

Ecological Impact Assessment

August 2025

**Carisbrook Road,
Mitcheldean**

Prepared by
CSA Environmental

On behalf of
Gladman Developments

Report No: CSA/4057/13

This report may contain sensitive ecological information. It is the responsibility of the Local Authority to determine if this should be made publicly available.

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EXECUTIVE SUMMARY

Residential development is proposed at Carisbrook Road, Mitcheldean for which outline planning permission is sought.

CSA Environmental was instructed by Gladman Developments Ltd to prepare an Ecological Impact Assessment (EclA) of the proposed development. This assessment is informed by a desktop study, and recent habitat survey, as well as detailed bat and reptile survey work completed during 2018 and 2019. Update bat survey work was updated for the 2024/2025 season.

The Site comprises an agricultural field under intensive rotational management. It is bound by native hedgerows with occasional mature trees.

A key constraint to the development is the presence of the nearby Wye Valley and Forest of Dean Bat Sites Special Area of Conservation (SAC), with the component Wigpool Ironstone Mine SSSI, an internationally important hibernation site for lesser and greater horseshoe bats located c. 480m west of the Site. Bat survey work has confirmed the presence of low numbers of commuting horseshoe bats (primarily lesser horseshoe bats) on-site, with occasional foraging behaviour associated with the boundary hedgerows and trees. These bats are likely connected with the SAC. Activity was focussed along the northern Site boundary and adjoining vegetation. Information to assist Forest of Dean District Council in their completion of an appropriate assessment is provided within a separate report (CSA/4057/17).

The proposed development will retain all hedgerow and tree vegetation on-site, with new woodland, thicket and hedgerow planting proposed along to strengthen existing habitats, improve bat foraging habitat and provide screening from the development and offsite light sources. Grassland and tree planting around the edges of the Site will also contribute to habitat enhancement for bats and other wildlife. A sensitive lighting proposal has been prepared which avoids artificial light-spill onto key bat habitats.

Precautionary measures for badger, dormouse, nesting birds and grass snake are also included herein. The proposed landscaping scheme will provide enhanced opportunities for these species on-site, compared to the baseline. New bird and bat roosting features are proposed within new buildings, as well as deadwood habitats for small mammals and invertebrates. Based on successful implementation of the proposed avoidance, mitigation and enhancement, the development is not anticipated to result in any significant residual negative effects on important ecological features.

1.0 INTRODUCTION

- 1.1 This report has been prepared by CSA Environmental on behalf of Gladman Developments. It sets out the findings of an Ecological Impact Assessment (EclA) of proposed development at Carisbrook Road, Mitcheldean (hereafter 'the Site'). Residential development is proposed at the Site, for which outline planning permission is sought.
- 1.2 The scope of this assessment has been determined with consideration of best-practice guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and the Biodiversity: Code of practice for planning and development published by the British Standards Institute (BS 42020:2013).
- 1.3 The Site occupies an area of c. 9.72ha and consists of a single agricultural field bounded by native hedgerows, scrub and scattered mature trees (see Habitats Plan in Appendix A). The Site is located around central grid reference SO 664 193, to the north of Mitcheldean. The wider landscape is dominated by residential and commercial use to the east, south and west, with extensive agricultural land to the north and steep, wooded valleys further west.
- 1.4 An earlier application for residential development was submitted to Forest of Dean Council (FoDDC) in December 2018, which was subsequently refused (Ref: P1994/18/OUT). The application was supported by an Interim Ecological Impact Assessment containing partial bat survey data.
- 1.5 This report provides an updated assessment of the proposed scheme, and the following additional survey work has been completed between June 2024 and June 2025 to inform the discussion herein:
 - Update UKHab Survey
 - Condition Assessment of habitats (to inform Biodiversity Net Gain)
 - Updated desktop study
 - Bat activity surveys
- 1.6 This report also includes a Bat Survey Report (containing the full suite of survey data collected between 2018 and 2019) as this was not originally submitted to FoDDC, plus details of reptile survey work completed at the Site in 2019. A separate bat survey report is also included to summarise the methods and results of work completed in 2024/25.
- 1.7 This EclA aims to:
 - Establish baseline ecological conditions at the Site.
 - Determine the importance of ecological features which could be affected by the proposed scheme.

- Identify any likely significant impacts or effects of the proposed development on important ecological features, in the absence of mitigation, including cumulative impacts.
- Set out any measures necessary to effectively avoid or mitigate likely significant effects, and identify residual impacts.
- Identify any compensation measures required to offset residual impacts.
- Set out potential ecological enhancement measures that may be secured by the proposed scheme
- Confirm how proposed mitigation, compensation and enhancement measures could be secured.
- Provide sufficient information to determine whether the project accords with relevant nature conservation policies and legislation, and where appropriate, to allow conditions or obligations to be imposed by the relevant authority.

