of mitigation, the loss of nine individual roosts is envisaged, with three entry/exit points.

Implementation of mitigation measures, detailed below, the roosting opportunities will be temporarily destroyed due to the building being demolished and replaced, they will be replaced by relocating to replacement bat boxes within the curtilage of the farmyard complex, either on trees or the agricultural buildings. Additional locations for crevice-roosting species will also be placed on trees within the curtilage of the site.

The soprano pipistrelle bat is considered by Wray et al (2010) as a common species. Night roosts comprising individual animals are categorised as being of local/district/parish importance. Applying guidance published in the Bat Mitigation Guidelines (2004) the loss of a roost such as this will result in a low impact. This implies that the loss of the roost is unlikely to have a significant effect on the favourable conservation status of the species. Whilst the roost identified is a night roost which suggests that bats are unlikely to be encountered during the daytime renovation works, this species of bat is an opportunistic crevice-dweller and may be encountered in locations not previously identified during the surveys. In the absence of mitigation, renovation works will leave bats without a place to roost, and may directly harm bats. Provision of temporary roosting locations as well as like-for-like replacement roosting opportunities is required to reduce the effects of the renovation works to within acceptable levels for maintaining the status of the species.

Foraging areas around Arvonia will not be significantly amended during the works. It is possible that any additional illumination of the building may result in the loss of available foraging and commuting habitat. Therefore, a slight impact might occur but this would be only on a local basis and with reference to Wray *et al.,* (2010) it is unlikely that there would be a significant effect on bat populations in the area.

When compared with guidance published in the Bat Mitigation Guidelines (2004), the end result is likely to be of a low impact. This implies that the modification of the roosts and mitigated disturbance is likely to only have effects locally, and is unlikely to have an impact on the favourable conservation status of the species concerned.

Recommendations

European Protected Species Licence

Proposed works on Arvonia will impact a number of bat roosts occupied by individual and low numbers of common and soprano pipistrelle bats.

Subject to planning consent being granted by the local planning authority, a European Protected Species (EPS) licence will be required to facilitate the proposals. The EPS licence is issued under Regulation 55 of the Habitats Regulations by Natural Resources Wales (NRW). Once the planning application has been

approved the applicant must appoint a suitably qualified and experienced ecologist, known as the Ecological Clerk of Works (ECoW), to prepare:

- European Protected Species Development Licence – Application Form
- European Protected Species Development Licence – Method Statement

The application form and a method statement are prepared to detail how the requirements of the Habitats Regulations will be met for managing the effects on bats during the works. In addition, the applicant is also required to collate and pass on to the appointed ecologist the following documents:

- A copy of the Local Planning Authority Decision Notice
- A copy of either the Delegated Decision Report or the committee meeting minutes (whichever format was used to approve the planning application)
- European Protected Species Development Licence - Local Planning Authority Consultation Form
- Architects drawings which contain the location of the bat mitigation measures (detailed below) and any proposed external lighting.

Once the planning application has been approved it is advised that the ecologist is engaged as early as possible as there can be a waiting time of approximately 40 working days / eight calendar weeks for NRW to process the application, in addition to the time it takes to prepare and collate the documents.

Further Survey

No further survey is recommended at this time. Should works not start within two years (i.e., September 2024) further survey may be necessary to qualify the roost status and recommend adaptations (if required) to the mitigation measures detailed below.

Timing of Works

The roosts identified at Arvonia are considered to be of low conservation significance (Mitchell-Jones, 2004) with breeding bats not a concern. Therefore, works will not be limited by time constraints, with works being able to be carried out throughout the summer months.

The main concern is absolute harm to bats during the course of works, which will be mitigated for by the presence of a licensed ECoW and the provision of temporary roosting opportunities.

It is currently unknown when works will start, but provided that adequate temporary roost provision is made, works may continue through the summer months without affecting the roosts present.

Works to be undertaken

Capture and Exclusion

An experienced ECoW will need to be appointed to advise the best location for the bat boxes and to direct the creation of features of mitigation. They will also provide a toolbox talk to the building contractor on the day of commencement of works, with information on the specific requirements relating to bats. They will remain on site during specific sensitive works such as the strip of the roof coverings and wooden cladding, creation of new roosting features and to inspect the placement and suitability of the new roost features.

