

Wild Service



Wildlife Trust
Consultancies

Old Monmouth Road, Longhope

Preliminary Ecological Appraisal

On behalf of Stephen and Jean Waters

Project Code: BB2023013Av1

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1 Introduction

1.1 Scope

- 1.1.1. Wild Service was commissioned by Stephen and Jean Waters to undertake a Preliminary Ecological Appraisal (PEA) of the land adjacent to The Sanctuary, Old Monmouth Road, Longhope, GL17 0NZ (hereafter referred to as the 'Site'). The survey was requested to inform proposals for construction of a new two-bedroom ground floor dwelling and associated soft landscaping, next to an existing Grade II listed residential building.
- 1.1.2. The Preliminary Ecological Appraisal comprised a UKHabs Survey and Conditioned Assessment to inform a subsequent Biodiversity Net Gain (BNG) on receipt of landscaping plans, desk study, and protected species survey assessment.
- 1.1.3. This report includes a description of methods used to identify habitats, results, and recommendations for mitigation.

1.2 Site Description

- 1.2.1 The Site comprised the existing garden area to the northwest of an existing residential building. The Site was located within Longhope village in west Gloucestershire, situated within the Forest of Dean. The Site comprised a well-manicured garden, of modified grassland, a raised water feature, introduced shrubs, fruit trees and a native hedgerow (Figure 1). Old Monmouth Road borders the northeast Site boundary. Immediately to the northwest and southeast are residential homes and gardens, and to the southwest there is a large field used for grazing animals.
- 1.2.2 The surrounding landscape includes the residential houses and gardens in Longhope village, and the wider area comprises arable fields and boundary hedgerows. There is a small linear woodland approximately 60m south of the Site, and the closest large woodland block is approximately 450m north-east of the Site. A water course (Longhope Brook) passes the Site approximately 100m to the south-west.
- 1.2.3 The central Ordnance Survey Grid Reference for the Site is SO 69034 18778.



Figure 1. Site Location plan including red line boundary.

1.3 Legislation

1.3.1 This report has been prepared in accordance with relevant legislation and policy. Further detail is provided in Appendix 1, however the following primary documents are of relevance:

- The Wildlife and Countryside Act 1981 (as amended) (WCA 1981);
- The Countryside and Rights of Way Act (CRoW Act), 2000 (as amended);
- The Natural Environment and Rural Communities Act (NERC Act), 2006;
- The Protection of Badgers Act 1992 (PBA 1992); and
- The Conservation of Habitats and Species Regulations 2017 (as amended) (CHS 2017).
- The Environment Act 2021 contains provisions for the protection and improvement of the environment, including introducing biodiversity net gain (“BNG”).

1.3.2 No part of this report should be considered as legal advice and when dealing with individual cases, the client is advised to consult the full texts of the relevant legislation and obtain further legal advice.

2 Methods

2.1 Desk Study

2.1.1 The objectives of the desk study are to review the existing available information to identify the following:

- Statutory and non-statutory nature conservation sites within 1km of the Site (including an extended search of 5km for Special Protection Areas (SPAs) Special Areas of Conservation (SACs) & Ramsar sites;
- Records of protected and rare/notable species within 1km of the Site;
- Records of bats within 2km of the Site; and
- European Protected Species (EPS) licences within 1km of the Site.

2.1.2 Ecological data were provided by Gloucestershire Centre for Environmental Records (GCER) and sourced from the Multi-Agency Geographic Information for the Countryside (MAGIC) website (2023).

2.2 UKHabs Survey & Protected Species Survey

2.2.1 The methods used for the UKHabs Survey and protected species surveys are outlined in Table 1.

2.2.2 The fine scale Minimal Mapping Unit (MMU) has been selected for this site (MMU – 25m², 5m length). Appropriate secondary mapping codes have been added and detailed where necessary.

2.2.3 Becca Brown of Wild Service undertook the appraisal on 26th April 2023.

2.3 Limitations and Constraints

2.3.1 While every attempt has been made to collect accurate baseline data, all ecological surveys represent a 'snapshot' of activity. Ecological features are dynamic and often transient, and it is not possible to confirm the absence of a species through survey. It may be necessary to update the ecological surveys if sufficient time elapses since the surveys and data collection presented in this report were carried out.

Table 1. Phase 1 Habitat & Protected Species Survey Methods

UKHabs survey	The aim of the UKHabs survey is to provide a description of the habitats on a particular site and reference is made in accordance with the UKHabs classification methodology (UKHab, 2020). The survey includes a detailed assessment of the land within the development boundary, including a description and mapping of all key features and habitat types. The survey has been carried out to identify the range of habitats within the site and the predominant and notable species of flora. Where necessary, the condition of habitat has been described. The appraisal also aims to identify invasive plants listed on Schedule 9 of the Wildlife & Countryside Act that could have implications for works on site. Where appropriate, maps are provided in other formats, such as annotated aerial photographs/site plans.
Badgers	The site is assessed for suitable habitats that may support badgers <i>Meles meles</i> . Where relevant habitat occurs, evidence of badgers including setts, latrines, tracks, snuffle holes, padding or guard hairs is recorded.
Bats	The Site is assessed for suitable habitats, generally buildings and trees, that may support roosting bats. For example, buildings are assessed for holes in soffits, missing tiles and gaps in the masonry whilst trees are assessed for features such as cracks, holes, flaky bark and established ivy cover. Where possible the interior of buildings are also inspected for suitable roosting features and any evidence of bats in the form of bats, droppings, urine staining and feeding remains are noted. Potential roosting features are classed as negligible, low, moderate, or high potential in (Collins, 2016). The suitability of the habitats for foraging bats is also assessed.
Birds	The site is assessed for suitable habitats that may support birds in terms of feeding, nesting and roosting. Where relevant habitat occurs, evidence identifying the presence of birds including nests, droppings, pellets and feathers is recorded.
Dormice	The site is assessed for suitable habitats that may support dormice <i>Muscardinus avellanarius</i> including woodland and hedgerows. Where relevant habitat occurs evidence of dormice including nests and gnawed nuts is recorded.
Great crested newts	During the site visit the potential of the site to support great-crested newts <i>Triturus cristatus</i> is assessed; this includes looking for potential breeding sites such as ponds, disused swimming pools and other water-bodies. The appraisal also focuses on the potential for this species to find refuge in places such as log piles, rubble and compost heaps. Where still water-bodies occur a Habitat Suitability Index (HSI) is calculated. This is a standard appraisal method developed specifically to evaluate the habitat suitability for great crested newts (Oldham <i>et al.</i> 2000). A series of factors must be considered. Each factor is assessed along suitability guidelines and allocated a value of between 0.1 (highly unsuitable) to 1.0 (highly suitable). The geometric mean of these values provides an overall suitability value for the site. Although this is no substitute for a dedicated survey the suitability value informs the decision on whether to undertake a dedicated survey.
Otters	The area under appraisal is searched for suitable habitat along water-bodies, recording where appropriate, evidence pertaining to the presence of otters <i>Lutra lutra</i> in the form of holts, spraints, anal jelly, tracks and feeding remains.
Reptiles	The site is assessed for suitable habitats that may support reptiles including slow-worms <i>Anguis fragilis</i> , common lizards <i>Zootoca vivipara</i> grass snakes <i>Natrix natrix</i> and adder <i>Vipera berus</i> . Where relevant habitat occurs, evidence identifying the presence of reptiles, particularly tracks and sloughed skin is recorded.
Water voles	The area under appraisal is searched for suitable habitat along water-bodies, recording where appropriate, evidence pertaining to the presence of water voles <i>Arvicola amphibius</i> in the form of burrows, latrines, runs, footprints and distinctive “feeding lawns”.
White-clawed crayfish	The area under appraisal is searched for suitable habitats that may support white-clawed crayfish <i>Austropotamobius pallipes</i> . This typically includes freshwater streams and rivers but may also include still water-bodies.

3 Results

3.1 Desk Study

Statutory Nature Conservation Sites

- 3.1.1 There are two statutory nature conservation sites within 1km of the Site, both of which are designated as a Site of Special Scientific Interest (SSSI) for geological reasons. The closest site is Longhope Hill SSSI, located approximately 275m from the Site. The second site is Hobb's Quarry, Longhope SSSI, located approximately 630m north-east of the Site. Hobb's Quarry is also a Gloucestershire Wildlife Trust (GWT) Nature Reserve and is of importance due to ancient semi-natural woodland and hedgerow habitat, geological exposures, and plant and mammal interest.

Non-Statutory Nature Conservation Sites

- 3.1.2 There are seven non-statutory nature conservation sites within a 1km radius of the Site, five of which are designated as a Local Wildlife Site (LWS). The remaining two are Regionally Important Geological Sites (RIGS). The site names, reasons for selection and approximate distance from the proposed development site are provided in the table below.