1.8 An EclA can be used for the appraisal of projects of any scale. This is a best practice evaluation process, recommended by CIEEM (2018). It is intended that the evaluation of findings presented here-in will aid the Forest of Dean District Council in their review of the planning application.

2.0 LEGISLATION, PLANNING POLICY & STANDING ADVICE

Legislation

- 2.1 Legislation relating to wildlife and biodiversity of particular relevance to this EclA includes:
- The Conservation of Habitats and Species Regulations 2017 (as amended)
 - The Wildlife and Countryside Act 1981 (as amended)
 - The Natural Environment and Rural Communities (NERC) Act 2006
 - The Protection of Badgers Act 1992
 - The Environment Act 2021
- 2.2 This legislation has been addressed, as appropriate, in the production of this report with further information provided in Appendix B.

National Planning Policy

- 2.3 The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing & Communities, 2023) sets out the government planning policies for England and how they should be applied. Chapter 15: Conserving and Enhancing the Natural Environment, is of particular relevance to this report as it relates to ecology and biodiversity. Further details are provided in Appendix B.
- 2.4 Accompanying the NPPF, central government guidance on the implementation of planning policies is set out within online Planning Policy Guidance (PPG). The Natural Environment PPG addresses biodiversity conservation, from individual site and species protection through to the supporting of ecosystem services. Further guidance in respect of statutory obligations for biodiversity conservation within the planning system is provided by Government Circular 06/2005.

Local Planning Policy

- 2.5 A number of local planning policies relate to ecology, biodiversity and/or nature conservation. These are summarised in Appendix B.

Standing Advice

- 2.6 Natural England Standing Advice regarding protected species aims to support local authorities and forms a material consideration in determining applications in the same way as any individual response received from Natural England following consultation. Standing advice has therefore been given due consideration, alongside other detailed guidance documents, in the scoping of ecological surveys and production of this report.

3.0 METHODS

Desk Study

- 3.1 An ecological desk study was undertaken in June 2024 comprising a review of online resources and biological records centre data as detailed below.
- 3.2 The Multi-Agency Geographic Information for the Countryside (MAGIC) online database was reviewed to identify the following ecological features (based on the Site's likely 'zone of influence' in respect of such features):
 - Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites within 10km of the Site (including possible/proposed sites)
 - Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR) within 3km of the Site
 - Other relevant data e.g. Ancient Woodland Inventory within 1km of the Site
- 3.3 A review was undertaken of the location of any such designations, their distance from and connectivity with the Site, and the reasons for their designation. This information was used to determine whether they may be within the proposed development's Zone of Influence (Zol).
- 3.4 The Gloucestershire Centre for Environmental Records (GCER) was contacted for details of any non-statutory nature conservation designations and records of protected/notable habitats and species. This information was requested for an area encompassing the Site and adjacent land within c. 2km of its central grid reference. This search area was selected to include the likely zone of influence of effects upon non-statutory designations and protected or notable habitats and species.
- 3.5 A small area at the north of the search radius falls within the boundary of Herefordshire Biological Records Centre (HBRC) and data was not sought separately for this given the limited area and its distance from the Site (>1km). Data was previously obtained as part of the 2018 EcIA report.
- 3.6 Further online resources were reviewed for information which may aid the identification of important ecological features. The Woodland Trust's online Ancient Tree Inventory was reviewed for known ancient or veteran trees within the Site and adjacent land. Interactive online mapping provided by the charity 'Buglife' was used to determine whether the Site falls within an Important Invertebrate Area.
- 3.7 In accordance with Natural England's Great Crested Newt Mitigation Guidelines (2001), a desktop search was undertaken to identify ponds within 500m of the Site which may have potential to support breeding

great crested newts *Triturus cristatus*, using Ordnance Survey (OS) mapping, the MAGIC database and aerial photography.

- 3.8 Reference was also made to the Wye Valley and Forest of Dean Bat SAC interim guidance published by the Forest of Dean District Council (FoDDC, 2021) as this provides relevant information on key roosts and habitats used by greater and lesser horseshoe bats *Rhinolophus ferrumequinum/hipposideros* associated with the SAC.
- 3.9 Where possible under the terms of the data provider, relevant desk study data are presented in Appendix C.

