



## WEST BRADLEY HOUSE, SOMERSET

### Ecological Impact Assessment and Biodiversity Report

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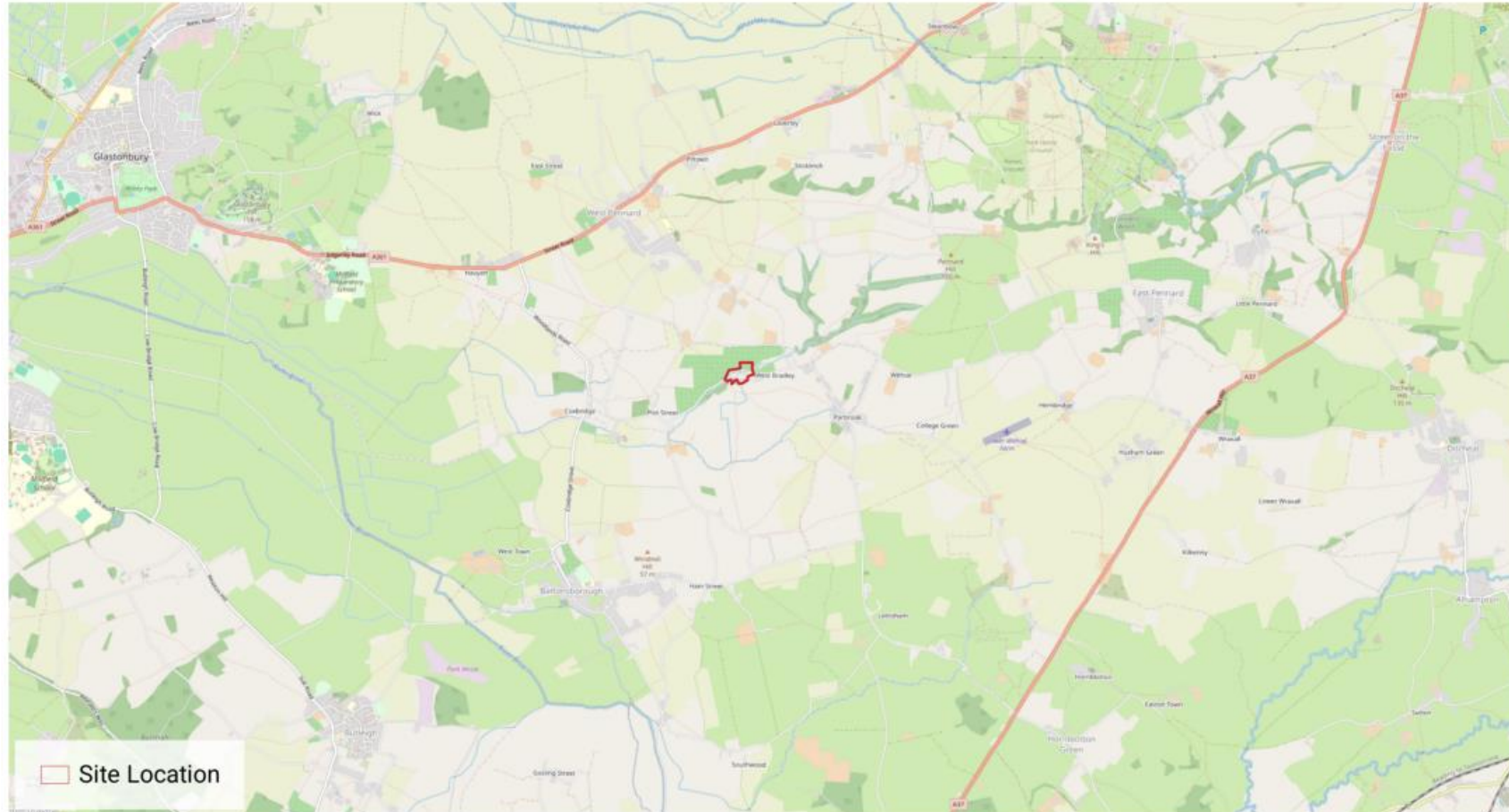
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## 1. INTRODUCTION

- 1.1. This report presents an assessment of the predicted ecological effects of a proposal to renovate the house and grounds of the Grade II\* listed West Bradley House in Somerset.
- 1.2. The new owners of the property are applying for planning permission for refurbishment and alterations to the Grade II\* listed building and adjoining structures, demolition of storage buildings and replacement with new ancillary residential buildings, refurbishment and conversion of storage barn / farm office to residential use, alterations to landscape and access.
- 1.3. The house is located in a generally flat and low-lying landscape amongst the Mid Somerset Hills National Character Area, approximately four miles south-east of Glastonbury (**Figure 1**). The grid reference for the centre of the site is ST558369 and the postcode is BA6 8LT. A plan showing the names of the main features of the site that are used in this report is provided in **Figure 2**.

Figure 1, "Site Location Plan"



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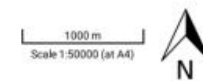


Figure 2, "Feature Names"



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## 2. APPROACH AND METHODS

### General Approach

- 2.1. This report provides a record of the identification of any potentially significant ecological impacts of the proposals and how they have been addressed by the project team. It also provides an assessment of the project's overall impacts on biodiversity and summarises the results of a biodiversity net gain assessment using the statutory metric, which is supplied separately as a spreadsheet and GIS project.
- 2.2. Whilst the impact assessment focusses on 'important' ecological features, the wider implications of the project for biodiversity *sensu lato* are also considered.

### Surveys and Assessments

- 2.3. The house and grounds were surveyed by Greena Ecological Consultancy between July and September 2022, the results of which are presented in a 'Preliminary Ecological Investigation Report and Stage II Bat Activity Surveys'. This report was provided to Somerset Council as part of the pre-application process, and a copy is appended to this document for ease of reference. The report contains the results of an extensive suite of bat surveys that made use of static detectors and infra-red cameras to determine the location and type of bat roosts in the house and outbuildings. It also presents a preliminary assessment of the site's suitability for several protected species, but does not include an assessment of potential impacts of the proposals.
- 2.4. The site has been surveyed by Engain ecologists with the aim of verifying the status of bat roosts assessing the condition of habitats to inform a biodiversity net gain assessment.
- 2.5. A detailed inspection of the house and outbuildings was conducted on 19<sup>th</sup> of January 2024 by Poppy Hookings, who possesses a Level 2 Bat Licence, assisted by Matt Davies of Engain. The house and outbuildings were searched inside and out for evidence of bats or places where they could roost. This included an inspection of the loft and cellar in the main house, and an internal inspection of the outbuildings. The methods followed those set out in the 4<sup>th</sup> edition of the bat survey guidelines (Collins, 2023).

- 2.6. A habitat condition assessment was completed by Matt Davies of Engain on the 5<sup>th</sup> of January 2024. Matt Davies has an MSc in Vegetation Survey and Assessment, over 18 years' experience in ecological consultancy and has been trained in the use of the biodiversity net gain metric and the application of good practice principles. A watercourse condition assessment was completed by Elliott Hails on the 11<sup>th</sup> of January 2024. Elliott is a qualified RiverMorph assessor and a biodiversity net gain technical specialist. The biodiversity net gain calculations were completed by Elliott Hails and informed by team discussions.
- 2.7. The Bradley Brook, which runs through the site, was searched extensively for signs of otters or water voles, and a systematic search for badger setts was also completed.
- 2.8. Data were obtained from Somerset Environmental Records Centre on the 15<sup>th</sup> January 2024.

### **Limitations**

- 2.9. The surveys of the house and grounds provide a snapshot of the ecological baseline conditions at the time of the surveys. They are not a comprehensive account of all wildlife that uses the site, but they are sufficient to undertake an assessment of the potential ecological effects of the proposed work.

