

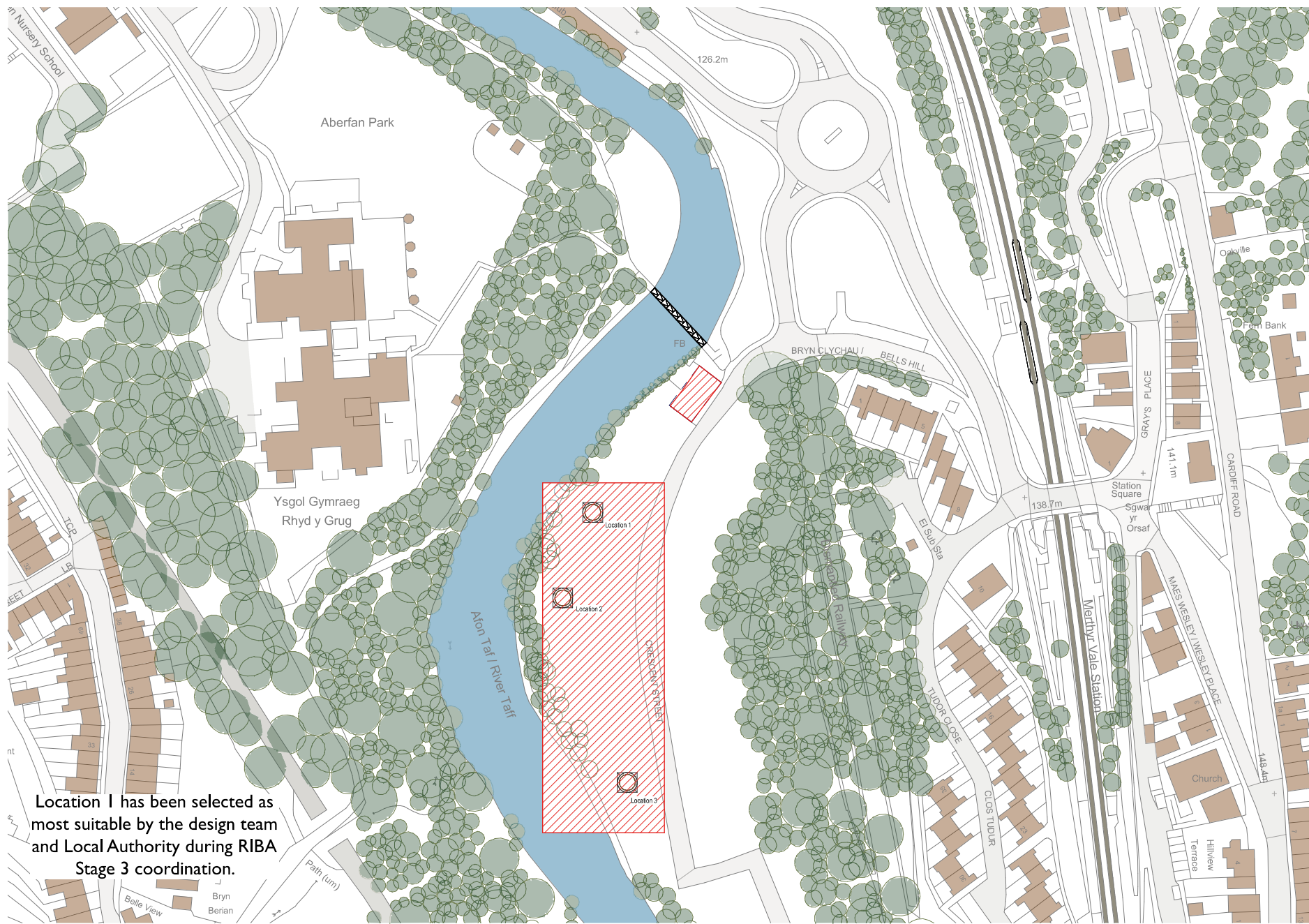


Figure 4 _Bat Tower Proposed Site Plan_ Locations



Figure 5 _Bat Tower Location 1 (From Crescent Street)