Field Surveys

- 3.10 A UK Habitat Classification ('UKHab') survey was carried out in fine and dry weather conditions on 13 June 2024 by Kate Kibble MCIEEM, FISC Level 4, encompassing the Site and immediately adjacent habitats that could be viewed. Reference to an earlier habitat survey completed by CSA Environmental in October 2018 is included herein where relevant.
- 3.11 UKHab is a unified and comprehensive system for mapping and classifying habitats, designed to provide a simple and robust approach to surveying and monitoring, and replaces Phase 1 Habitat survey methods. The method allows for identification of important habitat types, including habitats of Principal Importance under Section 41 (S41) of the NERC Act (2006) and Habitats Directive Annex I habitats. This method also allows for direct translation of habitats into the Statutory Biodiversity Metric (Defra, 2024).
- 3.12 The following parameters were adopted for the UKHab survey undertaken for this PEA:
- UKHab Professional edition (Butcher *et al.*, 2020, commercial End User Licence Agreement (EULA))
 - Minimum Mappable Unit (MMU):
 - 10m²/0.001ha (polygons)
 - 5m (linear)
 - Primary Habitats recorded to a minimum of Level 2 (see below) with UKHab codes provided
 - Mandatory secondary codes used
 - Base-mapping comprising a combination of aerial imagery and topographic information
- 3.13 Primary Habitats are recorded to a minimum of Level 2. Where the survey is conducted at an appropriate time of year (e.g. May to July for grassland) habitats may be recorded to Level 3, 4 or 5, only if conditions and the experience of the surveyor allow.
- 3.14 Alongside the UKHab survey, additional field survey information was collected, comprising:

- Detailed floral species lists recorded for each identified habitat/parcel
 - Evidence of, or potential for, European Protected Species (EPS) (including bats, great crested newt, dormouse and otter)
 - Evidence of, or potential for, other protected species (including birds, reptiles, water vole, badger and certain invertebrates)
 - Evidence of, or potential for, other notable species (including S41 Species of Principal Importance as well as notable, rare, protected or controlled plants and invertebrates)
 - Any other survey information relevant to ecological matters
- 3.15 Results of the UKHab survey are presented on the Habitats Plan in Appendix A. Appendix D provides photographs of the habitats at the Site. Nomenclature for higher plants within this report is consistent with the fourth edition of The New Flora of the British Isles (Stace, 2019).

Further Survey Work

- 3.16 The following detailed field survey work was carried out, with full methods and results provided in the relevant Appendices:
- Winter bat activity surveys (November 2018-March 2019)
 - Non-winter bat activity surveys (October 2018; April-September 2019)
 - Reptile presence/absence surveys (May- September 2019)
 - Non-winter bat activity surveys (July – October 2024; April to June 2025)
 - Winter bat activity surveys (December 2024 – February 2025)
- 3.17 All methods and results of bat survey work collected in 2018-2019 is included in Appendix F. The 2024/25 bat survey results are presented in Appendix G. Reptile survey work is reported on in Appendix H.

Limitations

- 3.18 There were no specific limitations to the desk study or field survey, which was conducted at an optimum time of year and in good conditions. Limitations to species-specific surveys are addressed in the relevant appendices.

Consultation

- 3.19 Natural England were consulted in November 2018 using their Discretionary Advice Service (DAS). The purpose of the consultation was to confirm a bat survey scope sufficient to understand potential impacts on the Wye Valley and Forest of Dean Bat Sites SAC (see Chapter 4.0), as well as to confirm likely impact pathways to this and other designated sites. The results of the consultation are included within a separate report (CSA/4057/17) to inform FoDDCs appropriate assessment of the proposed development scheme.

Evaluation and Assessment

- 3.20 Ecological features are identified, evaluated and assessed in accordance with the CIEEM Guidelines for Ecological Impact Assessment (2018), with detailed methods provided in Appendix E.
- 3.21 It is an established principle (CIEEM, 2018) that EcIA is an iterative process. Specialist advice on the avoidance and mitigation of the potential negative effects of the proposed development has been input from an early design stage.