### 3. ECOLOGICAL BASELINE

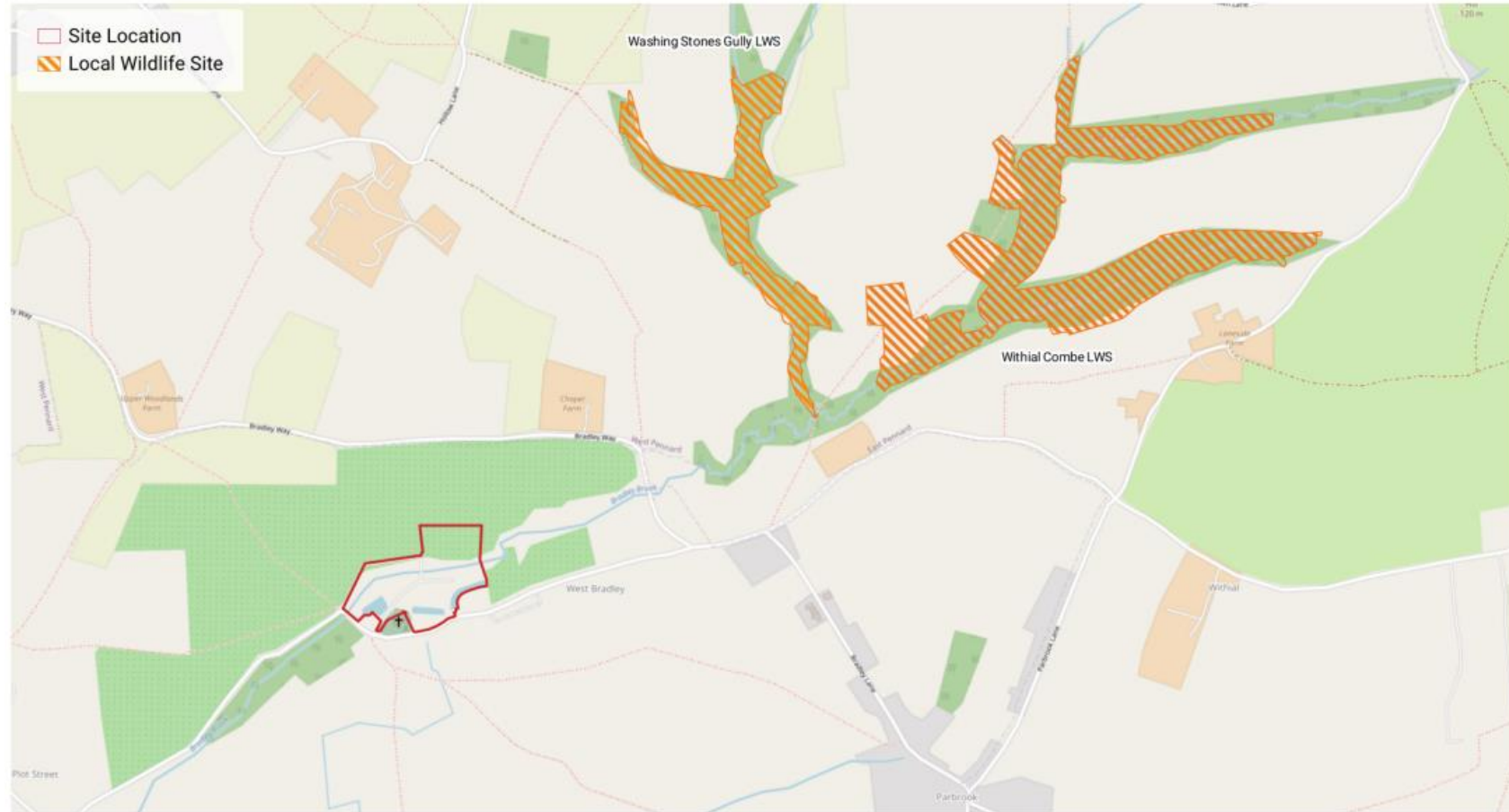
#### Designated Sites

- 3.1. The site is not designated for nature conservation. There are no statutory designated sites within 5km, the nearest such sites are the Somerset Levels and Moors, approximately 6km to the north-west, and the East Polden Grasslands approximately 7km to the south-west.
- 3.2. The nearest non-statutory designated sites are Withial Combe and Washing Stones Gully Local Wildlife Sites approximately 900m to the north-east (**Figure 3**).

#### Habitats and Plants

- 3.3. There are no records or rare or uncommon higher plants from the site and given the nature of its habitats it is not likely to support any such plants. It is possible that the orchards could support some lower plants that are characteristic of the habitat but given the relatively young age of the trees it is not likely that any of the rarest orchard species would be present.
- 3.4. There are non-native, invasive plant species present including bamboo, cherry laurel and gunnera, but no signs of the most troublesome species (e.g. knotweed or giant hogweed).
- 3.5. A map of the site's habitats is provided in **Figure 4**.

Figure 3, "Local Wildlife Sites"



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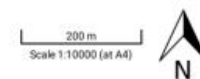


Figure 4, "Habitat Map of the Site"



- 3.6. The lawns around the main house (**Figure 5**) are closely mown and have been maintained as such for some years. They are overwhelmingly dominated by perennial rye-grass (*Lolium perenne*) with smaller amounts of red fescue (*Festuca rubra*) and creeping bent (*Agrostis stolonifera*). There are few forbs – the most frequently occurring are daisy (*Bellis perennis*) and dandelion (*Taraxacum officinale* agg.). The lawns are classed as ‘modified grassland’. They pass four out of the seven condition criteria for this habitat and are therefore assigned to ‘moderate’ condition.

**Figure 5, "Lawns around the main house"**



- 3.7. There is a stand of planted trees west of the house, consisting of rows of even-aged oaks (**Figure 6**). The trees stand within a regularly-mown lawn and appear to be around 50 or more years old.

*Figure 6, "Oak plantation"*



- 3.8. The ponds (**Figure 7**) are man-made, with straight-edged, low banks that shelve steeply into the water. The water was turbid at the time of the survey, but this followed a period of very heavy rain so they may be clearer at other times. The ponds are linked by pipes so that there is some flow from east to west. The banks of the ponds have large stands of pendulous sedge (*Carex pendula*), mature ash trees and some large stands of gunnera.
- 3.9. The ponds are ecologically a valuable part of the site, but they do not meet the relevant thresholds to qualify as a Priority Habitat.

**Figure 7, "Pond adjacent to the main house"**





- 3.10. The channel of the Bradley Brook is approximately 1m wide and it flows for the most part through a steep-sided channel approximately 1.5-2m deep (**Figure 8**). Upstream of the bridge, the banks are lower. A narrow band of shrubby vegetation with trees runs along both banks, although there are occasional gaps where the banks are dominated by nettles and brambles. Hazel (*Corylus avellana*) is the most frequent shrub, with smaller amounts of elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*). Trees include oaks (*Quercus robur*), ash (*Fraxinus excelsior*) and crack willow (*Salix fragilis*). There is abundant fallen dead wood on the banks and in the stream channel. The woody vegetation on the banks also includes a dense thicket of bamboo, and areas of cherry laurel (*Prunus laurocerasus*).
- 3.11. The brook is not one of the types included in the qualifying criteria for the Rivers Priority Habitat type. Of the species that count as qualifying criteria, there is potential that it could support one species from Criterion Level A (white-clawed crayfish) and five from Criterion Level B (eel, bullhead, water vole, otter, soprano pipistrelle). However, as there are no records of these species from the brook and the presence of white-clawed crayfish is doubtful, it does not qualify as a Priority Habitat type.