Site name	Reason for selection	Approximate distance (m) from Site
Coleman's Wood LWS	Ancient semi-natural broad-leaved woodland site larger than 2ha with plant and mammal interest	450m
Hobb's Quarry LWS	Ancient semi-natural broad-leaved woodland site larger than 2ha with plant and mammal interest	630m
Blaisdon Wood LWS	Ancient semi-natural broad-leaved woodland site larger than 2ha	915m
Hope Wood (Flaxley Woods) LWS	Ancient semi-natural broad-leaved woodland site larger than 2ha with plant, invertebrate and mammal interest	815m
Sculchurch, Parish Woods LWS	Ancient semi-natural broad-leaved woodland site larger than 2 ha with plant and mammal interest	815m
Little Blakemore Lane RIGS	A rare exposure of Woolhope Limestone in Gloucestershire. Observable dip of the beds, 50-60 deg ENE is almost opposite to the regional dip.	870m
Dick Whittington Farm Park Cutting RIGS	Coalbrookdale formation. Extremely good site for education and interpretation.	730m

Extended 5km Search for Statutory Nature Conservation Sites: SAC, SPA and Ramsar Sites

3.1.3 There are two SAC sites within 5km of the proposed development site, both of which form part of the Wye Valley & Forest of Dean Bat Sites (SAC). These are located approximately 3.3km west, and 3.4km south-west of the proposed development Site. The Wye Valley & Forest of Dean Bat Sites (SAC) are a complex of sites on the border between England and Wales which contains the greatest number of lesser horseshoe bats *Rhinolophus hipposideros* in the UK and supports greater horseshoe *R. ferrumequinum* maternity and hibernation roosts.

3.1.4 There are no Ramsar sites or SPA sites within 5km of the Site.

Biological Records

3.1.5 The biological data search yielded records of several protected species within 1km of the Site and several records of bats within 2km of the Site. None of the records occur within the Site boundary and the data are summarised in Table 3.

3.2 UKHabs & Protected Species Survey

3.2.1 The results of the UKHabs & Protected Species Survey assessment are outlined in the Table 2 and Table 3. Reference should be made to the Site Maps presented in Figures 1, 2 & 3, and photographs in Appendix 2.



Figure 2. UKHabs map of the Site

Table 2. UKHabs Survey Results & Recommendations

Habitat/Feature	Description	NERC ¹ habitat (Y/N)	Evaluation and potential impact	Recommendations Avoidance / mitigation / enhancement measures
h2a Hedgerow (priority habitat)	A single native intact species poor hedgerow, approximately 1.4m in height and 1.2m in width is present along the southwestern boundary. The hedgerow is actively managed. Species includes: hawthorn <i>Crataegus monogyna</i> , bramble <i>Rubus fruticosus</i> agg., and ivy <i>Hedera helix</i> . The hedgerow was assessed as being of moderate condition, failing four attributes out of eight.	Y	Species poor hedgerow of moderate ecological value.	The hedgerow is proposed to be retained due to being a shared boundary feature, however minor temporary impacts may occur during the construction period if machinery or building materials are stored near the hedgerow. Therefore, a suitable buffer should be installed between the hedgerow and working area. Hedgerow could be enhanced with planting of native species shrubs/trees to be outlined in Ecological Management Plan.
g4 Modified Grassland 920	The area to the northwest of the Site consists of modified grassland of poor condition, failing 3 out of 7 attributes including essential criterion A. The grassland is actively managed to a very short and unformed sward (<6cm). Species include perennial rye grass <i>Lolium perenne</i> , cock's foot <i>Dactylis glomerata</i> , ribwort plantain <i>Plantago lanceolata</i> , red fescue <i>Festuca rubra</i> , daisy <i>Bellis perennis</i> , clover <i>Trifolium</i> sp., common dandelion <i>Taraxacum officinale</i> agg., and germander speedwell <i>Veronica chamaedrys</i> . Fruit trees (<i>Prunes</i> spp.) are also present within this area and were likely to be remnant of a former orchard. The orchard is assessed as moderate condition, failing 4 out of 8 attributes including essential criterion A & B. Due to the active management of the grassland and fruit trees within an ornamental garden, the orchard	Y	Moderate ecological value.	Current plans indicate retention where possible of the modified grassland and orchard trees. It is recommended that no construction related activities including material storage take place within this area. Temporary fencing could be erected around the trees with clear signage attached to ensure no construction related activities take place within this area. The orchard would benefit from management to improve its ecological value, which should be detailed in the Ecological management plan for the Site.

¹ Habitats of 'Principal Importance' under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

Habitat/Feature	Description	NERC ¹ habitat (Y/N)	Evaluation and potential impact	Recommendations Avoidance / mitigation / enhancement measures
	habitat represents a poor example of a priority habitat 'traditional orchard' due to the lack of surrounding habitat features and structure,.			
U1d Suburban/mosaic of developed/ natural surface	The majority of the Site comprised a small mosaic of managed habitats (<25m ²) including modified grassland, introduced garden shrubs, and paving stones, a small raised ornamental pond (see Target Note on Figure 2 for pond location) was also present.	N	Low ecological value.	None.
U1e Built linear features 67	A mortared wall bounded the north, east and south Site boundaries.	N	Negligible ecological value.	None.

Table 3. Protected Species Survey Results & Recommendations

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
BADGERS	The site contained grassland, fruit trees and garden shrubs which could provide suitable foraging habitat for badgers, and it is likely badgers could pass through the Site although access is limited due to the presence of the garden wall. There was limited opportunity for sett excavation due to the lack of earth banks.	No evidence of badgers was recorded on Site including setts, snuffle holes and latrines.	There were no records of badgers within 1km of the Site.	Likely to be present within the wider landscape, could commute through Site.	None.	Badgers are offered full protection under the PBA 1992. No further surveys are required. Should any trenches or pits need to be excavated, these should be fitted with a ramp to enable any animals to escape.
BATS	There were no buildings on Site, and there were no trees on Site identified with potential roosting features for bats. The fruit trees, shrubs and native hedgerow could provide suitable foraging habitat for bats. The Site was connected to off-site commuting and foraging habitat including	None.	There were 57 records of bats within 2km of the Site. The closest record to the Site was a greater horseshoe approximately 100m north of the Site. The closest roost record was a lesser horseshoe roost	Light tolerant and light sensitive species are likely to pass across the Site although foraging would be limited due to the small size of the Site.	Moderate impact to commuting/foraging bats if unsuitable artificial lighting is installed. Impacts can be mitigated by incorporating a sensitive lighting strategy.	Bats and their resting places are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. Further surveys may be required by Forest of Dean District Council (FoDDC). Due to the potential loss of limited commuting/foraging habitat for bats, bat activity

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
	<p>hedgerows, small pockets of woodland and a brook which provided optimal foraging habitat for bats. The Site was also located on the edge of Longhope village where an element of external artificial lighting is likely from the existing residential houses. Therefore, both light-tolerant and light sensitive species may forage and commute across the site.</p>		<p>approximately 550m south-east of the Site.</p> <p>Other species records included noctule <i>Nyctalus noctula</i>, common pipistrelle <i>Pipistrellus pipistrellus</i>, soprano pipistrelle <i>P. pygmaeus</i>, brown long-eared bat <i>Plecotus auritus</i> and <i>Myotis</i> species.</p> <p>There is a single granted EPS licence application approximately 1km south-west of the site for the impact and damage on a breeding and resting place of Brown long-eared, common</p>			<p>surveys may be required to assess site usage by commuting/foraging bats. As two Wye Valley & Forest of Dean Bat Sites (SAC) lie within 5km of the Site, it is considered possible that the FoDDC may require bat activity surveys to be undertaken for a Site within 'A Sensitive Location (for bats)' as outlined in their Interim Guidance (Forest of Dean District Council, 2021). However, as the Site itself offers limited suitable foraging habitats for bats, and due to the limited nature of the proposed works, a pragmatic approach to activity surveys should be sought, for example, a minimum of Three activity transect survey over the summer, and deployment of one static detector for five nights on each survey to determine usage of the site</p>

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
			pipistrelle, lesser horseshoe, soprano pipistrelle and whiskered bat.			by horseshoe bats. However, this reduced survey effort would need agreement from FoDDC. Lighting recommendations to minimise impact on bats are provided in the discussion below.
BIRDS	The trees, garden shrubs and native hedgerows could provide suitable nesting and foraging habitat for common and widespread bird species.	The following species of bird were observed in the trees, and boundary habitats during the survey: blue tit <i>Cyanistes caeruleus</i> , great tit <i>Parus major</i> , robin <i>Erithacus rubecula</i> , woodpigeon <i>Columba palumbus</i> , magpie <i>Pica pica</i> and house sparrow <i>Passer domesticus</i> .	Biological records yielded 124 results of 37 bird species within 1km of the Site. Species records close to the Site included song thrush <i>Turdus philomelos</i> , starling <i>Sturnus vulgaris</i> and house sparrow.	Opportunities for birds to nest and forage are present within the habitats on Site.	High impact unless hedgerow, shrub and tree removal are undertaken outside bird nesting season.	All birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). It is therefore generally unlawful to intentionally kill or injure a bird, damage or destroy an occupied nest or take or destroy eggs other than in exceptional prescribed circumstances. No further surveys are required. Therefore, development operations should take care to avoid the risk of harm to