4.0 BASELINE ECOLOGICAL CONDITIONS

Nature Conservation Designations

Statutory

- 4.1 There are no statutory designations covering any part of the Site.
- 4.2 Five international statutory designations were identified within 10km of the Site comprising three SACs and one SPA/Ramsar site. The closest of these is the Wye Valley and Forest of Dean Bat Sites SAC located c. 480m west of the Site at its closest point (the Wigpool Ironstone Mine, also a SSSI). The SAC as a whole is designated for its internationally important populations of breeding and hibernating greater and lesser horseshoe bats *Rhinolophus ferrumequinum/ hipposideros* with the Wigpool Ironstone Mine being of particular importance for hibernation. The other four designations are the Wye Valley Woodlands SAC, the River Wye SAC and the Walmore Common SPA/Ramsar, as detailed within Table 1 below. Whilst not formally designated as part of the SAC, a significant, functionally-linked lesser horseshoe bat maternity roost is located at Longhope c. 2km east of the Site and this is also considered within this assessment at the advice of Natural England.
- 4.3 Nine national statutory designations were identified within 3km of the Site. Seven of these (summarised in Table 1 below) are of geological interest only so not considered further herein. The remaining two sites are the Wigpool Ironstone Mine SSSI and the Westbury Brook Ironstone Mine SSSI which are both component sites of the Wye Valley and Forest of Dean Bat Sites SAC, and of importance to hibernating greater and lesser horseshoe bats. SSSIs are administered and designated under national legislation and are therefore normally considered to be important at the National level. However, the special interest features of these SSSIs (i.e. the hibernating populations of lesser and greater horseshoe bat) reflect the qualifying features of the Wye Valley and Forest of Dean Bat Sites SAC, which have been determined above to be of international importance.
- 4.4 No local statutory designations are present within 3km of the Site.
- 4.5 The above statutory designations are described in Table 1 below.

Non-Statutory

- 4.6 GCER provided details of two Gloucestershire Wildlife Trust (GWT) nature reserves (Stenders Quarry and Wigpool) and 11 Local Wildlife Sites (LWS) within the 2km search radius, as well as five Regionally Important Geodiversity Sites (RIGS) which are not discussed further. Due to the number of sites these are not included within Table 1 but summarised below.

- 4.7 The majority of the wildlife designations are located within forested areas to the west and south-west of Mitcheldean and include sites of importance for ancient and semi-natural broad-leaved woodland, lowland heath, acidic ponds and scowles (quarry like features associated with past mining activity). To the north-east and south-east are three pockets of ancient woodland. The closest LWS/GWT reserve to the Site is Scully Grove LWS, c. 640m to the south-west which is designated for ancient woodland and semi-natural grassland habitat.

Table 1. Statutory and non-statutory designations within search radii

Site Name & Designation	Distance & Direction from Survey Area	Special Interests or Qualifying Features
International Designations within 10km		
Wye Valley & Forest of Dean Bat Sites SAC	c. 480m west	A cluster of Sites (the closest being Wigpool Ironstone Mine). Supports the greatest concentration of lesser horseshoe bats <i>Rhinolophus hipposideros</i> in the UK and the main maternity roost of greater horseshoe bat <i>R. ferrumequinum</i> in this area. Both species also hibernate within the disused mines and natural caves in the Wye Valley and Forest of Dean. Small numbers of Bechstein's bat <i>Myotis bechsteinii</i> are also known from this site.
River Wye SAC	c. 6.4km west	Primarily designated for its riverine habitat with exceptional aquatic flora (especially <i>Ranunculus</i> beds), and for the presence of white-clawed crayfish <i>Austropotamobius pallipes</i> , otter <i>Lutra lutra</i> and notable fish: sea lamprey <i>Petromyzon marinus</i> , brook lamprey <i>Lampetra planeri</i> , twaite shad <i>Alosa fallax</i> , Atlantic salmon <i>Salmo salar</i> and bullhead <i>Cottus gobio</i> .
Walmore Common SPA/Ramsar	c. 8.4km south-east	Damp grassland and ditches supporting an overwintering population of Bewick's swan <i>Cygnus columbianus bewickii</i> .
Wye Valley Woodlands SAC	c. 8.9km south-west	Comprises a variety of habitats but designated for its rare beech, lime and yew woodland types. Lesser horseshoe bats are a qualifying feature.
National Designations within 3km		
Wigpool Ironstone Mine SSSI	c. 480m west	One of a suite of sites in the Forest of Dean and Wye Valley used by breeding and hibernating greater and lesser horseshoe bats. This is mainly a hibernation site.
Westbury Brook Ironstone Mine SSSI	c. 2.1km south	A hibernation site for greater and lesser horseshoe bats as part of the Wye Valley & Forest of Dean Bat Sites SAC

The following SSSIs are designated for their geological interest only: Scully Grove Quarry SSSI (c. 780m south-west), Land Grove Quarry, Mitcheldean SSSI (c. 800m south-east), Stenders Quarry SSSI (c. 850m south-west), Puddlebrook Quarry SSSI (c. 1.8km south-west), Edgehills Quarry SSSI (c. 2.3km south), Longhope Hill SSSI (c. 2.8km south-east), Hobb's Quarry, Longhope SSSI (c. 2.9km east).		
Local Designations within 3km		
-	-	-
Non-statutory Designations within 2km		
There are 16 Local Wildlife Sites, two SWS and two GWT reserve sites within 2km. These are summarised in the text above.		