**Figure 8,**  
**"The Bradley Brook looking downstream"**



**Figure 9,**  
**"Bamboo and Cherry Laurel on the banks"**



- 3.12. The apple orchards to the north of the house and gardens (**Figure 10**) consist of even-aged, relatively young trees that are probably around 30 years old. They are planted in neat rows and stand over a coarse tussocky grass sward dominated by cock's-foot (*Dactylis glomerata*) and false oat-grass (*Arrhenatherum elatius*).
- 3.13. The orchards do not meet the thresholds to qualify as the 'traditional orchards' Priority Habitat type.

**Figure 10, "Apple orchards north of the house"**



## Amphibians

- 3.14. Four amphibian species are recorded in the data search: common toad (*Bufo bufo*), smooth newt (*Lissotriton vulgaris*), palmate newt (*Lissotriton helveticus*) and great crested newt (*Triturus cristatus*). The closest records are around the settlement of Baltonsborough, approximately 2km south of the site. The commoner newt species, common toads and common frogs are widespread in the region and breed in the majority of suitable water bodies. Great crested newts have a patchier local distribution – sometimes being absent from otherwise apparently suitable habitats. West Bradley House is in an Amber Risk Zone for District Level Licencing, and it is in a Great Crested Newt Strategic Opportunity Area.
- 3.15. Aside from the ponds on the site, only one other water body is visible within 500m of the site – a silage pit on a farm approximately 200m south-west of the house (**Figure 11**). The silage pit is not likely to be suitable for amphibians.
- 3.16. The ponds provide good habitat for amphibians, with some caveats. Generally speaking they are large water bodies with aquatic and water margin plants, and there is good terrestrial habitat close to the ponds (including scrub, rough grassland, orchards etc). However the ponds are frequented by water fowl and have fish in them, which militates against successful breeding of amphibians. There is also a flow of water, which can reduce the suitability of ponds for great crested newts. The ponds all have a Habitat Suitability Index (HSI) score of 'Good' (see **Appendix 1**).

Figure 11, "Water Bodies within 500m of West Bradley House"



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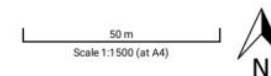


- 3.17. The short-mown lawns immediately surrounding the ponds are unlikely to be home to amphibians except when they move between the ponds and nearby habitat. Considering the site's context, the desktop records and the habitat preferences of the various amphibian species, it is not unlikely that the ponds would be used for breeding by common toads and common frogs (*Rana temporaria*), and they may also be used by smooth newts.
- 3.18. The presence of great crested newts is less likely owing to the presence of fish and water fowl and a flow to the water but cannot be ruled out. Any species that breed in the pond may be encountered amongst the trees and shrubs along the Bradley Brook and in the tree belts surrounding the property to the south. A map of the site indicating the relative suitability of its habitats for terrestrial habitats is provided in **Figure 12**.

Figure 12, "Relative Suitability of Terrestrial Habitat for Amphibians"



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## Badgers

- 3.19. There are many records of badgers in the data search, and they are common and widespread in the local area and across Somerset and the south-west.
- 3.20. There is an active sett on the south bank of the Bradley Brook, consisting of seven recently-used entrances (**Figure 15**), and there is one disused sett entrance on the northern bank. The recently-used entrances have fresh spoil heaps, and there were badger prints in soft mud next to the stream. The sett entrances are connected by well-worn paths between them. It would appear that this is a main sett.
- 3.21. The grounds of the house provide good foraging habitat for badgers – they are likely to feed on worms in the lawns and forage amongst the scrub along the stream bank. The orchards provide a wealth of food for badgers, including fallen fruit in summer and autumn and invertebrates amongst the tussocky grass beneath the trees.

*Figure 13, "Sett Entrance"*



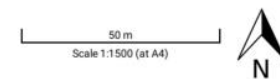
*Figure 14, "Sett Entrance"*



Figure 15, "Badger Setts Location."



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## Bats

3.22. There are desktop records of 10 species of bat within the data search:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- Serotine (*Eptesicus serotinus*)
- Leisler's bat (*Nyctalus leisleri*)
- Notcule (*Nyctalus noctula*)
- Daubenton's bat (*Myotis daubentonii*)
- Natterer's bat (*Myotis nattereri*)
- Brown long-eared bat (*Plecotus auritus*)
- Lesser horseshoe bat (*Rhinolophus hipposideros*)
- Greater horseshoe bat (*Rhinolophus ferrumequinum*).

3.23. The majority of these species are widespread in Somerset and the south-west. Lesser horseshoe, serotine and Leisler's bat are less common (but still more common here than in many parts of England) and similarly, greater horseshoe bats are amongst the rarest of UK bats, albeit they are commoner in this part of England. The site is not within a core sustenance zone or consultation zone for any of the European designated sites with bat qualifying features in the region (North Somerset and Mendip Bats SAC, Mells Valley SAC, Hestercombe House SAC).

3.24. The gardens and habitats around the house provide habitat suitable for foraging and commuting bats. The Bradley Brook provides a continuous habitat corridor through the landscape, which links to Washing Stones Gully and Withing Combe Sites of Nature Conservation Importance to the north-east. The brook is likely to be used by bats to commute between roosting and foraging grounds. The ponds, orchards and open-grown trees also provide good foraging habitats, and whilst the lawns may be of lower value, they will still support prey such as craneflies.

3.25. Some of the larger trees within the grounds have potential roosting features, most notably the two very mature horse-chestnuts next to the entrance driveway (**Figure 16**), but the majority of the open-grown trees are intact and without potential roosts.

*Figure 16, "Horse chestnut with high bat roosting potential"*



3.26. There are bat roosts in three of the existing buildings: the main house, the apple barn and the little stone barn (**Figure 17** and **Table 1**).

Table 1, "Bat Roost Details"

Building Name	Description	Potential Roosting Features	Evidence of Roosting	Roosting Categorisation
Building B - Little Stone Barn	Brick and stone barn, partially open sided on northern elevation. Pitched, tiled and bitumen felted roof. Small, dense ivy-covered extension to east comprising block walls, corrugated fibre cement roof and open sided on northern elevation.	Missing and broken tiles/broken felt. Crevices/gaps in stonework on southern and western elevation. Gaps behind barge and fascia timbers. Refer to Figure 18.	Observation and recordings from emergence and activity surveys.	Confirmed day roost of common pipistrelle and soprano pipistrelle. Night roost for greater horseshoe, lesser horseshoe, brown long eared and <i>Myotis</i> species.
Building C – Cart Shed	This building was a single storey shed/garage divided into three connected sections. <b>Section 1:</b> Furthest western section was a garage, comprised block and render walls, corrugated fibre cement and tin roof, pitched roof with timber clad gable ends, timber barge boards and fascias. <b>Section 2:</b> timber frame outbuilding with corrugated tin walls and roof, partially open sided on southern elevation. Derelict roof. <b>Section 3:</b> Block and render walls, corrugated fibre cement and plastic roof. Open roof at eastern end.	<b>Section 1:</b> Gaps behind timbers, holes at both northern and southern ridges enabling access into building. <b>Section 2:</b> Gaps above doors enabling access into closed off section of building. <b>Section 3:</b> access points into building at all aspects. Holes at ridge timbers. Refer to Figures 19 and 20.	None	Low bat roost potential
Building D - Main House	Large, three storey, stone and brick house with tiled, pitched roof and four chimneys. Single storey extension to north of main building: stone extension with tiled roof.	Access points into the roof void of the main house through vents in the northern and southern gable end walls and where the rafters join the gable walls. Lifted lead	Bat droppings in main house roof void: Pile of 1000's of bat droppings by brick wall of northern gable end and 100's scattered beneath ridge line. Refer to Figures 21 and 22.	Confirmed roost for common pipistrelle, soprano pipistrelle, serotine in roof (also BLE TBC – dropping analysis)