Figure 6 _Bat Tower Location 1 (Elevated Crescent Street)

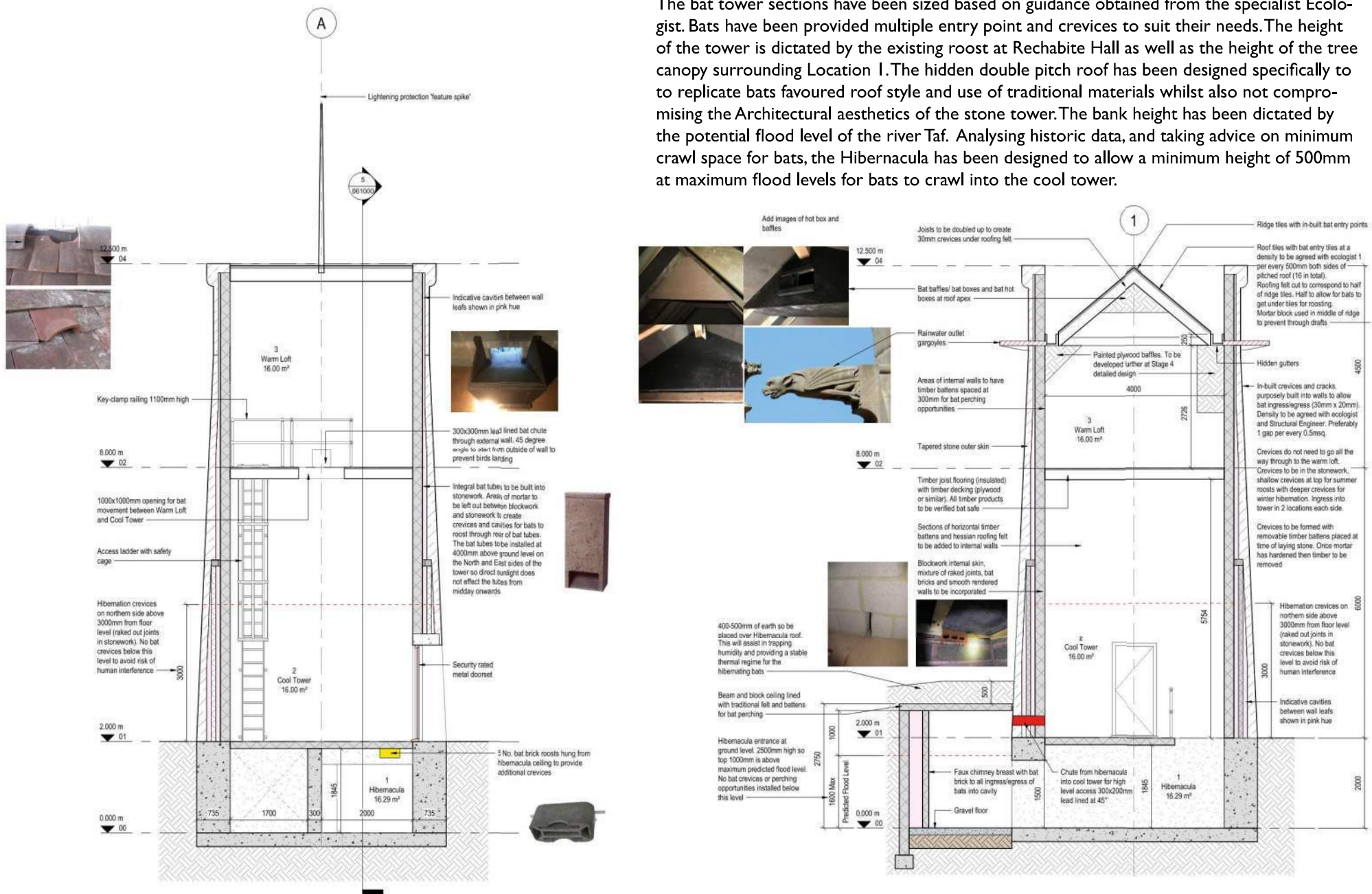


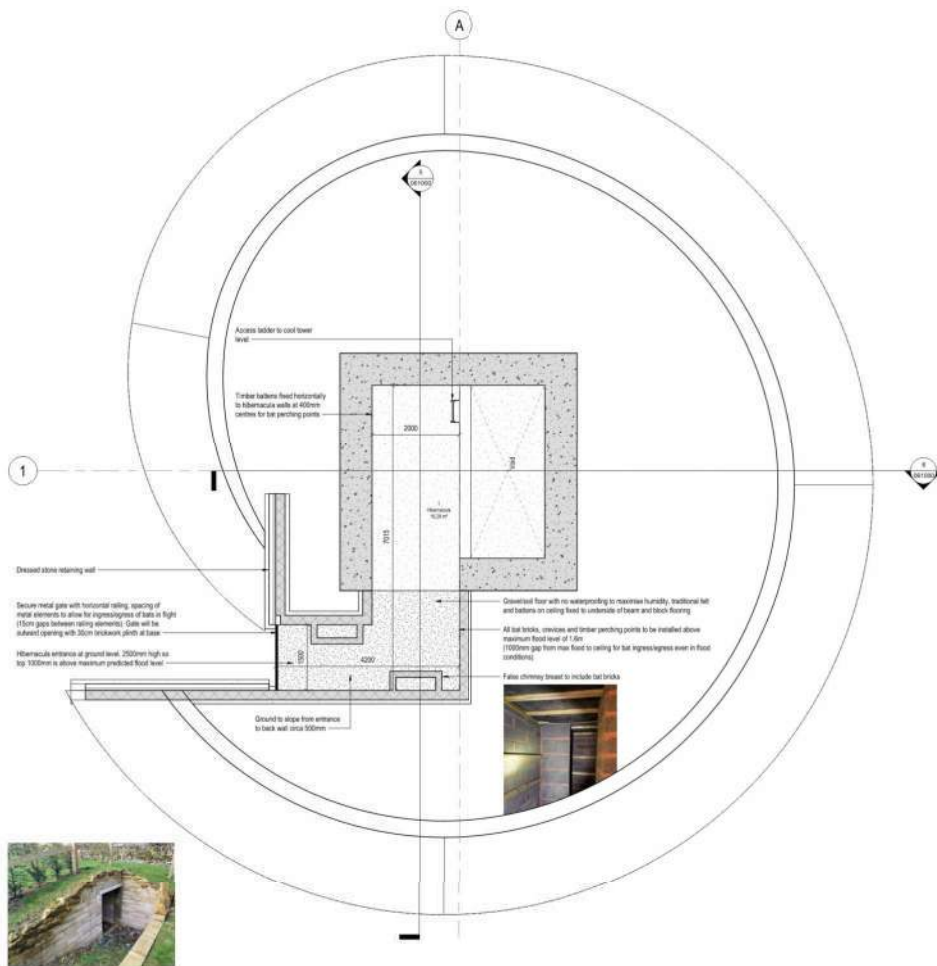
Figure 7_Bat Tower Location 1 (South end Crescent Street)



Figure 8_Bat Tower Location 1 (Opposite River Bank)

The bat tower sections have been sized based on guidance obtained from the specialist Ecologist. Bats have been provided multiple entry point and crevices to suit their needs. The height of the tower is dictated by the existing roost at Rechabite Hall as well as the height of the tree canopy surrounding Location 1. The hidden double pitch roof has been designed specifically to replicate bats favoured roof style and use of traditional materials whilst also not compromising the Architectural aesthetics of the stone tower. The bank height has been dictated by the potential flood level of the river Taf. Analysing historic data, and taking advice on minimum crawl space for bats, the Hibernacula has been designed to allow a minimum height of 500mm at maximum flood levels for bats to crawl into the cool tower.