Habitats and Flora

- 4.8 Habitats recorded on-site are illustrated in Appendix A and D. Relevant UKHab codes are provided within parentheses for each habitat type recorded e.g. Other Neutral Grassland (g3c).

Irreplaceable Habitats

- 4.9 There is no ancient woodland, as shown on the ancient woodland inventory, covering any part of the Site or immediately adjacent land. The closest area of Ancient Woodland is Cornage Wood c. 240m west of the Site however Ancient Woodland is a key component of the local landscape and could potentially be affected by the proposed development. As a result it is included as an important ecological feature within this assessment. Ancient Woodland is considered to be of importance at the County level.
- 4.10 The Ancient tree Inventory identifies a pedunculate oak *Quercus robur* within the field to the north of the Site as a Veteran specimen, with another pedunculate oak along the eastern boundary of this field as Notable. These are located c. 20m and 12m north of the Site. With regard to the distance of these trees from built development at the Site, and consideration of the intensive arable cultivation of land on-site and around the trees, there is not considered to be a risk of harm to veteran/notable trees as a result of the proposed development and they are not considered further in this assessment.

Notable Flora Records

- 4.11 GCER provided two records of notable plant species, box *Buxus sempervirens* and bluebell *Hyacinthoides non-scripta*, both from woodland habitat c. 1.5km north-west of the Site. No notable plant species were recorded on-site during any of the Site visits undertaken to date, including no invasive non-native plant species as listed on Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) though some non-native garden plants are present within the western Site boundary hedgerow.

Habitats

Arable and Horticulture (UKHab code: c1)

- 4.12 The Site comprises a single field under agricultural management. In 2018/2019 the land was used for growing potatoes before being resown for winter cereals. In June 2024, a grass ley was present. This was dominated by perennial rye-grass *Lolium perenne* or cultivar thereof, with occasional cock's-foot *Dactylis glomerata*, creeping thistle *Cirsium arvense* and hogweed *Heracleum sphondylium*. Very narrow margins (<1m wide) have been present throughout though these are routinely cut. Species recorded at the margins include sterile brome *Bromus sterilis*, common nettle *Urtica dioica*, cow parsley *Anthriscus sylvestris* and burdock *Arctium* sp.
- 4.13 In June/July, the grass was cut for hay or silage and then the land was grazed by a small flock of sheep until the autumn when it was ploughed, and winter cereals were resown. The margins were very narrow (c. 0.5m) with a steep drop to the cultivated area.
- 4.14 The farmland habitats are currently considered to be of low ecological interest although field margins can be used by a variety of wildlife and changing crop rotations will provide different opportunities year on year e.g. for nesting or foraging farmland bird species. Cropland habitats are therefore scoped out of further assessments.

Hedgerows (h2a) and Trees

- 4.15 Hedgerows form most of the Site boundaries, with occasional trees. The main component species are hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and blackthorn *Prunus spinosa* with some elm *Ulmus* sp., field maple *Acer campestre* and elder *Sambucus nigra*.
- 4.16 The eastern boundary hedgerow (reference H1) is species-rich native hedgerow with c. eight woody species present in total and on average of between five and seven woody species per 30m stretch.
- 4.17 The northern boundary hedgerow (H2) contains seven woody species (average four species/30m) plus a mature oak and ash tree. It is wide and appears to have been laid in the past.
- 4.18 Hedgerow H3 is located in the north-west of the Site, it is of a similar composition to the other hedgerows but has several gaps dominated by bracken *Pteridium aquilinum*, nettle and cleavers *Galium aparine*.
- 4.19 Part of the western boundary is comprised of a gappy native hedgerow. There are multiple semi-mature to mature trees on the adjacent verge/bank though these are not contained within the hedgerow itself. This hedgerow is of poorer condition than the eastern boundary having several gaps and large sections comprising of bramble and Traveller's joy *Clematis vitalba*. Non-native species (snowberry *Symphoricarpos* sp.) was recorded within the hedgerow.

- 4.20 Two large multi-stem willows *Salix* sp. are present in the southern tip of the Site (historically the location of pond habitats known as “Carisbrook Pools”).
- 4.21 A short line of trees (UKHab secondary code 33) is recorded along the south-west boundary comprising a line of semi-mature to mature ash *Fraxinus excelsior* with a very small amount of associated blackthorn scrub.
- 4.22 All hedgerows are adopted as a S41 of Habitat of Principal Importance under the NERC Act 2006. The eastern boundary hedgerow was found to be species-rich and may qualify as ‘Important’ under the Hedgerow Regulations. The hedgerows and trees are considered to be important at up to the Local level.