Prior to the start of works, two bat boxes are to be installed on the existing building that is to be retained (14 Heol Maengwyn St) within the curtilage of the site, these will be facing south or south-west, to act as temporary roost provision. Artificial light must not illuminate the boxes at any time. The boxes must be suitable for crevice-roosting bats such as the Vincent Pro Bat Box. The bat boxes must remain in-situ for

the duration of works, and will ideally be retained following the completion of works to act as additional roosting features.

Figure 9: Vincent Pro Bat Box (Vincent Wildlife Trust)

Due to the location and number of the roost egress points, an exclusion approach is not considered appropriate. Reasoning behind this conclusion is that the number of potential access points are many, with the possibility of bats utilising another unknown access point.

Works will commence with the strip of bat roosting features under supervision from the ECoW, who will undertake a high level of ecological inspection prior to and supervision during works that will enable works to be carried out. This includes inspecting all areas behind the wooden cladding and on wall tops. In the course of works, any bats encountered during the strip of roost features will be captured by the ECoW, who will be wearing gloves and a facemask (Nuñez *et al.*, 2020) and will be relocated to one of the bat boxes. This process will continue until all roost access points and potential access points have been removed and the building is clear.

If a bat is discovered when the ECoW is not on site, all works must cease and the ECoW contacted for advice before proceeding.

New roost creation

Ridge tile roost

The creation of three ridge tile access points to allow bats to roost under ridge tiles is recommended. Gaps above the ridge board to the new houses will be created using additional mortar to slightly raise the ridge tile above the proposed roost location. Mortar will be placed along the ridge tiles exposing a slit of 20mm long x 15mm wide (Figure 10). This will provide access under the ridge tiles and into a crevice roof unit (Figure 11).

Figure 10: Examples of ridge tile access.

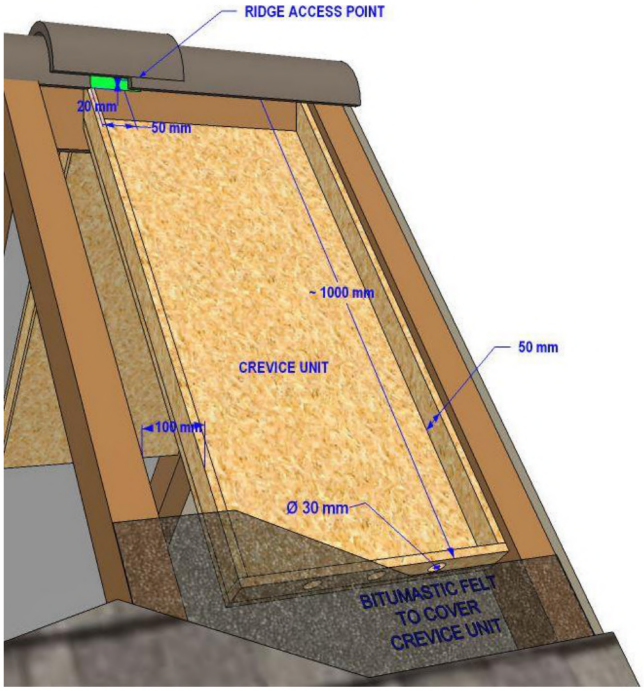

Figure 11: Example of ridge tile access into crevice roof unit.