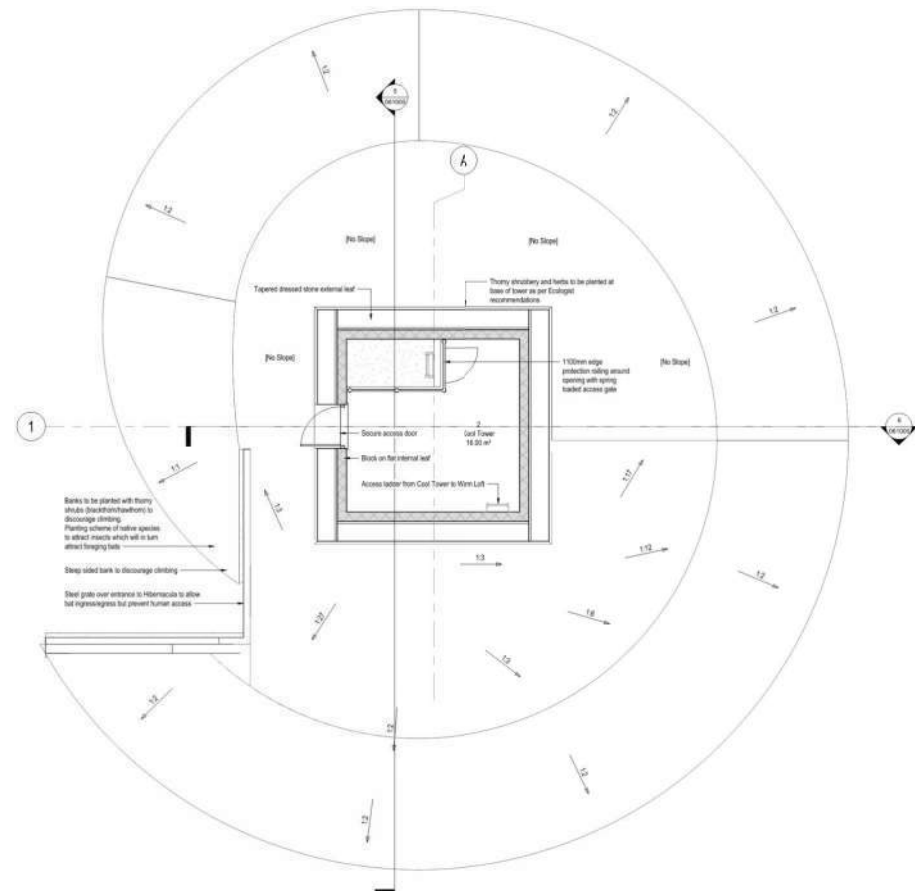


Level 00 - Hibernacula Floor Plan

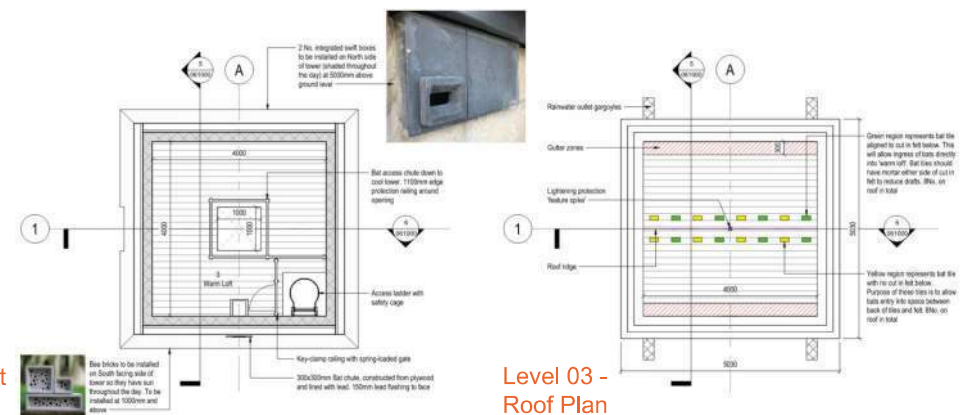
The floor plans have been sized based on guidance obtained from the specialist Ecologist. Bats entering the tower into the warm loft are able to drop down into the cool tower. A bat will fold its wings as it passes through the warm loft hatch and unfurl them to fly in the cool tower. A four meter squared space is the minimum size required for the large bat species to comfortably fly around the tower.