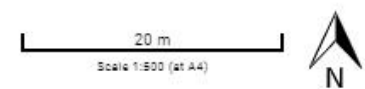
Building Name	Description	Potential Roosting Features	Evidence of Roosting	Roosting Categorisation
	Cellar found below ground floor of main building with door access from garden on the southern elevation of the building.	<p>around the chimneys. Gaps at eaves and crevices in stonework.</p> <p>Northern extension features: Gaps under extension roof tiles on western aspect, vents into northern gable and holes in stonework, behind barge timbers and broken tiles/timbers.</p> <p>Access into cellar through gap above door on southern elevation.</p>	Approximately 30 bat droppings found in the cellar, on an internal window ledge adjacent to access door on northern elevation. Refer to Figure 23.	Possible BLE hibernation roost in cellar (TBC – dropping analysis)
Building E - Apple Barn	<p>This building was divided into two sections with two pitched roofs.</p> <p><b>Southern section:</b> block and rendered walls, corrugated fibre cement pitched roof, timber cladding on western elevation.</p> <p><b>Northern section:</b> Stone and block building with tiled, pitched roof, timber soffit and fascia.</p>	<p><b>Southern section:</b> holes in walls and access through gaps under corrugated panels.</p> <p><b>Northern section:</b> Gaps around ridge tiles and roof tiles at gable ends, holes into timber soffit, gaps where joists meet gable walls, gaps around fascia timbers, lifted roof tiles on northern elevation, missing ridge tiles, access through vent in western gable end and at ridge. Refer to Figure 24.</p>	Observation and recordings from emergence and activity surveys.	Serotine roost
Building F	Agricultural barn comprising steel frame, corrugated cement walls and roof, many broken/missing panels and	N/A	N/A	Negligible

Building Name	Description	Potential Roosting Features	Evidence of Roosting	Roosting Categorisation
Building G	building open on western elevation. Farm building comprising block and rendered walls, corrugated cement roof, dense ivy covering part of roof. fig tree scrub along southern elevation, connected to Building F along northern elevation.	Gap above door on western elevation enabling access into building. Gap on south western corner of building at eaves. Access into building at eastern ridge and where rafters meet gable. Refer to Figure 25.	None	Low bat roost potential
Building H	Agricultural barn, timber and concrete frame, corrugated cement and tin roof/walls, open on southern and western elevation.	N/A	N/A	Negligible

Figure 17, "Bat Roosts"



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**Figure 18, "Building B"**



**Figure 19, "Building C"**



**Figure 20, "Building C"**



**Figure 21,  
"Bat droppings in main house attic"**



**Figure 22, "Droppings under ridge in attic"**



**Figure 23, "Droppings in cellar"**



**Figure 24, "Building E"**



**Figure 25, "Building G"**





## Birds

- 3.27. There are numerous records of birds within the data search, but none from the site or land immediately adjacent to it. Of the notable species within the data records, species such as skylarks, swifts, yellowhammers, house sparrows, starlings, song thrushes, mistle thrushes, redwings and fieldfares might frequent the orchards or the brook.
- 3.28. Several of the outbuildings have features where barn owls could roost or perch, but there were no signs of any pellets or white streaking (and no mention of any signs of barn owls was made in the Greena Ecological report). The orchards and rough grassland around them do however provide excellent foraging habitat for barn owls.
- 3.29. As well as the wide range of garden birds likely to frequent the grounds of the house, dippers and kingfishers could use the Bradley Brook for foraging and nesting. The orchards are likely to be frequented by various species foraging on the fruit and the invertebrates associated with the trees, such as starlings, swallows and others. Thrushes such as fieldfares and redwings may feed on the fallen fruit in autumn and winter.
- 3.30. The lawns and rough grassland provide good foraging habitats for green woodpecker, and greater spotted woodpeckers may forage or nest in some of the larger trees amongst the grounds.
- 3.31. The remains of a swallow's nest from summer 2023 was found in the Little Stone Barn, but no other nests were found in any of the other buildings. House sparrows might nest in the outbuildings or on the main house although no signs of nests were found during the surveys.

## Dormice

- 3.32. There are no records of dormice in the data search. There are no ancient semi-natural woodlands in the surrounding landscape, and woodland cover is sparse amongst the landscape dominated by pasture fields and the levels.
- 3.33. The narrow strip of woody vegetation along the Bradley Brook contains large amounts of hazel and is connected to the two woodland SINCs to the east, but even taken together these two woodlands amount to considerably less than the 20ha generally taken as the minimum area to support a viable dormouse population. Based on the absence of records and the low woodland cover in the surrounding landscape it is unlikely that dormice would be present here.

## Fish

- 3.34. There are desktop records of bullhead and eels from rivers and rhynes to the north, south and west of the site, but none from the Bradley Brook. The brook is broadly suitable for bullhead as it is likely to be relatively fast-flowing and well oxygenated even in summer, and although the bed is largely muddy there are stony areas. Eels may also use the brook, and they could also make use of the ponds.
- 3.35. Fish were seen catching insects from the surface of the pond during the survey in winter, but it was not possible to tell which species they were. The ponds might support sticklebacks, roach and possibly carp.

## Otters and Water Voles

- 3.36. There are records of otters and water voles in the data search from rivers and rhynes north, south and east, but few records close to the site.
- 3.37. The Bradley Brook is good habitat for both species. The earth banks and dense vegetation cover provide good places for water voles to forage and burrow and a route for otters to move through the landscape.
- 3.38. Fresh prints in soft mud on the stream banks appear to be those of rats rather than water voles, and it is likely that the small number of burrows seen upstream of the bridge are those of rats rather than water voles. There were no signs of otter slides and no spraints or prints were found along the brook. Given that these species are not uncommon in this area, it is likely that they do traverse the Bradley Brook but it appears that they do not reside here.
- 3.39. Any otters using the brook as a commuting corridor would also be likely to use the ponds to hunt for fish, amphibians and other prey items.

## Invertebrates

- 3.40. The diverse habitats within the grounds of the house are likely to support a wide range of invertebrates. Whilst in general, traditional orchards can support rare invertebrates, young trees at West Bradley lack the features that support the rarer species such as red-belted clearwings (*Synanthedon myopaeformis*). The mix of rough grassland, lawns and woody vegetation provides excellent habitat for species such as cockchafers (*Melolontha melolontha*) and the lawns may support large numbers of craneflies.

- 3.41. The Bradley Brook has a largely muddy bed and were it not for the likelihood that it is occupied by signal crayfish, it may once have supported white-clawed crayfish. However there are no records of white-clawed crayfish in the data search and it is not likely that they are present here.
- 3.42. There are records of various butterfly species within the data search but none from the site or the immediate surroundings. There are records of white letter hairstreaks, but the site does not have large amounts of elm, so they are unlikely to be present here. However, blackthorn is present on site and so brown-letter hairstreaks, which are also reported in the data search, could use the site.
- 3.43. There are records of nine locally notable and one nationally notable dragonfly species. The ponds are likely to provide good habitat for adult and larval dragonflies and damselflies, albeit it did not appear that there would be large stands of emergent vegetation onto which the larvae could emerge.

### Reptiles

- 3.44. The data search contains records of slow-worms and grass snakes, both of which are likely to be present here in suitable areas of habitat (i.e., in the areas shown on **Figure 11** as being most suitable for amphibians). The ponds in particular make the presence of grass snakes more likely as they will provide prey in the form of frogs, toads and other favoured items. Both of these species are widespread in Somerset but restricted to suitable areas of habitat and thus exist in disjointed meta-populations broken up by areas of sub-optimal habitat in intensive farmland, towns etc. The site does not have habitats likely to support adders or common lizards, which are less common in the area.

### Terrestrial Mammals

- 3.45. There are records of hedgehogs in the data search and the range of habitats within the site is excellent for them. Other terrestrial mammals likely to be present on and around the site include hares, polecats, stoats, weasels, mice and voles.