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
						birds and their nests, especially during the nesting season (generally considered to be March to August). Removal of hedgerows, trees and shrub should be undertaken outside the main nesting season and where this is not possible a suitably qualified ecologist should be engaged to check for nesting birds and to provide advice on the most appropriate way to proceed.
DORMICE	The managed hedgerow within the site is suboptimal to support dormouse and the other habitats within the Site boundary (grassland, scattered trees and shrubs) were very unlikely to support dormice.	None.	There were 15 records of dormice within 1km of the Site (exact locations were not provided). 13 of the records related to Hobbs Quarry SSSI or Coleman's Wood LWS, both more than 450m north-east of the Site. The closest	Likely absent.	None.	Dormice and their resting places are protected under the WCA 1981 and the CHS Regs 2017. No further surveys are required. It is our understanding that the native species poor hedgerow is being retained and other habitats which are likely to be impacted by the development are unsuitable

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
			<p>record was located approximately 350m south-east of the Site. No ESP licence records within 1km for dormouse was returned.</p>			<p>for dormouse. Although there are several dormouse records within 1km of the Site, the Site is separated from the closest dormice record by the presence of the A4136 road which is a major barrier for dispersal for dormice. The Site is poorly connected to Coleman's Wood or Hobbs Quarry, where dormice have been recorded. The roads, defunct hedgerows and large pasture fields which are present between the Site and the dormouse records reduce the likelihood of dormice being present in the hedgerow on Site. Should plans change and any hedgerow or orchard require removal then an ecologist should be consulted to advise on the appropriate course of action.</p>

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
GREAT CRESTED NEWTS (GCN)/ OTHER AMPHIBIANS	There is a small, raised stone ornamental pond (P1) within the Site boundary (see Target Note, Figure 2). P1 is approximately 80cm in height, and 1.2m wide, with overhanging edges. HSI assessment of P1 returned a value of 0.23 which results in an index rating of 'poor' suitability to support breeding GCN. It is considered very unlikely that great crested newts or other species of amphibian would be able to climb into the pond. The short sward of the modified grassland shrubs within the managed garden provided suboptimal terrestrial habitat for GCN. The hedgerow along the western boundary could provide suitable terrestrial habitat however it is not	None.	There were no great crested newt records within 1km of the Site. The only amphibian record within 1km of the Site was a common frog <i>Rana temporaria</i> located at the outer limit of the 1km search radius. There were no GCN granted EPS licence applications, no GCN Class Survey Licence Returns or GCN eDNA HSI Pond Surveys results returned within 1km of the site (MAGIC, 2023).	Likely absent.	It is considered that the development will have no impact on GCN, small areas of urban habitats such as modified grassland and shrubs will be removed to facilitate the development and used to store construction materials.	No further surveys required. GCN and their resting/breeding places are protected under the WCA 1981 and CHS Regs 2017. It is considered unlikely that GCN would be present on the Site, due to the lack of suitable habitat on Site and lack of suitable connecting habitat, and lack of GCN records on/nearby. While GCN can be present up to 500m from their breeding ponds, radiotracking studies of GCN have shown that the majority of newts stay within the core habitat of 65m (Jehle 2000) and are therefore more likely to remain around their breeding ponds. As a precautionary measure, all material must be stored on pallets or otherwise separated from the ground

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
	<p>connected to waterbodies or suitable terrestrial habitats within the wider landscape.</p> <p>Seven waterbodies were identified within 500m of the Site (MAGIC, 2023). Water bodies P2-P8 (see Figure 3 for locations) and are separated from the Site by Old Monmouth Road leading to Church Road (which is the main road that connects the A4136 in the south to the A40 to the north) and the stone walls which run along the majority of the road. In combination these are considered a barrier to dispersal.</p> <p>.</p>					<p>in order to eliminate any potential refuge for reptiles/great crested newts. Aggregates must also be delivered in bags and stored in this way. It is also recommended that that site is continued to be managed in the same way to discourage suitable habitat from forming on site.</p>
OTTERS, WATER VOLES	There are no waterbodies on the Site to provide habitat for these species.	None.	There was one otter record, approximately	None.	No impact.	No surveys required. Otters, white-clawed crayfish and water voles plus water vole resting places are protected

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
			575m to the south-west of the Site. There were no water vole or white-clawed crayfish records.			under the WCA 1981, and otters and their resting places are protected under the CHS Regs 2017. No further surveys required.
REPTILES	The Site is small and contained heavily managed grassland and managed garden shrubs which is suboptimal to support a population of reptiles.	None.	There was one slowworm record within 1km of the Site, approximately 550m north-east of the Site. No other reptile records occurred within 1km of the Site.	Likely absent within the site.	None.	Reptiles are protected under the Wildlife & Countryside Act 1981 (as amended). No further survey required. Due to the lack of suitable habitat for reptiles within the development site boundary and owing to the small-scale and limited nature of proposed works, it is considered highly unlikely reptiles would be impacted by proposed works. As a precaution, a short grassland sward should be maintained to continue to prevent the habitats from becoming suitable. Furthermore, construction materials

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
						should be stored on pallets off the ground.
HEDGEHOGS/ AND OTHER MAMMALS	The Site contained a hedgerow, garden shrubs and grassland which could provide foraging opportunities for hedgehogs. The site lacked sheltering opportunities.	None.	There were eight records of hedgehogs <i>Erinaceus europaeus</i> within 1km of the Site, the closest being approximately 100m to the north.	Moderate likelihood of hedgehogs passing through the Site.	High impact for any hedgehogs that may be present, if discovered during the construction phase.	Hedgehogs are listed as a Species of Principle Importance under the NERC Act 2006. The majority of shrubs and trees are being retained. Those identified for removal should where possible be removed outside of the winter hibernation season and undertaken carefully following a check for hedgehogs. Should any hedgehogs be found, these should be moved to the base of retained hedgerow. Construction of leaf and log piles will provide additional shelter. Any fencing can be made more permeable to wildlife, such as hedgehogs,

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Potential impact	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
						through leaving small gaps of 13x13cm under fences.