This careful consideration of the bats' natural behaviors and needs ensures not only the function but also the success of the bat tower as a conservation measure. By adhering to expert ecological advice, the design meticulously caters to the specific requirements of the bat species expected to use the tower, promoting their health and well-being.

Figure10_Bat Tower Proposed General Arrangement Plans



Level 01 - Cool Tower Floor Plan



Level 02 - Warm Loft Floor Plan

Level 03 - Roof Plan

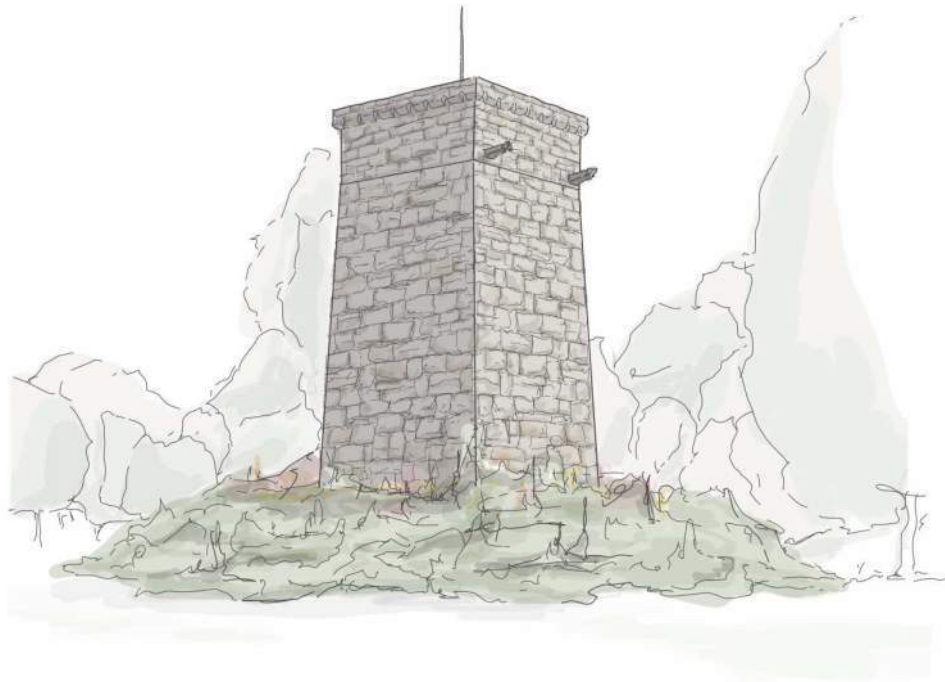


Figure 11_Bat Tower Proposed Elevations (Artistic Concept)

The locations were reviewed with respect to connectivity via existing riverine / scrub habitat for commuting bats, and the levels of disturbance by noise, lightning and people. The disturbance is taking into account likely current levels and potential future levels.

The tower and works area (including plant access/material storage) must avoid the tree root. Protection Areas (RPA). Arborist input will be required to determine RPAs.



Trees near location 1, with the river retaining wall for context. (taken looking west)



Trees near location 2, on the fair right side of the photo. (taken looking south)



Trees near location 1 (taken looking north)



View of trees between location 3 and 1 (from river across the river, with hill for context)



Building and trees to the north of location 3



Trees location 3 (taken from across the river)



Building and trees near location 3 (taken looking north)



Functional Requirements Research

RESEARCH INTRODUCTION

Bats are a vital part of our native wildlife, accounting for almost a third of all mammal species in the UK and occupy a wide range of habitats, such as wetlands, woodlands, farmlands as well as urban areas. They can tell us a lot about the state of the environment, as they are top predators of common nocturnal insects and are sensitive to changes in the land use practices. Bats are excellent indicators for the wider health of the UK's wildlife, as they're facing relevant environmental pressures such as landscape change, agricultural intensification, development, and habitat fragmentations.