Other habitats

- 4.23 A 1-1.5m band of dense bracken (UKHab: g1c) and dense bramble scrub (h3d) are components of the boundary vegetation, particularly in the south-west where there is no boundary hedgerow. These habitats can provide valuable shelter for wildlife, and foraging opportunities in the case of bramble, but are of low intrinsic ecological value and scoped out of further assessment.

Fauna

Bats

- 4.24 GCER provided 77 records of ten bat species from the search area. These include common and widespread species such as common and soprano pipistrelle *Pipistrellus pipistrellus/pygmaeus* as well as the rarer Nathusius’ pipistrelle *P. nathusii*, barbastelle *Barbastella barbastellus*, lesser and greater horseshoe bats. Several of the records were submitted by CSA following survey work at the Site in 2018/2019 and these results are included within Appendix F. Other notable records include a farm c. 1.8km south-east of the Site which supports a maternity roost of whiskered/Brandt’s bat *Myotis mystacinus/brandtii*, day roosts of common and soprano pipistrelle day roosts and night roosts of brown long-eared bat *Plecotus auritus*. There are various winter hibernation records of individual *Myotis* and up to 200 lesser horseshoe bats from various locations within the SAC c. 700m west of the Site and beyond. There are routine monitoring counts for a common pipistrelle bat maternity roost (peak count 82 bats recorded between 2014 and 2016) from a residential property within 100m west of the Site (exact location unknown).
- 4.25 Monthly bat survey work was completed between October 2018 and September 2019, including automated monitoring of four locations around the Site and walked transects to observe bat activity. Full methods, results and interpretation are provided in Appendix F but in summary, at least ten bat species were found using the Site. Common

pipistrelle was the most frequently recorded and key foraging areas were recorded along the northern boundary hedgerow and mature trees in the west and south of the Site. Activity by other species was comparatively low but there was evidence of some seasonal foraging behaviour by barbastelle bat along the northern boundary hedgerow, as well as year-round commuting behaviour by lesser horseshoe bat along this feature. Further information is included within Appendix F.

- 4.26 Bat survey work has been updated in 2024 and 2025 with reference to revised guidance by FoDDCC (2021) and the Bat Conservation Trust (Collins, 2023). A total of five walked transects (now referred to as night-time bat walkovers) and monthly automated monitoring were completed between July and October 2024 and April to June 2025 (inclusive). Monthly automated monitoring was also undertaken between December 2024 and February 2025 (inclusive) to monitor the winter period. The full methods and results are presented in Appendix G. A similar assemblage of bats was recorded as during previous work, with the north-west, northern and north-east boundaries determined to be of greatest significance for bats (particularly non-pipistrelle species). Commuting and foraging behaviour was observed/recorded for lesser horseshoe bat, with key habitats as described above. Whilst high foraging activity was recorded for most species on a couple of nights in September, on average, activity by non-pipistrelle bat species at the Site was low.
- 4.27 Horseshoe bats recorded on-site are highly likely to be associated with the nearby Wye Valley and Forest of Dean Bat Sites SAC. Predominantly commuting behaviour was recorded with a small amount of foraging activity associated with the boundary hedgerows and trees (mostly on one occasion which is likely linked to a short-term foraging opportunity). Impacts to horseshoe bats and their habitats will be fully assessed by Forest of Dean District Council as part of an appropriate assessment. Information to support the council is included within a separate report (CSA/4057/17).
- 4.28 The latest edition of the UK Bat Mitigation Guidelines (Reason & Wray, 2023) sets out a method of evaluating the bat assemblage of the Site with regards to the rarity of different bat species in different geographical areas. This approach determined the Site to be of national importance because of the number of species found and the presence of several rare species (barbastelle, Nathusius' pipistrelle and the horseshoe bats). This assemblage is not considered to be of such high significance for the local area as many of the 'rare' species are widespread in the region, however the association between horseshoe bat populations on-site and the SAC does warrant this valuation.
- 4.29 There are no buildings on-site to support roosting bats, and minimal number of boundary trees, none of which are due to be directly impacted by the proposals. Potential for bat roosting was only recorded

within a mature willow tree in the south of the Site (partially healed vertical wound in trunk of T4 (tree ref from Arboricultural Impact Assessment, CSA/4057/14). Impacts to bats and their roosts could result in an offence under the Wildlife and Countryside Act, 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017, so bats are also assessed below in consideration of their legal protection.