### Assessment of Ecological Importance

- 3.46. The table below provides an assessment of the ecological importance of the site's features. In accordance with the guidelines for ecological impact assessment (CIEEM, 2018), this is defined within a geographical scale so that features are important at one of the levels as follows:

- International e.g. features (habitats, species or ecosystem functions) that are so rare, threatened or present in such abundance that the site is important at an international level;
- National e.g. features that would be sufficiently notable as to be outstanding representatives of their kind amongst all the examples in England and worthy of designation such as a Site of Special Scientific Interest;
- Regional e.g. features that would be outstanding within the South-West of England and worthy of designation at that level, such as Local Nature Reserves;
- County e.g. features that would be outstanding in the context of Somerset and worthy of designation as Local Wildlife Sites
- Local e.g. features outstanding within the ecological context of the parish of West Bradley
- Site e.g. features that stand out as contributing to significantly to the ecological value of the site.

3.47. Any features valued at above the Site level may be considered 'important' within meaning of the CIEEM guidelines. The notion of 'important' features is intended to avoid the need to consider potential for adverse impacts on an exhaustive list of ecological features and to exclude any that are so widespread or insensitive to the likely impacts of the project that effects on nature conservation would not be significant.

**Table 2, "Relative Importance of the Site's Ecological Features"**

Ecological Feature	Assessment	Ecological Importance
Lawns	Not a protected or priority habitat, and extremely common and widespread at all geographical scales.	Site
Ponds	Not a protected or priority habitat. Ponds are uncommon in the parish. They are widespread but subject to large historic losses in Somerset and beyond. They are good but not exceptional examples of this type of habitat.	Local
Plantation woodland	Not a protected or priority habitat, and a small example of a widespread and common habitat type locally and beyond.	Site
Orchard	Traditional orchards have been subject to long-term losses in Somerset and beyond, however the examples on this site are closer to the more common commercial type of orchards and are thus not an outstanding example in the context of the County.	Local
Bradley Brook	Not a protected or priority habitat. Widespread and common habitat type in Somerset but not common locally.	Local
Amphibian assemblage and habitats	The species likely to be found on the site are relatively widespread in Somerset but may not be especially common in the parish owing to the lack of large numbers of ponds.	Local
Badger sett and foraging grounds	Badgers are extremely common and widespread at all geographical scales in England and the sett on site is not an exceptional example. There are likely to be other, similar scale setts in the parish and beyond.	Site
Bat foraging and commuting habitat	The Bradley Brook forms a distinctive feature in an otherwise fairly intensively farmed landscape that has few substantial linear features beyond well-managed hedgerows. However there are many such features within Somerset and this is not an exceptional example of a bat foraging corridor, and it does not connect any known roosts of high conservation significance (such as SSSI or SAC sites).	Local
Bird assemblage and habitats	Because the site is small and consists of habitats that are relatively common and widespread in the surrounding landscape, it is not likely to support a bird assemblage of notable importance. Uncommon species may frequent the site and it could make	Local

Ecological Feature	Assessment	Ecological Importance
	up an important part of their wider territory, but it is not likely that any populations of notable species will be wholly dependent upon the site.	
Serotine roost in attic of main house	Serotines are amongst the rarer bats in the south-west. However, this is a common type of roost supporting a relatively small number of bats that use it as a day roost in summer. Serotines are commonly encountered in Somerset and there are many old buildings with roof voids and chimney stacks likely to support similar roosts in the local area. Attic of main house considered unlikely to support hibernating bats due to the height of the building and various vents/holes around the roof space resulting in fluctuating temperature and humidity.	Local
Brown long-eared roost in attic of main house	Brown long-eared bats are widespread and relatively common in Somerset and are also considered widespread across the UK. As with the serotine roost, this type of roost is not unusual in this area and is not likely to be outstanding within the county. Attic of main house considered unlikely to support hibernating bats due to the height of the building and various vents/holes around the roof space resulting in fluctuating temperature and humidity.	Local
Pipistrelle roosts in main house	The two species of pipistrelle roosting at West Bradley House are the most common and widespread species locally and across the UK. The roosts do not support notable numbers of bats and are not of an unusual kind.	Site
Serotine roost in Apple Barn	Serotines are amongst the rarer bats in the south-west. However, this is a common type of roost supporting low numbers that use it as a day roost in summer and may also hibernate here. Serotines are commonly encountered in Somerset and there are many old buildings likely to support similar roosts in the local area.	Local / County (hibernation roost)
Common pipistrelle, soprano pipistrelle, greater horseshoe, lesser horseshoe, brown long eared and <i>Myotis</i> species roosts in Little Stone Barn	<p>The Little Stone Barn is a day roost for common and soprano pipistrelle. These two species of pipistrelle are the most common and widespread species locally and across the UK. The building is not suitable to support high numbers of these species and the roost is a common type.</p> <p>The Little Stone Barn is also an occasional night roost for greater horseshoe, lesser horseshoe, brown long eared and <i>Myotis</i> species. Brown long eared bats are generally common and widespread across the south-west and UK. <i>Myotis</i> species</p>	<p>Pipistrelle day roosts – Site</p> <p>Night roost for range of species - Site</p>

Ecological Feature	Assessment	Ecological Importance
	<p>which would roost in buildings are generally common and widespread in the south-west but not as abundant in all areas. Lesser horseshoe bats are amongst the rarer bats in the south-west. Greater horseshoe bats an Annex II species and one of the rarest species. However, as the barn is not suitable to support high numbers of bats and a night roost is a type of roost of less importance, these roosts are classified as being of 'lower' conservation significance in accordance with the Bat Mitigation Guidelines (Reason &amp; Wray, 2023). No evidence of maternity roosts has been recorded and the open structure of the barn provided sub-optimal conditions for hibernating bats (fluctuating temperatures, low humidity and draughts).</p>	
Hibernation roost in cellar of main house	<p>BLE Roost Brown long-eared bats are widespread and relatively common in Somerset and are also considered widespread across the UK. Droppings indicate this is a hibernation roost for one or low numbers of BLE bat. Due to the size of this roost and species present it is not likely to be outstanding within the county. However, a hibernation roost is of higher conservation importance.</p>	Local / County
Fish	<p>The Bradley Brook and ponds may support species that are widespread in the Region but which are threatened and have a restricted distribution. The site is not exceptionally notable as habitat for these species in the context of the County.</p>	Local
Otter and water vole habitat	<p>The Bradley Brook is a distinctive feature within the landscape that would form a useful corridor for these species, and the ponds add to the overall value of the site. The site is not large or unusual enough to support a notable number of breeding otters or water voles (if any) except at a local level.</p>	Local
Invertebrate assemblage and habitats	<p>The site's habitats are sufficiently common and widespread that it is unlikely to support a large number of notable species that are not also found elsewhere in the parish.</p>	Site
Reptile habitats	<p>The site could support a breeding population of slow-worms and form part of the territory of a breeding population of grass snakes. At a local level a meta-population of these species may be at least in part reliant upon the site's habitats.</p>	Local / Site

Ecological Feature	Assessment	Ecological Importance
Terrestrial mammals	The site is not likely to be used by an outstanding assemblage or number of these species that are relatively common and widespread in Somerset.	Site



## 4. ECOLOGICAL IMPACT ASSESSMENT

### Potential Adverse Impacts

- 4.1. The proposed project would only be likely to result in significant adverse impacts if any of the proposed activities would remove or damage habitats used by notable species, or result in the killing or injury of such species. The main aspects of the proposals that involve any real degree of risk are:
- Removal and replacement of the roof of the main house
  - Replacement of the outbuildings
  - Relocation of the tennis court
  - Alterations to the access route and parking areas including construction of the new garage, yard and forecourt
- 4.2. The table below cross-references the location of these proposals with the location of ecological features, to determine which features are at risk of being adversely affected. This serves to narrow down the impact assessment process to focus only on aspects where there is a real rather than a hypothetical risk of an adverse impact.
- 4.3. On this basis, the proposals would not have any impact **ponds, plantation woodland and orchards**: there are no physical works that would adversely affect these features. They are valued at the Site or Local level and any potential for indirect, minor impacts (such as damage whilst construction vehicles are manoeuvred) can be addressed in a Construction Ecological Management Plan (CEMP).
- 4.4. There are some features that are so widespread and common, and the risk of actual effects is so low, that there is no need for a detailed consideration of the likely effects of the proposals. This includes the **lawns, invertebrates and terrestrial mammals**. Potential minor impacts on these features can be addressed in a CEMP and they are highlighted in green in the table.
- 4.5. There are several features that are sufficiently ecologically valuable and at risk of adverse impacts, that a more detailed impact assessment is appropriate. These are highlighted in amber.