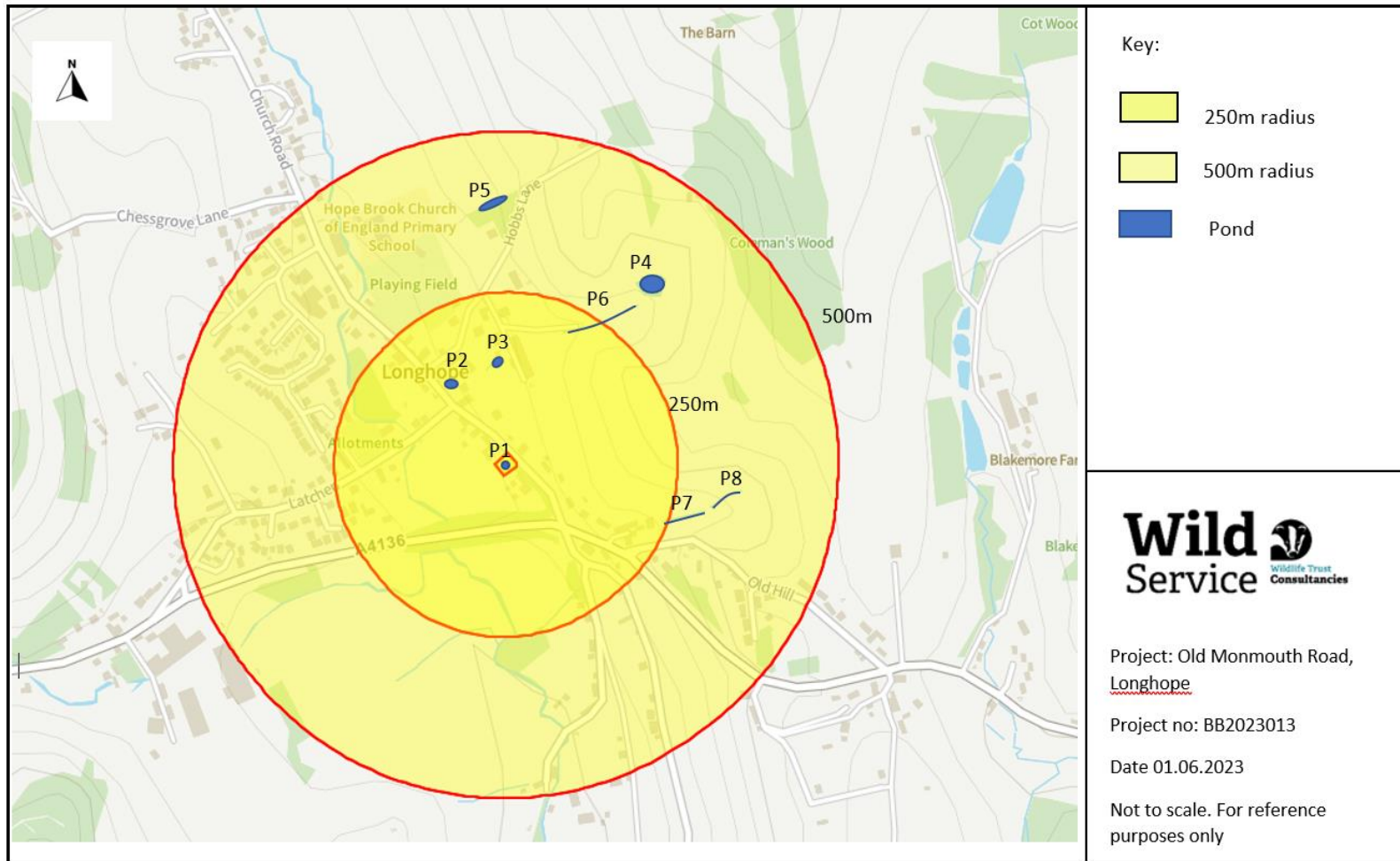


Figure 3: Pond Location Plan

4 Discussion

4.1 Nature Conservation Sites

4.1.1 There are seven Local Wildlife Sites located within 1km of the proposed development site, the closest being approximately 450m distant from the Site. Due to the nature and small scale of the proposed development (single dwelling within existing residential curtilage, surrounded by existing dwellings) no effect on the ecological value of nature conservation sites is anticipated. However, the Site is located within 5km of two Wye Valley & Forest of Dean Bat SAC sites (located approximately 3.3km west, and 3.4km south-west of the proposed development Site), which are designated for their importance to lesser and greater horseshoe bats. Consideration of the potential impacts of the proposed development on bats associated with the SAC sites is provided in the Bats section below.

4.2 Habitats

4.2.1 The habitats that need consideration in relation to this development are mentioned below with some enhancement measures to inform the landscape plans that are in the process of being finalised. However, a detailed Ecological Management Plan is outside the scope of this report. The landscape plans will need to allow for positive biodiversity net gain, which will be assessed through use of the current version of the DEFRA BNG metric.

Hedgerows

4.2.2 Hedgerows are a Priority Habitat under the NERC Act 2006. It is our understanding that the hedgerow on Site is due to be retained due to being a shared boundary feature. In the event that the hedgerow is to be removed or large sections removed, it will be necessary to undertake a Hedgerow Regulations survey to determine if the hedgerow is classed as 'important' under the Wildlife and landscape element of the Hedgerow Regulations 1997. Retention, protection and enhancement of the hedgerow is recommended. This could be done through additional planting of native species to increase diversity of the hedgerow and relaxing the management of the hedgerow and associated ground flora.

Orchard

4.2.3 Traditional Orchards are a Priority Habitat under the NERC Act 2006. Although the orchard on Site is unlikely to meet the criteria of a traditional orchard, the existing trees are of ecological value in their own right. It is our understanding that the trees are being retained where possible. Should the trees be removed compensatory planting of fruiting trees of local provenance should be included within the proposals of the Site. It is recommended that no construction related activities including material storage take place within this area. Temporary fencing could be erected around the trees with clear signage attached to ensure no construction related activities take place within this area. By introducing a relaxed management of the grassland, mowing less frequently and allowing tall swards of grassland to grow between and around the fruit trees this would enhance the ecological value of the orchard overall.

4.2.4 The ecological value of the Site can be enhanced through planting native species and/or those of value to wildlife, i.e. producing fruits, seeds, nuts or single-flowering varieties. Leaving patches of unmown grass and tall herb as well as creating compost heaps/log piles creates valuable wildlife habitat, particularly for invertebrates, reptiles, amphibians and small mammals including hedgehogs². In more residential areas, gardens can be made more permeable to wildlife, such as hedgehogs, through leaving small gaps of 13x13cm under fences. Ideally only pesticides branded as 'wildlife friendly' should be used. Wildlife planting tips and advice can be found here: <https://www.gloucestershirewildlifetrust.co.uk/wildlife/wildlife-gardening>. Further information is provided in the Ecological Enhancements Appendix below.

4.3 Protected Species

4.3.1 The protected species and their mitigation that need consideration in relation to this development are mentioned below.

² The State of Britain's Hedgehogs 2015, publicised at a special UK summit on hedgehogs: since 2000, records of the species have declined by half in rural areas and by a third in urban ones. Hedgehogs are also a species of 'Principal Importance' under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and therefore need to be taken into consideration by a public body when performing any of its functions with a view to conservation

4.4 Badgers

- 4.4.1 Badgers are offered full protection under the the PBA 1992. Although no direct evidence of badger presence was found on Site, badgers are highly mobile species and could forage and commute across the site.
- 4.4.2 Should any “D” shaped holes appear at any time, advice form an ecologist should be sought immediately.
- 4.4.3 Should any trenches or pits need to be excavated during the development, these should either be covered or fitted with a ramp to enable any animals to escape.

4.5 Bats

- 4.5.1 Bats and their resting places are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017.
- 4.5.2 There were no buildings on Site and there were no trees on Site that supported potential roosting features for bats. The hedgerow, shrubs and fruit trees could provide some foraging and commuting opportunities for both light tolerant and light sensitive species of bats.
- 4.5.3 It is our understanding that the hedgerow and fruit trees will be retained. However, the Site is locted within the Zone of influence for the Forest of Dean (FoD) Bat Special Conservation Area (SAC).
- 4.5.4 The Site is located within a 1km lesser horseshoe bat maternity buffer and within a 3km of a horseshoe hibernation buffer site. In line with the guidelines the site falls within impact zone ‘A’ due to the presence of a hedgerow within the site. It is considered likely that the Forest of Dean District Council planning authority will expect bat activity surveys to be undertaken in line with Wye Valley and Forest of Dean Bat Special Area of Conservation (SAC) guidelines for sites recognised as being highly sensitive for lesser horseshoe bat (i.e. in Zone A; <https://fdean.gov.uk/media/q1jinfo54/wv-fod-bat-sac-development-management-survey-and-assessment-guidance-vr-july-2021.pdf>). The FoD guidelines are as follows:
- During the bat ‘active’ season (April – October inclusive), a minimum of 35 days surveying is required. Surveying should be spread throughout the

spring/summer/autumn to gain an understanding of how bats use a site throughout the season. A minimum of 10 days of surveying should take place during the spring (April-May), 15 days during the summer (June–August) and 10 days during the autumn (September-October).

- Recent research in the Forest of Dean has shown that bats are frequently active during the winter (November–March inclusive). Winter surveys are therefore generally required in Band A unless otherwise robustly justified with evidence. Automated detectors should be deployed in similar locations as above between November and March for 5 consecutive days in at least 3 of the 5 winter months (3 months x 5 days = 15 days total). Alternatively, detectors could be deployed for 10 days within two of the winter months (2 months x 10 days = 20 days total).

4.5.5 Due to the limited nature of the proposed works and retention of the hedgerow a pragmatic approach to activity surveys is suggested, with a minimum of three activity transect surveys and deployment of one static detector for five nights on each survey visit during the active season for bats to obtain an idea of bat usage of the Site. However, this reduced survey effort would need agreement from the FoDDC Council to ensure that they accept the bat survey report for planning purposes.

4.5.6 It is recommended that any proposed lighting should be designed sensitively to minimise light spill and potential impacts on bats in accordance with best practice. The following recommendations are based on Bats and Lighting in the UK (Stone, 2013):

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin or >550nm) should be adopted to reduce blue light component, as redder light is preferable for bats.
- <0.2 lux on horizontal plane good, hedgerow lighting tends to be <1 lux.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Blue/white light should be avoided, or if mercury lamps are installed, these should be fitted with UV filters.

- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it below horizontal plane.
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered.
- Column heights should be carefully considered to minimise light spill.
- Reducing the height of light units to keep the light as close to the ground as possible and reduce the volume of illuminated space.
- Only luminaires with an upward light ratio of 0% should be used.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt. Ideally the angle of the luminaire should be less than 70 degrees to avoid upward light spill.
- Any external security lighting should be set on people-activated motion-sensors and short (1min) timers.

4.5.7 It is recommended to include new hedgerow/ shrub planting with wildlife value to create new foraging/commuting links to the wider landscape. Examples of enhancement opportunities for bats are outlined in Appendix 4.

4.5.8 Roosting opportunities for local bats can be incorporated into the new building through the installation of bat boxes under the eaves either on the exterior walls (e.g. Schwegler 1WQ/1FF bat box) or integrated into the new walls (e.g. Habibat 001 bat box) and the creation of raised ridge tiles. Bat boxes should ideally be installed at a minimum height of 3.5m – 4m, facing away from external illumination and should ideally face in a south-east or south-west orientation. Examples are provided in the Ecological Enhancements Appendix below.

4.6 Birds

4.6.1 All birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). It is therefore generally unlawful to intentionally kill or injure a bird, damage or destroy an occupied nest or take or destroy eggs other than in exceptional prescribed circumstances. Therefore, development operations should take care to avoid the risk of harm to birds and their nests, especially during the nesting season (generally

considered to be March to August). Removal of trees, hedgerow, and shrub and/or any tree surgery (if required) should be undertaken outside the main nesting season and where this is not possible a suitably qualified ecologist should be engaged to check for nesting birds and to provide advice on the most appropriate way to proceed.