Badger

- 4.30 No records of badger *Meles meles* were provided by GCER for the search area although the previous desktop study in 2018 did provide three records of badger from 2005 and before. The wider landscape has extensive farmland and woodland habitats which will support badger.
- 4.31 A mammal path with badger hair was previously found through the eastern boundary hedgerow in 2018, confirming their use of the Site. No setts are present and no sightings of badger or more recent evidence has been confirmed during the 2019 and 2024 survey visits. It is likely any badger activity on-site is sporadic.
- 4.32 Badgers and their setts are legally protected under the Protection of Badgers Act, 1991. As there is potential for badger to cross the Site and potentially to be impacted by the proposed development, or for new setts to be dug at a future date, badgers are taken forward in this assessment on the basis of their legal protection.

Dormouse

- 4.33 A single hazel dormouse *Muscardinus avellanarius* has been recorded c. 1.1km west of the Site where it was discovered during scrub cutting works near Wigpool. Dormice are known to be widespread within the Forest of Dean and there is information on the MAGIC website regarding a European Protected Species (EPS) mitigation licence for dormouse having been granted for works c. 1.1km south-west of the Site in 2012-2014.
- 4.34 With reference to the limited amount of dormouse habitat on-site, the retention and proposed enhancement of all hedgerows and trees, no further survey work for dormouse was recommended. Dormice are an EPS and national and local priority species. As on-site habitats are suboptimal, dormice are taken forward for further discussion in this report on account of their legal protection, using the precautionary principal.

Other Notable Mammals

- 4.35 There is no suitable habitat for otter *Lutra lutra* or water vole *Arvicola amphibius* within or immediately adjacent to the Site. Whilst otter has been recorded to the west of the Site within the Wigpool area, and are likely to make use of local streams, these species are considered likely absent from the Site. Riparian mammals are therefore scoped out of further assessment.

- 4.36 Twenty-three hedgehog *Erinaceus europaeus* records have been provided by GCER, in association with the residential areas of Mitcheldean. These include a record of hedgehog from 2019 noted in Holywell Road adjacent to the south-west of the Site. It is likely that hedgehog make use of on-site habitats, particularly the boundary hedgerows and scrub, though on-site populations are unlikely to be significant at the Local level.
- 4.37 Two records of polecat *Mustela putorius* were also provided by GCER, with one record (from 2022) located c. 770m south-east of the Site and another c. 1km south-west of the Site from 2024. Polecat are widespread within Gloucestershire and are likely to make occasional use of on-site habitats as part of a larger home range. A significant population is unlikely to occur on-site.
- 4.38 No records for brown hare *Lepus europaeus*, water shrew *Neomys fodiens* or harvest mouse *Micromys minutus* were provided and on-site opportunities for these species are considered to be limited. These species are considered to be likely absent and are scoped out of further assessment.

Birds

- 4.39 GCER provided over 400 bird records for the local area, predominantly comprising of species associated with woodland habitats. The dataset had been reduced by GCER to include only the most recent record of a species at each location, and only for the previous ten years, given the vast number of records available for the area. Species of potential relevance to on-site habitats which have been recorded locally include greenfinch *Chloris chloris*, fieldfare *Turdus pilaris*, kestrel *Falco tinnunculus*, house martin *Delichon urbicum*, linnet *Linaria cannabina*, meadow pipit *Anthus pratensis*, redwing *Turdus iliacus*, reed bunting *Emberiza schoeniclus*, starling *Sturnus vulgaris* and yellow wagtail *Motacilla flava*. Reed bunting, redwing and fieldfare have been recorded within the 1km grid-square adjacent to the north-east of the Site. Yellow wagtail, a rarer farmland specialist species, have only been recorded from Plump Hill on the south side of Mitcheldean.
- 4.40 The application area is limited in extent with the habitat of most value to birds being the boundary trees, hedgerow and scrub. A colony of house sparrow were noted on-site during several of the Site visits, using bramble scrub along the Site's southern and western boundary. Additional species recorded during the 2024 Site visit were dunnoek *Prunella modularis* and woodpigeon *Columbus palumba* as well as skylark *Alauda arvensis* which was noted singing on adjacent farmland but not on the Site itself.
- 4.41 Several bird species which receive additional legal protection whilst nesting (Schedule 1 of the Wildlife and Countryside Act, 1981) have been recorded locally. These include crossbill *Loxia curvirostra*, goshawk

Accipiter gentilis, brambling *Fringilla montifringilla*, hobby *Falco subbuteo*, red kite, peregrine falcon *Falco peregrinus*, redwing and fieldfare. These species are unlikely to nest on-site with the potential exception of hobby which is known to use hedgerow trees or tree-lines. Two records of hobby were provided by GCER, comprising single birds recorded in 2015 and 2017 from central Mitcheldean and Plump Hill, respectively.