**Table 3, "Potential for the proposals to significantly affect ecological features"**

Proposal	Lawns	Ponds	Plantation Woodland	Orchard	Bradley Brook	Amphibians	Badger sett	Birds	Bat roosts	Bat commuting / foraging	Fish	Otters and Water Voles	Invertebrates	Reptiles	Terrestrial Mammals
Roof works on main house	x	x	x	x	x	x	x	✓	✓	x	x	x	x	x	x
Replacement of outbuildings	x	x	x	x	✓	✓	x	✓	✓	✓	x	x	x	✓	x
Tennis court	x	x	x	x	x	✓	x	x	x	x	x	x	x	✓	x
Access, Parking and yards	x	x	x	x	✓	✓	✓	x	x	x	x	x	x	✓	x

- 4.6. **Table 4** sets out an assessment of the potential for the proposals to impact on the ecological features, in the absence of the application of any additional measures beyond those that would be contained in a CEMP. The purpose of this is to identify a ‘worst-case’ scenario and determine whether any of the potential impacts would be severe enough to be ecologically significant *i.e.* whether they require the introduction of measures to avoid, mitigate or compensate for their effects and whether the absence of such measures would carry substantial weight in a planning decision.
- 4.7. The conclusion of this assessment is that the proposals could result in impacts that would be significant at a Local level but not beyond. Avoidance, mitigation or compensation measures are required for the following potential impacts:
- Pollution of the Bradley Brook during construction of the new access route or the outbuildings;
  - Killing or injury and / or loss of habitat of amphibians and reptiles during construction of the outbuildings and the relocation of the tennis court and car parking
  - Killing, injury or disturbance of nesting birds during vegetation clearance or demolition
  - Loss of bat roosts during works to the roof of the main house, to the Apple Barn or the Little Stone Barn
  - Light spill into the Bradley Brook
- 4.8. These issues have been discussed with the project team, and measures to address them incorporated into the project design. They are described in **Section 5**.

**Table 4, "Impact Assessment in the Absence of Avoidance, Mitigation or Compensation"**

Ecological Feature	Potential Impact	Extent / Magnitude	Duration / Frequency	Ecological Effect	Significance in the absence of additional measures to address impacts
Bradley Brook	Construction could lead to pollution of the water channel	The magnitude of any pollution event such as fuel spill or runoff of soil is relatively small – the effects are unlikely to be significant outside of the reach of the Brook due to the effects of dilution.	Construction impacts could occur over a matter of weeks	In the long-term any pollution would dissipate, and the effects would be reversed	Impact significant at a Local level.
Amphibians	Killing or injury of amphibians during the construction stages of the outbuildings, tennis court access and parking	Considering the small area of habitat that would be affected, it would not be expected that more than a small number of individuals would be affected, and the meta-population would not be extirpated from the site	The temporary impact during construction would be expected to be reversed over a small number of generations (fewer than 10)	There would not be likely to be a long-term effect on the conservation status of any of the relevant species, even at a site level in the long-term	Impact significant at a Site level in the short term, reduced to zero in long term
	Loss of terrestrial habitat as a result of the above construction activities	The total amount of habitat affected is approximately 10m <sup>2</sup> , a very small proportion of the amount of good habitat within the site	The habitat removal would be permanent	The small proportion of total habitat removal is not expected to lead to a detectable effect on the Site population	Impact not significant at any level
Birds	Killing or injury of birds or disturbance of nesting birds during construction	The total area of habitat suitable for nesting birds that would be directly affected by the proposals is very small. Considering the typical nesting densities of the species concerned this might equate to fewer than 10 nests in total.	Temporary during construction	Reduced breeding success is a significant factor in bird populations in following years, but the small scale of this potential impact would not be likely to affect populations at anything beyond the Site level	Impact significant at a Site level in the short term, reduced to zero in long term

Ecological Feature	Potential Impact	Extent / Magnitude	Duration / Frequency	Ecological Effect	Significance in the absence of additional measures to address impacts
Bat roosts	Loss of bat roosts and killing or injury of bats during construction	Loss of roosts of up to County importance	Temporary risk of killing or injury during construction and permanent loss of roosts	Potential to lead to a reduction in the abundance of bats at a County level	Impact significant at a County level.
Commuting and foraging habitat for bats	Light spill from the new outbuildings could attract invertebrates and light-opportunistic bats (e.g. pipistrelles) and deter light-averse bats from using the affected area of the Bradley Brook	<p>Bats are faithful to important commuting routes over generations and even light-averse species may continue to use a route if it is important enough. It is therefore possible that bats commuting along the brook would be more vulnerable to predation, but it is not likely that it would completely deter them from flying along it.</p> <p>The Guest House has three windows facing onto the brook, and the Leisure Barn has glazing facing the brook from the sauna and the plunge pool. Light spill from the new outbuildings risks illuminating the southern bank of the brook but would not be likely to spill as far as the northern bank.</p>	<p>Lighting within the new outbuildings would only likely be used after sunset, and the buildings are design for occasional use. Light spill onto the brook would therefore be temporary at most.</p> <p>Furthermore, when lights are switched on at night in the guest suites, it is more than likely that the curtains would be closed (although of course this is not guaranteed).</p>	In combination with other large-scale factors affecting bat populations (climate change, farming, roost loss etc) the reduced functional connectivity along the brook could affect the conservation status of bats at a Local level.	Impact significant at a Local level.
Badger setts	Construction of the new access track will be within the 30m zone around the badger setts, which could lead to disturbance of	The track runs within 3m of the nearest sett entrance, but no sett entrances would be destroyed	Temporary during construction	Short term disturbance that would be reversed within one year	Impact significant at a Site level

Ecological Feature	Potential Impact	Extent / Magnitude	Duration / Frequency	Ecological Effect	Significance in the absence of additional measures to address impacts
	badgers or damage to the setts				
Reptiles	Killing or injury during the construction	Considering the small area of habitat that would be affected, it would not be expected that more than a small number of individuals would be affected, and the meta-population would not be extirpated from the site	The temporary impact during construction would be expected to be reversed over a small number of generations (fewer than 10)	There would not be likely to be a long-term effect on the conservation status of any of the relevant species, even at a site level in the long-term	Impact significant at a Site level in the short term, reduced to zero in long term

## 5. AVOIDANCE, MITIGATION AND COMPENSATION

### Avoidance through Design

- 5.1. The design team considered various options for improving vehicular access into the site, one of which required the creation of a new bridge over the Bradley Brook. An alternative option that avoided the need for the bridge has been decided upon and this avoids any potential impacts on the wildlife of the brook that would have resulted from the construction of the bridge.