4.6.2 Nesting opportunities for house sparrows and swifts *Apus apus* can be provided in the form of swift bricks (that are fitted into the walls and are readily used by these and other species of small bird) or where it is not possible to fit into the wall, swift boxes can be fitted externally. Swift boxes should ideally be installed at a height of 4-5m to ensure usage. House martins *Delichon urbicum* can be provided with nesting provision in the form of house martin cups, which can be fitted on the exterior walls of a building. Barns, carports and open fronted porches or large overhanging eaves are suitable locations for swallow cups to provide nesting features for swallows *Hirundo rustica*. All these species have undergone a decline in recent years. These nesting features should be installed under the eaves of a building at minimum heights of 2-2.5m and face in a north to south-east direction. In addition, hole-fronted and open-fronted bird boxes can be installed on medium-large trees at similar heights and directions to attract other species of birds. Examples are provided in the Ecological Enhancements Appendix below.

4.7 Great Crested Newts

4.7.1 GCN and their resting/breeding places are protected under the WCA 1981 and CHS Regs 2017.

4.7.2 There are no records of great crested newt (GCN) within 1km of the Site and the site also lacks suitable terrestrial and aquatic habitat to support GCN. The Site is also isolated from ponds within 500m of the site by the presence of roads and mortared walls providing barriers to dispersal. It is therefore considered unlikely that GCN will be present.

4.7.3 As a precautionary measure, all material should be stored on pallets or otherwise separated from the ground in order to eliminate any potential refuge for other amphibians, or reptiles. Aggregates should also be delivered in bags and stored in this way.

4.8 Reptiles

- 4.8.1 Reptiles are protected under the Wildlife & Countryside Act 1981 (as amended).
- 4.8.2 The habitats onsite are not suitable to support reptiles. The site is heavily managed and the grassland mown to a short sward. Therefore, reptiles are likely absent onsite. As a precaution the grassland and garden management should continue to prevent the habitats from becoming suitable. Furthermore, construction materials should be stored on pallets off the ground.

4.9 Hedgehogs

- 4.9.1 Hedgehogs are listed as a Priority Species under the NERC Act 2006. The hedgerow, shrubs and grassland could provide foraging opportunities for hedgehogs. Although connectivity is limited and the majority of shrubs and grassland are being retained, hedgehogs are highly mobile and may commute/forage across the Site and site workforce should remain alert to the potential for hedgehog to be present. Furthermore shrubs identified for removal should where possible be removed outside of the hibernation season and undertaken carefully following a check for hedgehogs. Should any hedgehogs be found, these should be moved to the base of retained hedgerow. Should any trenches or pits need to be excavated during development, these should either be covered or fitted with a ramp at night to enable any animals to escape.
- 4.9.2 Construction of leaf and log piles will provide additional shelter. Any fencing can be made more permeable to wildlife, such as hedgehogs, through leaving small gaps of 13x13cm under fences. Further details can be provided in a Construction Ecological Management Plan.

4.10 General Protected Species

- 4.10.1 There appear to be no other obvious and immediate issues for this development with regard to any other species protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 and no further dedicated surveys for any other species are recommended. However, in the unlikely event that any protected species listed in Section 2 are found on the site during

the works then all works must cease immediately and the advice of a suitably qualified ecologist must be sought.

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Appendix 1: Policy and Legal Considerations

Statutory nature conservation sites and protected species are a ‘material consideration’ in the UK planning process (DCLG, March 2012). Where planning permission is not required, for example on proposals for external repair to structures, consideration of protected species remains necessary given their protection under UK law.

The **Conservation of Habitats and Species Regulations 2017** transpose the requirements of European Directives such as the Habitats Directive and Birds Directive³ into UK law, enabling the designation of protected sites and species at a European level.

The **Wildlife and Countryside Act 1981** (as amended) forms the key piece of UK legislation relating to the protection of habitats and species. The **Countryside and Rights of Way Act 2000** provides additional support to the 1981 Act, for example, increasing the protection of certain reptile species. Specific protection for badger is provided by the **Protection of Badger Act 1992**. The **Wild Mammals (Protection) Act 1996** sets out the welfare framework with respect to wild mammals prohibiting a range of activities which may cause unnecessary suffering.

The Government has a duty to ensure that parties take reasonable practicable steps to further the conservation of habitats and species of Principal Importance for Conservation in England listed under Section 41 of the **Natural Environment and Rural Communities Bill 2006**⁴. In addition, the 2006 Act places a Biodiversity Duty on public authorities who ‘must, in exercising [their] functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity’ (Section 40 (1)). Criteria for selection of priority habitats and species include, for example, international threat (such that species may be protected in their strong holds) and marked national decline.

The **National Planning Policy Framework 2021**⁵ states that the planning system should minimise impacts on biodiversity, providing net gains in biodiversity, wherever possible. Section 15 states that when determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons⁶ and a suitable compensation strategy exists; and
- d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

³Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, and Council Directive 79/409/EEC on the Conservation of Wild Birds, respectively.

⁴The **NERC Act** refers to “*species of principle importance for the conservation of biodiversity*”, which translates to BAP habitats and species occurring in England.

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

⁶ For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.

Appendix 2: Photographs

No	Photo	Description
1		View of modified grassland and orchard trees.
2		Urban garden with modified grassland, ornamental shrubs, and ornamental pond.
3		Managed native hedgerow.

No	Photo	Description
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4



Ornamental pond (P1).

5



Modified grassland, mortared wall and boundary introduced shrubs.

Appendix 3: Habitat Suitability Assessment GCN

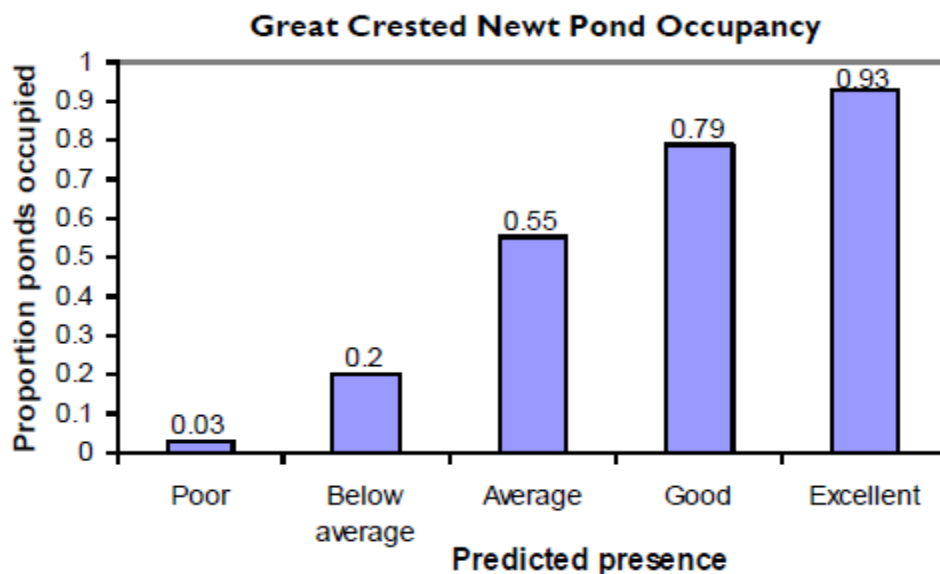
In order to evaluate the habitat suitability (HSI) for great crested newts a series of factors must be considered as described below. A description of each factor considered in the HSI is provided below and the value ascribed to each factor is provided in the table below the description. The overall **Habitat Suitability Index** for the site is calculated as the mean of the suitability indices.

HABITAT SUITABILITY ASSESSMENT GCN – DESCRIPTION OF FACTORS FOR ASSESSMENT	
HS1 - Geographic Location	Based on known distribution of great crested newts, Gloucestershire is located within Zone A and has a high probability of the presence of great crested newts within each 10km square.
HS2 - Pond Area	Pond area is a determinant of the magnitude of biological productivity of the pond ecosystem upon which the newt population depends. Ponds between 500 and 750m ² provide the optimal size but small ponds under 50m ² are given a nominal value.
HS3 - Pond Permanence	Pond permanence is essential to permit the completion of metamorphosis in any given year. However, intermittent (every few years) drying out may be beneficial in excluding fish populations. The optimum drying out frequency is assumed to be one in every three to four years.
HS4 - Water Quality	Although the adult great crested newt is relatively tolerant of eutrophic conditions, the larvae are more vulnerable and require reasonably well aerated water with a number of aquatic invertebrates.
HS5 - Pond Shading	Shade counteracts the growth of macrophytes and the benefits they provide. Additionally, heavy tree cover increases the organic content through leaf fall potentially causing eutrophication. Great crested newts tend to favour ponds with a shade cover of between 0% and 60%.
HS6 - Waterfowl	Common waterfowl in naturally occurring numbers have little effect on great crested newt populations, however if at high artificial numbers due to supplementary feeding they can seriously damage the habitat.
HS7 - Fish	The effect of fish on newt populations varies across species and ponds. However, in general the presence of fish species is detrimental to newt populations. In particular the stickleback has a very serious impact, through predation and competition.
HS8 - Pond density	A network of suitable ponds within a landscape increase the chances of great crested newts in an area, through the metapopulation processes of recolonisations from surrounding ponds if any one population becomes extinct.
HS9 - Proportion of 'Newt Friendly' Habitat	The habitat occupied by crested newts is highly variable and we do not understand the species' detailed requirements at different phases of their life on land. However, scrub, unimproved grassland, woodland and gardens are regarded as newt friendly habitat, unlike improved pasture, arable and urban habitats. Additionally, features such as ditches and hedges enhance the habitat suitability of any site. Features such as roads and rivers form serious barriers dependent on width and flow of traffic and water. Such barriers cause issues with direct mortality but also through their impact on metapopulation dynamics.
HS10 - Macrophyte Content	Macrophytes are important for newts as they provide habitat for their prey organisms, provide cover from predators and a substrate for egg attachment.