They play an important role in many habitats around the world. Some tropical plants depend on certain bat species to pollinate their flowers or spread their seeds, while many bats, including all British Bats, help control insects by feeding on them. In the UK, some bats are indicator species, because changes to these bat populations can indicate changes in aspects of biodiversity.

Bats and people have been sharing dwellings for thousands of years. As natural roosting sites have become scarce due to development and land use change, so the number of artificial roost sites has increased in the form of houses, bridges, mines, barns, icehouses, etc.

Man-made roosts can provide stable micro-climates for the bats. Loss of natural has increased the importance of man-made structures for bats to the point that artificial roosts are becoming essential in the survival of many bat species.

Like humans, bats are looking for shelter that is clean - free of disease and parasites, comfortable - protected from the bad weather, and secure - safe from predators and disturbance. Bats have also unique requirements and may live in several different roosts through the year depending on their seasonal needs. Two important factors to consider when building roosts for bats are: temperature and aspect/ orientation.

A YEAR IN THE LIFE OF A BAT

January - Bats spend most of the winter hibernating, a state of inactivity characterized by lower body temperature, slower breathing, and lower metabolic rate.

February - Bats are still hibernating. They have little fat left to live off of now. They may leave the roost on warmer nights to find food and a drink of water.

March - Bats may begin to emerge and signs of limited activity can be seen. There are small numbers feeding as it gets warmer. In bad weather they may become torpid.

April - Bats have mainly come out of hibernation and are hungry and active, feeding on most nights. They might move between several roost sites and become inactive again when weather is too cold.

May - Bats are fully active and feeding. Females start forming maternity colonies and looking for suitable nursery sites, such as buildings or trees. Males roost on their own or in small groups.

June - Female bats usually give birth to a single pup, which they feed on their milk. Young bats are very small, less than an inch, with thin grey fur. Adult bats will catch thousands of insects each in a night.

July - Mothers continue to suckle babies. Some bats grow fast and are almost full-size, others are still very small. At about 3 weeks, young bats are sometimes found on the ground as they learn to fly.

August - At six weeks old, the young bats begin to catch insects for themselves and no longer need their mother's milk. The summer maternity colonies begin to disperse and bats may move to mating roosts.

September - Mating season begins. Males of most species use special calls to attract females, which can include purrs, clicks, and buzzing. Bats also concentrate on

building up fat stores for the coming months.

October - More mating is taking place, and building up fat reserves is becoming crucial to survive the winter season. Bats are seeking suitable hibernation sites and beginning periods of torpor.

November - Periods of torpor are lasting longer. Some begin hibernation, to save energy over the colder months when insects are harder to find. They are using stored fats fuel.

December - Bats are hibernating. They may roost on their own or in small groups, often in cool, quiet places like disused buildings, old trees or caves, where they hopefully won't be disturbed.



FURTHER INFORMATION

In the summer, bats usually have a pup and mothers gather together and find somewhere warm to take care of their young called maternity roost. Maternity roosts are usually between 30 and 40 Celsius degrees, however species can have their own unique preferences and studies have shown that even a 1.5 degree difference may influence bats to choose one building over another. Males will form smaller roosts somewhere else that are often the needs of the females.

In winter, British bats feed on insects which are scarce in the winter. Bats have adapted to this seasonal scarcity by going into hibernation where they lower their body temperature to the ambient or just above. Hibernation roosts are often a cool space with high humidity. For most species this is generally between 0 and 6 Celsius degrees, but some of them prefer slightly warmer conditions of 6 to 10 Celsius degrees.

In terms of aspect and orientation, summer maternity roosts in the northern hemisphere often have a southerly or westerly aspect for maximum solar heating. Male roosts and hibernation sites typically have a northerly aspect.

Bats need a variety of places in which to roost, as they select and use different types of roosts at different times of the year, in order to suit their metabolic and social requirements. Bat roosts are winter defined by their location, such as trees, buildings or underground roosts; or their function, such as maternity, hibernation, swarming or feeding roosts.

It is important to also consider how different bat species enter and leave roosts. Preferred ingress/egress depends upon the species of bat as well as environmental factors. Some entry points must be specifically designed to allow a bat to pass through but prevent other wildlife such as birds that could disrupt or damage the bat habitat.