### Pollution Control

- 5.2. Pollution could occur during construction through if any of the following substances were introduced directly or washed into the brook: silt / soil; cement or concrete; fuels or oils.
- 5.3. Pollution prevention measures will include:
- No working in the channel and no disturbance of the stream bed
  - Minimise vegetation removal to prevent soil erosion;
  - No stockpiling of materials where they could be washed into the channel;
  - No fuelling or storage of chemicals near the brook; and keeping all such materials on impermeable ground in an area where any spills cannot be washed into the brook;
  - Keeping adequate spill kits on site to deal with accidental spillages
  - Siting concrete or cement mixing and washing areas at least 10m away from the brook, in an area where runoff would not reach the brook;
  - Using contained or bunded areas for washing out kit;

### Avoidance of Harm to Amphibians and Reptiles During Construction

- 5.4. Phased vegetation clearance will be used to ensure that amphibians and reptiles are moved away from the construction area prior to the commencement of works.
- 5.5. Vegetation clearance and topsoil scraping will take place during periods of fine and warm weather (above 10°C with little rain) and will be undertaken in a sensitive and phased manner (with a period of 48 hours between phases), to make habitats less suitable for reptiles and encourage independent movement away or to installed refugia where they can be captured and translocated to the receptor site:

- Phase 1 - Cut rough grassland, scrub and other tall vegetation to a height of c. 15 cm and remove arisings;
- Phase 2 - Cut vegetation to ground level and remove arisings; and
- Phase 3 - Soil scrape.

5.6. Dismantling of suitable refugia within or adjacent to the construction area (such as rubble or debris piles) will avoid the gravid period (May to July) and will be supervised by a suitably qualified ecologist. Any individuals found during this exercise will be removed to a safe location elsewhere on the property.

5.7. After soil scraping, the area will be maintained as bare earth until construction begins, to minimise the likelihood of vegetation recolonising the area and providing new habitat for amphibians and reptiles.

#### **Avoidance of Harm to Nesting Birds**

5.8. Any vegetation or structures where birds could nest will only be removed outside of the bird nesting season. Where this is not possible, an ecologist will check the area for birds' nests by undertaking a manual inspection and watching the area for bird activity early in the morning. If any active nests are identified they will be left undisturbed until the young have fledged or the nesting attempt is completed.

#### **Avoidance of Harm to Badgers**

5.9. In order to ensure that badgers are not harmed during construction it may be necessary to temporarily exclude them from the sett during the construction of the section of track adjacent to the sett. Exclusion from the sett would require the installation of one-way gates onto the sett entrances, which would be monitored for 21 days (with a check every three days). There may be timing restrictions on the closure of the setts. Temporary exclusion of badgers from the sett would require a licence from Natural England.

5.10. An alternative to temporary exclusion would be to implement sensitive construction techniques that would avoid the risk of disturbing setts. This would include using Ground Penetrating Radar to map the underground tunnels. If there were no tunnels under the path of the proposed access track, construction would proceed with only such tools and machinery as could be safely deployed without disturbing badgers. This work would be completed in the presence of a suitably qualified ecologist.



## **Avoiding Harm to Bats and Compensating for Roost Loss**

### ***Bat Licence Application***

- 5.11. An application for a Natural England Bat Mitigation Licence would be prepared and submitted following planning approval to ensure that demolition/alterations of the buildings containing confirmed bat roosts and alterations to the main house could proceed lawfully.
- 5.12. The mitigation strategy to maintain the Favourable Conservation Status of the local serotine, brown long eared, common and soprano pipistrelle, *Myotis* species, and greater and lesser horseshoe bats populations would be detailed in the licence application documents and would incorporate the following:
- Timing of demolition to minimise disturbance of bats.
  - Measures prior to and during demolition to ensure no bats are harmed.
  - Provision of alternative roosting habitat.
- 5.13. No works affecting the bat roosts within the buildings or main house would be undertaken until the Natural England Mitigation licence is granted. All subsequent works would accord with the Mitigation Licence, Method Statement and Works Schedule.

### ***Timing of demolition/alteration works and roost construction***

- 5.14. Based on the results of the bat roost surveys, the optimum period for carrying out demolition and alterations to the buildings on site and main house roof, affecting the bat roosts, would be 1st September – 1st May. This would be set out in the Natural England Licence Work Schedule. This would also be set out in the Natural England Licence Work Schedule.
- 5.15. Based on the Bat Mitigation Guidelines for the status of roosts identified, there is the requirement for construction of the mitigation hibernation roost in advance of removal of any hibernation roosts. The cellar within the main house is a confirmed hibernation roost. It is possible that serotine bats may hibernate in the Apple barn. Local hibernating bat populations cannot be left without a roost during any intervening construction period therefore the mitigation roost would need to be constructed prior to works on the Apple barn commencing if they would affect the hibernation roosting potential. The main house roof void was considered unlikely to support a hibernation roost due to the height of the building and various vents/access points around the roof which would cause fluctuations in temperature and humidity, causing it to be unsuitable for hibernating bats.

- 5.16. The alterations on the main house roof and demolition of the Little Stone Barn could therefore be undertaken prior to the construction of the mitigation roost, as well as work to the Apple Barn as long as it does not affect potential hibernating areas.

***Demolition actions to ensure no bats are harmed***

- 5.17. Pre-construction roost inspections would be undertaken to confirm absence of roosting bats and sensitive works would be supervised by a licenced bat ecologist. This would be set out in the Natural England Licence Method Statement.

***Compensation for Loss of Bat Roosts***

- 5.18. Provision of a replacement bat roost providing enhanced roosting opportunities for serotine, brown long eared, common and soprano pipistrelle, *Myotis* species, and greater and lesser horseshoe bats.
- 5.19. A replacement, stand-alone roost building suitable for the species identified would be created in close proximity to existing roosts and located in land retained under the control of the applicant. Access would be restricted to ecological monitoring and maintenance access only. The location and design of the proposed bat roost is illustrated in Figure X
- 5.20. The roost building would provide enhanced roosting opportunities including hibernation and insulated (hot) voids to increase suitability for year-round roost use.

***Mitigation roost specification***

- 5.21. In order to mitigate for the loss of non-maternity day roosts for serotine, brown long eared, common and soprano pipistrelle bat roosts and night roosts for low numbers of greater horseshoe bat, lesser horseshoe bat. *Myotis* species and brown long eared bats, a replacement roost providing 'more or less like for like' roosting opportunities will be created (as required by Bat Mitigation Guidelines, Reason & Wray, 2023). For this development, a standalone roost building will be constructed within land which will remain under control of the applicant. The roost building will provide secure roosting habitat suitable for all identified species in close proximity to the original roosts. Detailed plans and construction schedules would be provided with the Licence application. However, to provide 'like for like' roost opportunities, the mitigation roost would incorporate the following characteristics:

- Building of stone / block / brick construction (6.4m x 3.6m) with pitched tiled roof to 3.9m height. Roof to be lined with bitumen roof felt (no breathable roofing membranes) plus secondary emergency access point in soffit.
- 450mm x 300mm access slot in a suitable elevation (facing a 'dark corridor' such as the Bradley Brook) at 2m height.
- Access slot to incorporate a sloping metal base plate to cover ledge and deter predators.
- Internal antechamber behind access point to minimise bird and predator access to main roost area, maintain low light levels and stabilise temperatures in main roost area.
- 'Cool tower' following Vincent Wildlife design within roost area to provide enhanced hibernation roost opportunities.
- Further roost enhancement measures including an insulated 'tower', timber baffles along roof, and wires strung across walls to provide roosting opportunities at a variety of heights, elevations and temperatures.
- Roost opportunities for crevice roosting bats including:
  - Lead access tiles in tiled roof.
  - Dry ridge system with gaps at gable ends to provide access for crevice roosting species.
  - Hanging tiles and integrated Schwegler1F bat tubes on gable ends.
- Schwegler 2FE boxes fixed to walls internally.
- Lockable access door with access restricted to monitoring and maintenance.
- Lighting strategy to ensure roost structure is not subject to external lighting.