Habitat Suitability Index Results for Pond 1 (P1).

Habitat Suitability Index	Factor	Value	Rating for Index
HS1	Geographic Location	1.00	<i>Excellent</i>
HS2	Pond Area	0.05	<i>Poor</i>
HS3	Drying out frequency	0.90	<i>Excellent</i>
HS4	Water Quality	0.01	<i>Poor</i>
HS5	Shade	0.01	<i>Poor</i>
HS6	Fowl	1.00	<i>Excellent</i>
HS7	Fish	1.00	<i>Excellent</i>
HS8	Pond Count	1.00	<i>Excellent</i>
HS9	Terrestrial habitat	0.33	<i>Poor</i>
HS10	Macrophytes	0.30	<i>Poor</i>
Overall HSI Value		0.23	Poor

The graph below is reproduced from the ARG-UK Advice Note 5 and shows the predicted presence of great crested newts in relation to the Habitat Suitability Index value.



Appendix 4: Condition Assessment Tables

	Hedge no.	1
	Hedge type	Native Hedge
A1	Height >1.5m	X
A2	Width >1.5m	X
B1	Are the Vertical Gaps ⁷ (i.e. base-canopy) only small? i.e. Are there gaps <0.5m for >90% of length	Y
B2	Are Hedge horizontal Gaps only small? i.e. gaps <10% total length, no gaps>5m	Y
C1	>1m undisturbed margin for >90% length	X
C2	Undesirable perennials dominate <20% of margins	Y
D1	>90% hedge & margins native	Y
D2	>90% free of damage	X
	CONDITION	Moderate
Additional group – hedgerows with trees only		
E1	Tree age – 1 mature tree per 30m	N/A
E2	Tree health > 95% of hedgerow trees in healthy condition	N/A
	CONDITION	N/A

⁷ Eg of vertical gap in hedge is where sheep graze through part of hedge to give thin bottom and bushy top, this would not meet good criteria for hedges if excessive gaps from base to top of hedge

Hedgerow Condition Assessment

The hedgerow condition assessment generates a weighting (score) ranging from 1-3, which is used within the biodiversity metric 3.1.

Condition categories for hedgerows without trees		
Category	Maximum number of attributes that can fail to meet 'favourable condition' criteria in Table TS1-2	Weighting (score)
Good	No more than 2 failures in total; AND No more than 1 in any functional group.	3
Moderate	No more than 4 failures in total; AND <u>Does not fail both attributes</u> in more than one functional group (e.g. fails attributes A1, A2, B1 & C2 = Moderate condition).	2
Poor	Fails a total of more than 4 attributes; OR <u>Fails both attributes</u> in more than one functional group (e.g. fails attributes A1, A2, B1 & B2 = Poor condition).	1
Score achieved:		
Condition categories for hedgerows with trees		
Category	Maximum number of attributes that can fail to meet 'favourable condition' criteria in Table TS1-2	Weighting (score)
Good	No more than 2 failures in total; AND No more than 1 failure in any functional group.	3
Moderate	No more than 5 failures in total; AND <u>Does not fail both attributes</u> in more than one functional group (e.g. fails attributes A1, A2, B1, C2 & E1 = Moderate condition).	2
Poor	Fails a total of more than 5 attributes; OR <u>Fails both attributes</u> in more than one functional group (e.g. fails attributes A1, A2, B1 & B2 = Poor condition).	1
Score achieved:		

Grassland Habitat - Low Distinctiveness

	Field No	1
A	6-8 species per m ²	X
B	Varied sward height (20% <7cm & 20% >7cm)	X
C	Some scattered scrub (<20% total grassland area)	Y
D	<5% physical damage	Y
E	Bare ground 1%-10% cover	X
F	Bracken <20%	Y
G	Invasive non-native absent	Y
	Condition	Moderate

Grassland Condition Assessment

Condition Assessment Result	Condition Assessment Score	Score Achieved x/✓	
Passes 6 or 7 of 7 criteria including passing essential criterion 1	Good (3)		
Passes 4 or 5 of 7 criteria including passing essential criterion 1	Moderate (2)	Y	
Passes 0, 1, 2 or 3 of 7 criteria; OR 4, 5 or 6 of criteria but failing criterion 1	Poor (1)		
Suggested enhancement interventions to improve condition score			
Notes			

Orchard Habitat

	Field No	1
A	Ancient or veteran trees*essential criterion	X
B	Deadwood present 20% mature trees have deadwood *essential criterion	X
C	Some scattered scrub (<5% trees and 10% ground cover)	Y
D	Signs of formative and restorative pruning	Y
E	95% trees free from damage	Y
F	Grassland not over grazed	X
G	Grassland species richness medium-high distinctiveness	X
H	Absent of invasive non native	Y
	Condition	Poor

Orchard Condition Assessment

Condition Assessment Result (out of 8 criteria)	Condition Assessment Score	Score Achieved x/✓
Passes 6- 8 criteria, including essential criteria A and B.	Good (3)	
Passes 4 or 5 criteria; OR Passes 6 or 7 criteria but fails an essential criterion.	Moderate (2)	
Passes 3 or fewer criteria.	Poor (1)	Y
Suggested enhancement interventions to improve condition score		
Footnotes		
<p>Footnote 1 - See gov.uk standing advice on ancient and veteran trees. Available from: Keepers of time: ancient and native woodland and trees policy in England (publishing.service.gov.uk) and: Ancient woodland, ancient trees and veteran trees: advice for making planning decisions - GOV.UK (www.gov.uk)</p>		

Footnote 2 – Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly, applying a buffer zone around the invasive non-native species with a size relative to its risk of spread into adjacent habitat, by applying professional judgement.

Footnote 3 – Wildlife and Countryside Act 1981 (as amended).

Footnote 4 - Species indicative of sub-optimal condition for this habitat type include: creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex obtusifolius* and common nettle *Urtica dioica*. There may be additional relevant species local to the region and or site.

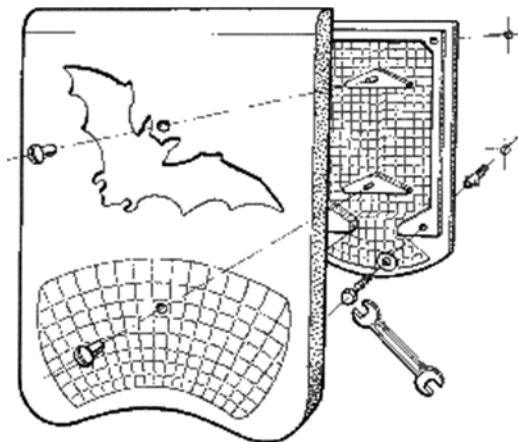
Appendix 5: Ecological Enhancements

BAT ROOSTING FEATURES

Schwegler 1FF Bat Box



Schwegler 1WQ Summer & Winter Bat Box



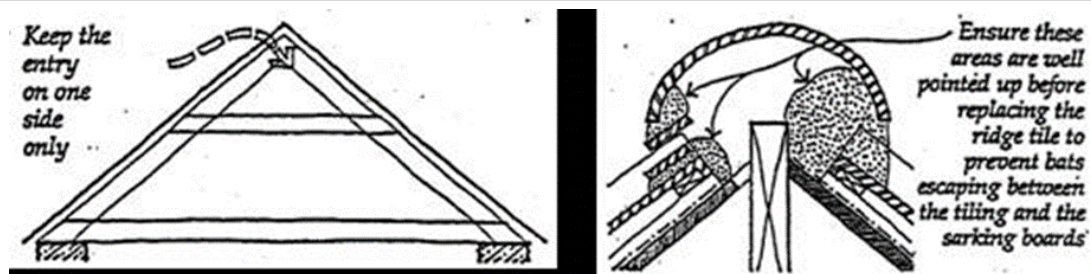
Habibat 001 Bat Box – integral bat box, fitted into wall



Schwegler 2FN Bat Box - for installation in trees



Diagrammatic view of ridge tile and cross section through ridge tile showing access point (taken from Scottish Natural Heritage 1996). Bitumastic lining must be used near/on the ridge beam to ensure bats can only have contact with this type of membrane to avoid any possible entanglement with a breathable membrane.