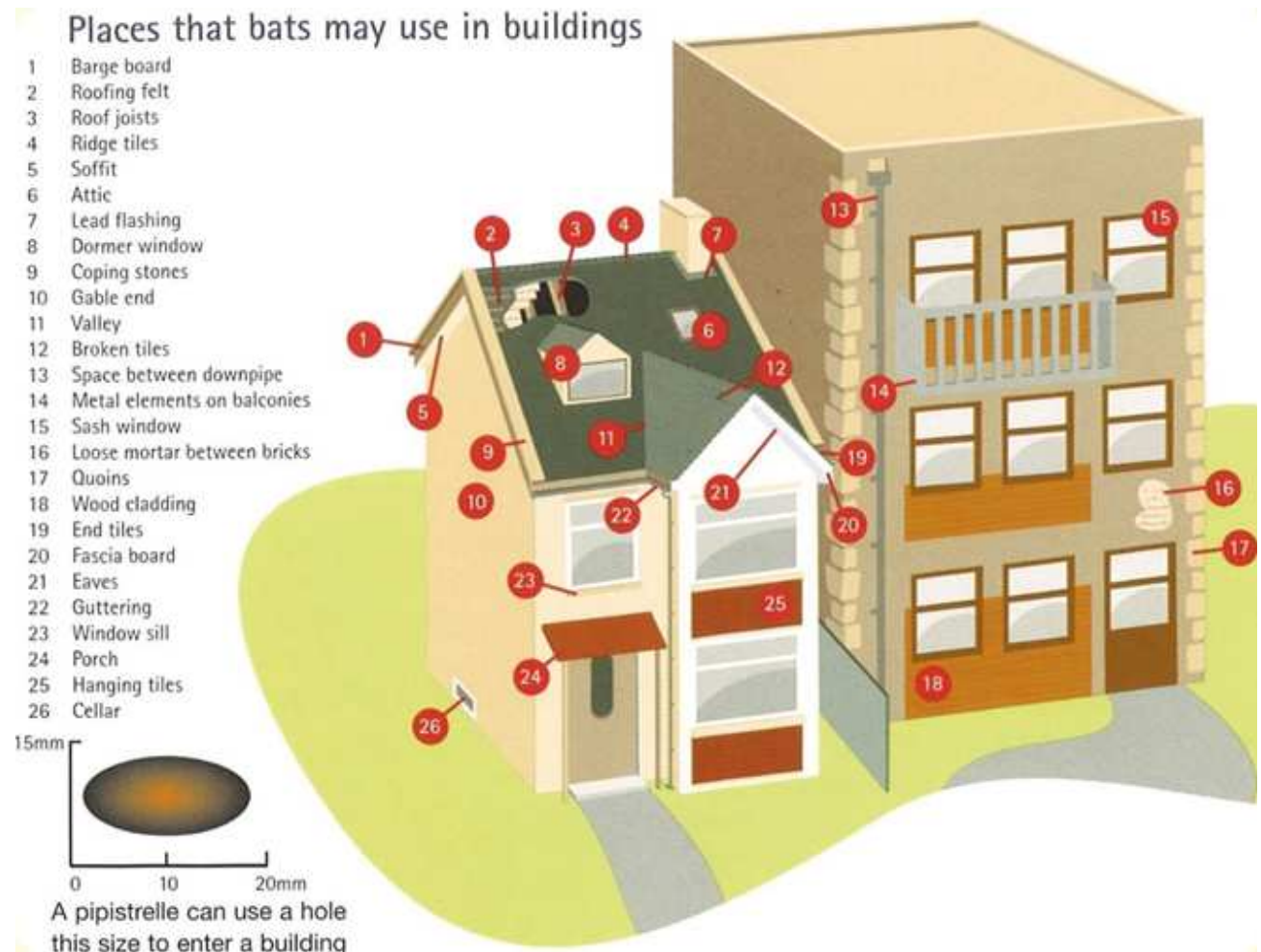


Figure 12 _Bat access opportunities in buildings