### ***Mitigation roost monitoring***

- 5.22. Monitoring will be set out in the Mitigation Licence application. This will include compliance monitoring to ensure that mitigation roost construction is in accordance with approved plans and post-construction inspection to review bat usage.

Figure 26, "Proposed Compensation Roost Above New Garage"



### **Avoiding and Mitigating the Effect of Light Spill**

- 5.23. No new external lighting is included in the proposals.
- 5.24. Measures such as automated blinds and treated glazing have been proposed as ways to minimise light spill from buildings, but the latest guidance from the BCT and ILP suggests that these should not be relied upon. The potential narrowing of the bat corridor caused by light spill will instead be mitigated by new planting to widen the corridor on the tops of the banks. This will ensure that there is no net loss in functional connectivity and it will enhance the strength of the linear feature as a commuting and foraging habitat for bats.

### **Impact Assessment after Avoidance, Mitigation and Compensation is Applied**

- 5.25. After the application of the measures set out above, the risks of pollution during construction are controlled to an acceptable level. The significance of the ecological effect has been reduced from a Local level to less than a Site level.
- 5.26. The proposed avoidance and mitigation measures set out above also mean that nesting birds, otters, water voles, fish, amphibians and reptiles would not be harmed during construction, and there would be no adverse ecological effect from this aspect of the proposals.
- 5.27. Light spill from the proposed buildings on the southern bank of the brook will illuminate localised areas of vegetation on some occasions when bats may be present, but this will be intermittent and occasional. The additional planting will mean that there is no net loss in the width of the commuting corridor, and bats will not therefore be prevented from commuting through the landscape. The ecological effect is therefore not significant beyond a localised area of the site.

## 6. BIODIVERSITY NET GAIN

6.1. The headline results from the metric are provided below, which show that the proposals achieve greater than 10% net gain in habitats and watercourses. As illustrated on Figure 18 and Figure 19, there is very little change in the amount of any given habitat type. The net gains have been achieved primarily through actions agreed with the landscape architect including:

- Enhancing modified grassland by allowing it to become tussocky and overseeding to improve species-diversity, so that it will become ‘other neutral grassland’ in at least moderate condition.
- Enhancing retained scrub by improving the graded edge so that it achieves good condition.
- Extensive tree planting – planted trees have been included as ‘small’ trees in the metric, but in reality they have been designed to achieve their full natural height and spread.
- Removing invasive species from the banks of the Bradley Brook.

6.2. The long-term management of the biodiversity enhancements can be secured via a Habitat Management and Monitoring Plan.

**Table 5, "Headline BNG Results"**

FINAL RESULTS		
<b>Total net unit change</b> <small>(Including all on-site &amp; off-site habitat retention, creation &amp; enhancement)</small>	<i>Habitat units</i>	3.51
	<i>Hedgerow units</i>	0.00
	<i>Watercourse units</i>	0.25
<b>Total net % change</b> <small>(Including all on-site &amp; off-site habitat retention, creation &amp; enhancement)</small>	<i>Habitat units</i>	16.55%
	<i>Hedgerow units</i>	0.00%
	<i>Watercourse units</i>	10.24%
<b>Trading rules satisfied?</b>	Yes ✓	

Figure 27, "Pre-development Habitat Plan"



Figure 28, "Post-development Habitat Plan"



## 7. SUMMARY OF ECOLOGICAL OUTCOMES

- 7.1. All of the potential adverse effects on ecology have been reduced by the Site level of significance through the application of avoidance, mitigation and compensation measures.
- 7.2. The positive effects of the proposals include:
- Over 10% net biodiversity gain in habitats and watercourses, as measured using the statutory metric.
  - The removal of non-native invasive plants from the site.
  - A purpose-built bat roost secured for the future that will be capable of supporting an increased number of bats compared with the current conditions.
- 7.3. The balance of the proposals is therefore overwhelmingly positive, and thus they are compliant with the policy and legislation applicable to the planning application. This includes the NPPF requirement for the enhancement of biodiversity, the statutory requirement for the delivery of at least 10% net gain, the protection of wildlife covered by *The Wildlife and Countryside Act 1981* (as amended) and the Habitats Regulations, and the relevant local planning policies.



## APPENDIX 1 – HSI SCORE SHEET

<b>Recorder:</b>	MD		<b>Location:</b>	West of House	
<b>Date</b>	05/01/2024		<b>Grid Ref:</b>	ST 55737 36896	
<b>Job No:</b>	eg230209		<b>Weather:</b>	Clear and dry	
<b>Pond Ref:</b>	Pond 1				
<b>Suitability Index Number</b>	<b>Category</b>	<b>SI Value (to cross-reference with graphs)</b>	<b>Score</b>	<b>SI Result</b>	<b>Notes</b>
SI <sub>1</sub>	Geographic Location	1	1	1	See SI <sub>1</sub> map for score
			0.5		
			0.01		
SI <sub>2</sub>	Pond Area	0.9	See SI <sub>2</sub>	0.9	See SI <sub>2</sub> Graph for area HSI score
SI <sub>3</sub>	Permanence	0.9	0.9	0.9	Never dries
			1		Dries no more than 2/10 years or in drought only
			0.5		Dries between 3/10 years to most years
			0.1		Dries annually
SI <sub>4</sub>	Water Quality	0.67	1	0.67	Abundant & diverse invertebrate community, netting has handfuls of diverse invertebrates including mayfly larvae & water shrimps
			0.67		Moderate invertebrate diversity
			0.33		Low invertebrate diversity e.g. midge & mosquito larvae. Few submerged plants
			0.01		Clearly polluted, pollutant tolerant invertebrates e.g. rat-tailed maggots. No submerged plants.
SI <sub>5</sub>	Shade	1.00	See SI <sub>5</sub>	1.00	Do not include emergent vegetation. See SI <sub>5</sub> shade graph for HSI score
SI <sub>6</sub>	Fowl	0.67	1	0.67	No evidence of waterfowl impact (moorhens may be present)
			0.67		Waterfowl present, little impact on pond vegetation. Pond supports submerged plants & banks are not denuded of vegetation.
			0.01		Sever impacts of waterfowl. Little or no evidence of submerged plants, water turbid, pond banks showing patches where vegetation removed, evidence of provisioning waterfowl.
SI <sub>7</sub>	Fish	0.33	1	0.33	No fish stocking, no fish in torch and netting survey

			0.67		No evidence of fish, but local conditions suggest that they may be present.	
			0.33		Small numbers of crucian carp, goldfish or stickleback	
			0.01		Dense populations of fish	
SI <sub>8</sub>	Pond Count	0.8	See SI <sub>8</sub>	0.8	See SI <sub>8</sub> Graph for pond count HSI score	
SI <sub>9</sub>	Terrestrial	0.33	1	0.33	Extensive area of habitat that offers good opportunities for foraging and shelter completely surrounds pond (e.g. rough grassland, scrub or woodland). Mammal holes, proximity to old farm buildings, stone walls piles of loose stone.	
			0.67		Habitat that offers opportunities for foraging and shelter, but may not be extensive in area and does not completely surround pond.	
			0.33		Habitat with poor structure that offers limited opportunities for foraging and shelter (e.g. amenity grassland).	
			0.01		Clearly no suitable habitat around pond (e.g. centre of large expanse of bare habitat).	
SI <sub>10</sub>	Macrophytes	1.00	See SI <sub>10</sub>	1.00	This includes emergents, floating plants (excl. duckweed) and submerged plants reaching the surface. See SI <sub>10</sub> Graph for macrophyte HSI score.	
<b>Product Index</b>		0.031677616	<b>To the tenth root</b>	0.7081	<b>Final HSI Score</b>	Good



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