BIRD BOXES

Various designs of swift boxes



Swift Brick



Swallow Cup



Hole-fronted bird box (for trees)



Open-fronted bird box (for trees)



House Martin Terrace Box



HEDGEHOG NEST BOX



HEDGEHOG HOUSE

Make a deluxe hedgehog house



You will need

- 20mm FSC plywood boards cut to the sizes shown
- Hammer and nails
- 2 metal hinges
- Soil
- Dry leaves
- Straw or dry grass
- Newspapers
- Polythene sheeting

Birch is ideal

1 Construct the hedgehog house from the following diagram and dimensions.

2 Put the newspaper and straw or dry grass inside, cover the house with polythene sheeting, then pack soil and dead leaves around the outside.

Do not creosote or treat the wood

Make sure the entrance tunnel faces south, and is kept clear at all times

The roof is hinged so you can clean the box in future

raised up on feet

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INVERTEBRATES

<p>BEE BRICK</p>	
<p>SCHWEGLER INSECT NESTING AID</p>	

INVERTEBRATES

How to Make an insect hotel



the express way!

What you need:

- hollow plant stems, like bamboo canes
- twigs and sticks
- String

- 1 Collect handfuls of stems, twigs and sticks.
- 2 Tie the bundles quite tightly in two places.
- 3 Post into a hedge/bush or hang in a sheltered place.

the deluxe way!

What you need:

- Small logs or untreated timber
- hollow plant stems, like bamboo canes
- twigs and sticks

An adult to help with tools:

- wood saw
- nails and hammer or screwdriver and wood screws
- drill and 5mm wood bit

- 1 Make a wooden frame, fixing the wood with screws or nails.
- 2 Fill the frame with stems, twigs and sticks.
- 3 Fix a wire loop to the back of the frame and hang somewhere sheltered.

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How to build a bug hotel



You will need:

- Wooden pallets x4
- Bricks
- Plastic bottles*
- Bamboo canes
- Straw
- Leaves
- Tiles
- Cardboard
- Stones/pebbles
- Twigs/loose bark

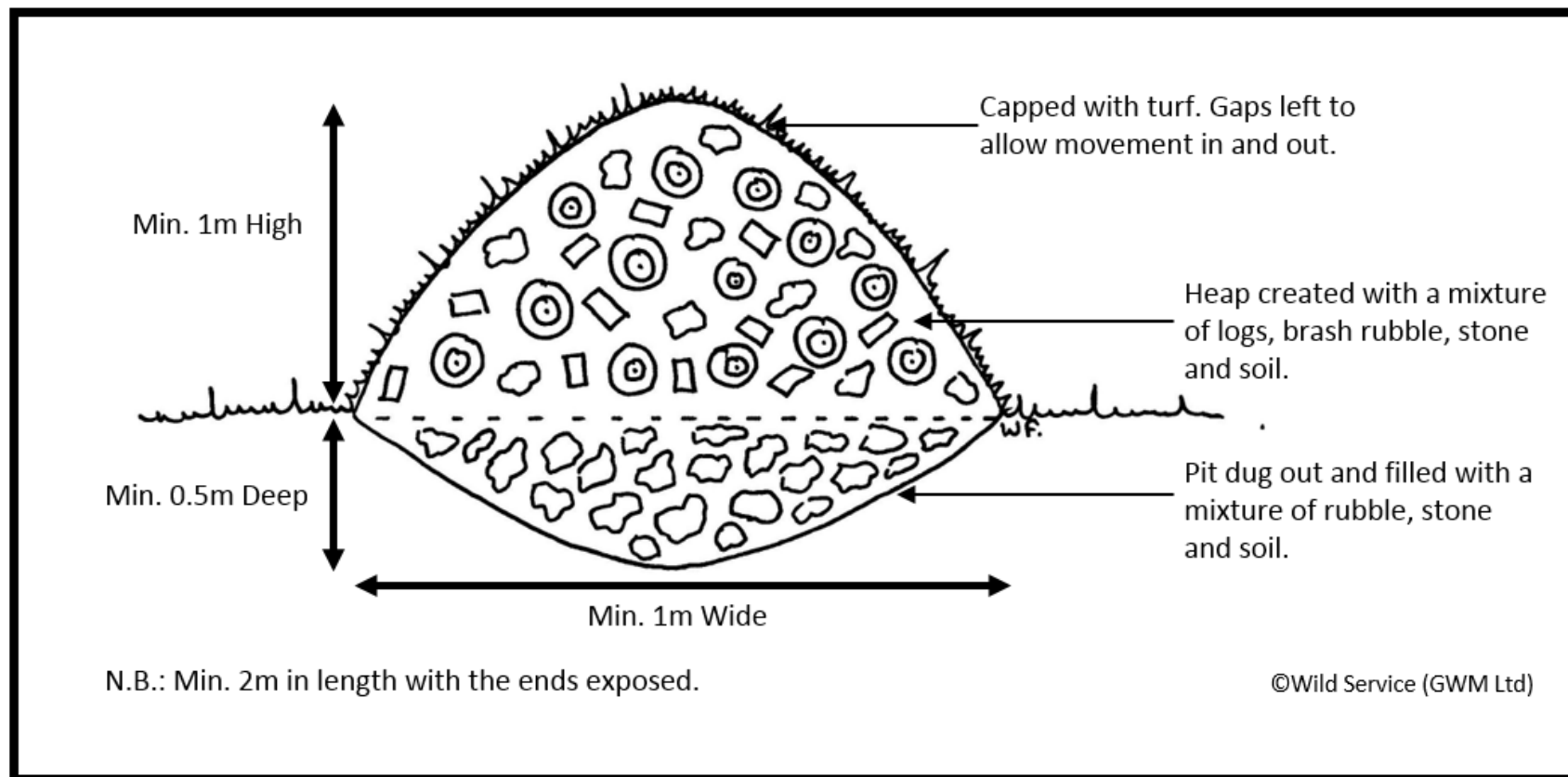
*Use old plastic bottles for this, and always recycle after use.

- 1 Place a wooden pallet in your chosen location. On top of the pallet, line bricks around the corners and across the middle.
- 2 Place your next pallet on top of this and repeat the process for all of your pallets.
- 3 Cut off the top two-thirds of your bottles. Fill up half of them with bamboo canes/plastic straws and the other half with rolled up cardboard. Place these inside the hotel.
- 4 Fill in the remaining spaces with bricks, leaves, pebbles, stones, tiles, loose bark and straw.
- 5 Add in any extra materials that you want to recycle e.g. old pipes, carpeting, toilet tubes, old plant pots. Be creative - add a welcome sign or give your hotel a name!

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AMPHIBIAN/REPTILE HIBERNACULUM





Many wildlife species benefit greatly from considerate planting choices that still meet our practical and aesthetic needs. Plants and trees provide food for wildlife as well as places to nest and rest. Vegetation providing a variety of these functions creates an environment more beneficial for wildlife.

Non native species

Native species provide the best habitat for UK wildlife but there are also many non-native species, which are single flowering and/or provide fruits/nuts/seeds that can be used as food sources for insects, birds and small mammals. When using these non-native species in planting schemes, care should be taken to avoid invasive species such as Cotoneaster and Rhododendron. This is especially important when sites are adjacent to open countryside particularly nature reserves.



Butterfly bush

Uses of Wildlife Planting

Wildlife value can be easily incorporated into visually pleasing and useful green areas and amenity spaces, such as borders, grass verges and tree screens.

Attractive Borders: Well selected decorative borders can be valuable for many insects and birds. Native plants can be mixed with single flowering ornamental species to add aesthetic interest and increase the flowering period of a planting scheme.

Shrubs and hedges: Native spiky species like blackthorn and hawthorn are effective barriers when used in hedges. They also provide an attractive feature at all times of year especially when in blossom and fruit. Bushy areas of foliage provide useful nesting and feeding areas for birds and small mammals, as well as foraging/commuting corridors for bats.

Grasses mixes and verges: Leaving uncut areas of suitable grasses provides great wildlife value and is economical to manage. Diverse grassy areas and verges also create an attractive human environment with different flowers and colours. There are a range of native grass and flower mixes for various soil types available on the market.



Wild flower grass mix



Selecting Suitable Species

There are wildlife friendly species suitable for all situations, from fields, verges, shady corners or small gardens. Listed below are native wildlife friendly plant species organised by type and suitability for different locations.