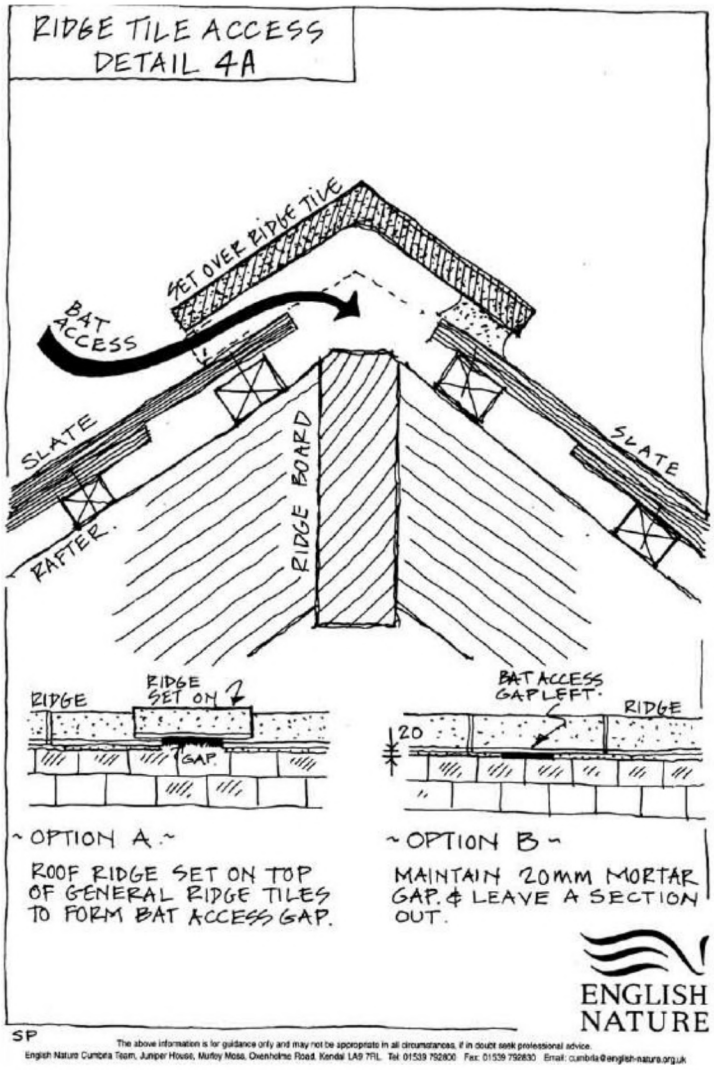

Figure 12: Ridge tile access

Building mounted boxes

The primary mitigation will be provided in the form of four externally mounted bat boxes, three mounted on the southeast elevation, and two on the southwest gable end of the newly built buildings. This will offer a range of temperatures. Two bat boxes will also be placed along the east façade of the new builds

Flat panel timber boxes will be used – of a design like in Figure 13 (e.g., Causa maternity box or Schwegler 1FF). It may be possible to clad or paint the box to make it less obtrusive.

Figure 13: Scwegler 1FF mounted bat boxes (Courtesy of NHBS.com)

The mitigation provision detailed above must be included on the final architect's drawings that are submitted to support the planning application.

External Lighting

The surrounds of the Arvonia building appear to be valuable for common and soprano pipistrelle bats that all use the vicinity for foraging and commuting. If any lighting is to be installed on the exterior of the new buildings, only a limited amount of lighting must be affixed and only to aid safe access to and from the new builds. Light fixtures will be directed downwards with additional canopy protection, and must be on a passive infrared (PIR) sensor, to allow lighting to come on only when required. Light fixtures must never directly illuminate any bat roosts, access points or boxes.

The sensitive lighting scheme as recommended must be created using the advice given by an ecologist specialising in bat ecology. The sensitive lighting scheme must follow advice detailed in the Technical Guidance note 08/18 and generally comprise:

- light fixtures, fitments, light spill and any artificial light must be directed away from bat roost entrances, both existing and those to be created as part of the mitigation;
- luminaires are to be LED only, due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- luminaires should have a warm white spectrum (ideally <2700 Kelvins), reducing the blue light component and increasing the red-light component;
- luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats;
- heights of fixtures should be carefully considered to minimise light spill;
- only luminaires with an upward light ratio of 0% and with good optical control should be used;
- luminaires must always be mounted on the horizontal, i.e. no upward tilt;
- any external security lighting should be set on motion-sensors and short (1min) timers;

- as a last resort, accessories such as baffles, hoods or louvres must also be used; and
- reduce light spill and direct it only to where it is needed. Lighting fixtures must be directed away from any natural features and must not encroach outside the site boundaries, particularly the surrounding trees, hedgerow and other vegetation in the landscape.

This form of lighting will be in keeping with Powys LDP Policy DM7: Dark Skies and External Lighting, where all efforts are being made to minimise light pollution. No lighting will illuminate the bat mitigation.

Conclusion

Information gathered during the surveys on the building at Arvonia confirms the presence of at least nine common pipistrelles utilising two roosting locations, and the night roost of a soprano pipistrelle. Surveys were conducted for the purposes of a planning application.

Recommendations in this report include the requirement of a European Protected Species licence in order to conduct the works. Works will commence with the strip of all roof coverings, areas where know bat roosts are present will do so under supervision of a licensed Ecological Clerk of Works. Works will result in the destruction of all bat roosts, with new roosting features being installed as part of the application.

Two bat boxes will be installed on the building within the curtilage of the site as temporary roost provision. Seven bat boxes will also be installed as new roost features on the new builds. Three ridge tile roosts will also be created within the new build.

All bat roosts and individual bats are protected by the Habitat Regulations and must be appropriately mitigated. With implementation of the mitigation measures detailed in this report, it will be possible to facilitate the long-term retention of roosting bats at the site.

References and Bibliography

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