Large Trees

Ash *Fraxinus excelsior*
Beech *Fagus sylvatica*
English Elm *Ulmus procera*
Oak *Quercus robur* or *Q. petraea*
Small-leaved lime *Tilia cordata*
White willow *Salix alba*
Wild cherry *Prunus avium*



White willow

Medium/small trees

Alder *Alnus glutinosa*
Aspen *Populus tremula*
Crab apple *Malus sylvestris*
Field maple *Acer campestre*
Holly *Ilex aquifolium*
Rowan *Sorbus aucuparia*
Silver birch *Betula pendula*
Yew *Taxus baccata*



Tussocky grassland

Native shrubs

Blackthorn *Prunus spinosa*
Dogwood *Cornus sanguinea*
Elder *Sambucus nigra*
Guelder rose *Viburnum opulus*
Hawthorn *Crataegus monogyna*
Hazel *Corylus avellana*



Blackthorn

Plants for shady areas

Archangel *Lamiaeum galeobdolon*
Betony *Stachys officinalis*
Bluebell *Hyacinthoides non-scriptus*
Bugle *Ajuga reptans*
Foxglove *Digitalis purpurea*
Ground ivy *Glechoma hederacea*
Lily of the valley *Convallaria majalis*
Lords-and ladies/cuckoopint *Arum maculatum*
Nettle-leaved bellflower *Campanula trachelium*
Primrose *Primula vulgaris*
Sweet violet *Viola odorata*
Wild daffodil *Narcissus pseudo-narcissus*

Plants for marshy areas & pond edges

Bugle *Ajuga reptans*
Hemp agrimony *Eupatorium cannabinum*
Marsh marigold *Caltha palustris*
Marsh woundwort *Stachys palustris*
Meadowsweet *Filipendula ulmaria*
Purple loosestrife *Lythrum salicaria*
Ragged robin *Lychnis flos-cuculi*
Water avens *Geum rivale*
Water forget-me-not *Myosotis scorpioides*
Water mint *Mentha aquatica*
Water violet *Hottonia palustris*
Yellow flag *Iris pseudacorus*

**Beneficial cultivated plants
(generally non-natives)**

Grecian windflower *Anemone blanda*
Angelica *Angelica archangelica*
Aubretia *Aubretia deltoidea*
California poppy *Eschscholtzia californica*
Candytuft *Iberis sempervirens*
Christmas rose *Helleborus niger*
Cosmos *Cosmos bipinnatus*
Evening primrose *Oenothera biennis*
Fleabane *Erigeron spp.*
Forget-me-not *Myosotis spp.*
French marigold *Tagetes patula*
Globe thistle *Echinops ritro*
Grape hyacinth *Muscari botryodes*
Hollyhock *Althaea rosea*
Honesty *Lunaria rediviva*
Ice plant *Sedum spectabile*
Lenten rose *Helleborus orientalis*
Tree mallow *Lavatera spp.*
Michaelmas daisy *Aster novae-belgii*
Mint *Mentha x rotundifolia*
Perennial cornflower *Centaurea montana*
Perennial sunflower *Helianthus decapetalus*
Phlox *Phlox paniculata*
Poached-egg plant *Limnanthes douglasii*
Red valerian *Centranthus ruber*
Snapdragon *Antirrhinum majus*
Spring crocus *Crocus chrysanthus* and hybrids
Sweet alyssum *Lobularia maritima*
Sweet bergamot *Monarda didyma*
Sweet William *Dianthus barbatus*
Tobacco plant *Nicotiana affinis*
Wallflower *Cheiranthus cheiri*
Alpine rock-cress *Arabis alpina*
Winter aconite *Eranthis hyemalis*
Yellow alyssum *Alyssum saxatile*

Native wildflowers for borders

Agrimony *Agrimonia eupatoria*
Betony *Stachys officinalis*
Bluebell *Hyacinthoides non-scriptus*
Chicory *Cichorium intybus*
Chives *Allium schoenoprasum*
Common poppy *Papaver rhoeas*
Corncockle *Agrostemma githago*
Cornflower *Centaurea cyanus*
Corn marigold *Chrysanthemum segetum*
Cowslip *Primula veris*
Cuckooflower *Cardamine pratensis*
Dame's-violet *Hesperis matronalis*
Devil's-bit scabious *Succisa pratensis*
Field scabious *Knautia arvensis*
Foxglove *Digitalis purpurea*
Goldenrod *Solidago virgaurea*
Great mullein *Verbascum thapsus*
Greater knapweed *Centaurea scabiosa*
Harebell *Campanula rotundifolia*
Herb-robert *Geranium robertianum*
Lady's bedstraw *Galium verum*
Marjoram *Origanum vulgare*
Meadow cranesbill *Geranium pratense*
Common mallow *Malva sylvestris*
Oxeye daisy *Leucanthemum vulgare*
Primrose *Primula vulgaris*
Red campion *Silene dioica*
Snowdrop *Galanthus nivalis*
Spiked speedwell *Veronica spicata*
Tansy *Tanacetum vulgare*
Teasel *Dipsacus fullonum*
Toadflax *Linaria vulgaris*
White campion *Silene alba*
Wild thyme *Thymus drucei*
Yellow loosestrife *Lysimachia vulgaris*



Marjoram



Cornflower



Perennial sunflower

Appendix 6: Ecological Experience

Becca Brown: Senior Ecologist, BSc (Hons) ACIEEM

Becca has been working in ecological consultancy since 2016 and has been involved in a wide range of surveys including Extended Phase 1 Habitat surveys and a variety of protected species surveys including bats, badger *Meles meles*, barn owl *Tyto alba*, great crested newt *Triturus cristatus*, hazel dormouse *Muscardinus avellanarius*, reptiles, otter *Lutra lutra* and water vole *Arvicola amphibius*. She has experience in writing technical reports, including Preliminary Ecological Appraisals (PEAs), Ecological Impact Assessments (EclAs) and preparation of European Protected Species (EPS) licence applications. She has experience undertaking Conditioned Assessments and Biodiversity Net Gain (BNG) calculations. She has extensive experience as an Ecological Clerk of Works (ECoW) for a variety of projects. Becca Holds Natural England Class Licences for bats (level 1), barn owl and great crested newt. She also holds a valid CSCS card, is mental health first aider and is an Associate member of the Chartered Institute of Ecology and Environmental Management (ACIEEM).

Elizabeth Pimley: Head of Ecology & Principal Ecologist, BSc (Hons) PhD, CEnv MCIEEM

Elizabeth has worked in both the academic and consultancy ecology sectors since 2000 with a focus on mammalian ecology, particularly badgers, dormice, bats, water voles and otters. Elizabeth manages the Consultancy as well as being involved in project delivery. She has managed ecological projects, ranging in size and type, both in the UK and abroad. She regularly advises clients on the planning process in relation to Ecology. Elizabeth has expertise in a wide variety of ecological survey techniques including Preliminary Ecological Appraisals/Phase 1 habitat assessments and a variety of protected species surveys (e.g. the aforementioned mammal species as well as reptiles and great crested newts).

Elizabeth also devises ecological mitigation schemes, both as part of protected species mitigation licences (e.g. bats, great crested newts, badgers, dormice, water voles, otters) and for projects not requiring licensing (e.g. reptiles). She has produced a wide variety of preliminary ecological appraisals, BREEAM/CSH Ecology Assessments, mitigation licences for protected

species (including Bat Mitigation Class Licences), Ecological Impact Assessments (EclA), Construction Ecological Management plans, Habitat Regulations Assessments, Biodiversity Net Gain assessments, Biodiversity Enhancement Schemes, Ecological Design Strategies as well as writing for scientific journals, books and magazines. As a Building with Nature Assessor, Elizabeth also has expertise in providing green infrastructure advice to projects.

Elizabeth offers a scientific approach to projects with additional skills in radiotracking, bat call analysis, statistical analysis, home range and compositional habitat analysis and Geographical Information Systems (GIS) mapping. Elizabeth holds Natural England and Natural Resources Wales licences for bats and dormice as well as Natural England licences for great crested newts and water voles. She is also a Registered Consultant of the Bat Low Impact Class (BLIC) Licence and holds a CSCS card.

Julia Morrison: Ecologist, BSc (Hons) MSc

Julia has worked with Wild Service for several years and has recently gained her MSc in Applied Ecology from the University of Gloucestershire. Julia's dissertation project involved large-scale data analysis of biometric bird ringing data to assess biometric changes in UK wintering waterbirds. Julia has a keen interest in bat ecology and in addition to undertaking professional bat surveys and assessments, she has also studied bats in Ghana, West Africa. She is experienced in a range of ecological surveys including Phase 1 habitat assessments, protected species surveys, reptile surveys and translocations, great crested newt and dormouse surveys. Julia's additional skills include advanced data analysis and GIS mapping using various software packages including QGIS and ArcGIS. In addition to project delivery, she also assists with the management of Wild Service projects. Julia has also spent time volunteering on conservation projects with the Gloucestershire Bat Group and the Gloucestershire Wildlife Trust. Julia is a Qualifying member of CIEEM and holds a CSCS card. She is currently working towards her Natural England bat and great crested newt licences.

Wild Service



Wildlife Trust
Consultancies

ECOLOGICAL SERVICES
MITIGATION
CONSERVATION

- We provide ecological surveys and assessments, mitigation, advice and guidance regarding wildlife, plants and habitats for both development and conservation projects throughout the UK.
- Wild Service is the Ecological Consultancy for Gloucestershire Wildlife Trust. As such, the company reinvests its profits into local conservation work.
- We are also part of a wider network of Wildlife Trust Consultancies enabling us to offer national delivery with local expertise.

We offer the following types of service to clients:

Ecological Surveys
Protected Species Licences
Ecological Management Plans
Biodiversity Net Gain
Ecological Impact Assessments (EcIA)
BREEAM Assessments
Mitigation, Enhancement & Rewilding
Green Infrastructure Planning (Building with Nature)
Arboricultural Surveys
Landscape Consultancy Services

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