- 4.42 The value of the arable land to farmland birds is likely to change with crop rotation. Nesting birds are legally protected under the Wildlife and Countryside Act 1981. Assumptions relating to the clearance of potential nesting habitat are discussed in the following chapter. The Site is unlikely to support an important assemblage of birds and they are scoped out of further assessment.

Reptiles

- 4.43 GCER provided records of 32 slow-worm *Anguis fragilis* records, nine common lizard *Zootoca vivipara* records and eight grass snake *Natrix natrix* records. Reptiles are common and widespread locally, particularly in association with Wigpool Common and surrounding areas where targeted survey work has been undertaken by local naturalists.
- 4.44 Boundary habitats at the Site appeared suitable for reptiles and targeted presence/absence surveys were completed by CSA in 2019. No reptiles were found however the survey was disrupted by routine cutting of the field margins to control weeds, management which is likely to reduce the suitability of habitat for reptiles at any rate, and which continued in 2024. The habitats on-site became less suitable in 2024 and reptile survey work was not repeated. Full details are included in Appendix H.
- 4.45 It is concluded that reptiles are likely absent from the Site though occasional use of boundary habitats by low numbers of grass snake cannot be discounted (as they have wide ranging territories and can occur at low densities). As all native British reptiles are legally protected against killing and injury under the Wildlife and Countryside Act, 1981, reptiles are considered further within this assessment.

Amphibians

- 4.46 GCER provided 46 records of smooth newt *Lissotriton vulgaris*, 68 records of palmate newt *L. helveticus* and 68 great crested newt *Triturus cristatus* records, as well as three common toad *Bufo bufo* and one common frog *Rana temporaria* records. All of the records relate to Wigpool and surrounding areas c. 1km west of the Site. Information about Natural England pond survey results and class licence returns for great crested newt licences available on the MAGIC website is consistent with this, and there are no positive records of great crested newt from other areas of Mitcheldean.

- 4.47 Two waterbodies have been identified within 500m of the Site using online mapping sources. These comprise a small woodland pond within Lining Wood c. 350m west of the Site and a small "reservoir" within the business park c. 300m south-east of the Site. Terrestrial opportunities on-site are limited to the hedgerows and field margins. It is unlikely that great crested newts present within the wider area would make use of the Site given the abundance of suitable habitat in close proximity to known breeding ponds, their distance from the Site and the nature of the intervening habitats and landscape. Great crested newts are considered likely absent and are scoped out of further assessment.

Invertebrates

- 4.48 GCER provided one invertebrate record from the 2km search radius, of the small square-spot moth *Diarsia rubi* recorded from Wigpool c. 1km from the Site in 2016.
- 4.49 The Site is not located within an Important Invertebrate Area though it should be noted that ancient woodland areas to the north, west and south-east are part of the Wye Valley and Forest of Dean IIA. This is an extensive area classified for its variety of habitats which support multiple endangered invertebrate species. Key habitats of relevance to the local area are primarily woodland floor, arboreal and decaying wood habitats.
- 4.50 The habitats on-site are common and widespread and not considered likely to support a notable assemblage of invertebrates, as such invertebrates are scoped out of further assessment. Opportunities to enhance opportunities for invertebrates at the Site are included below.

Future Baseline

- 4.51 The Site is presently under active arable management, including the periodic cutting of field margins and hedgerows. Notwithstanding the potential rotation of crop-type, these management interventions maintain the on-site conditions in a relatively stable state. There is no known intention to cease this management, other than to accommodate the proposed development should planning permission be granted. As such, the future baseline status of important ecological features is not anticipated to vary significantly from that at present.

Summary of Ecological Features

- 4.52 Table 2 below summarises all important ecological features identified within the respective zones of influence, together with the geographic context of their importance:

Table 2. Summary of important ecological features and their geographic context

Ecological Feature	Geographic Context of Importance and/or Protection Status
International statutory sites and component SSSIs	International
Non-statutory Sites	County
Ancient Woodland	County
Hedgerows and Trees	Local
Bats	National
Dormouse	Protected (W&C Act, Conservation of Habitats and Spec Regs)
Badger	Protected (Badger Act, 1992)
Nesting birds	Protected (Wildlife and Countryside Act, 1981)
Reptiles	Protected (Wildlife and Countryside Act, 1981)

5.0 ASSESSMENT OF EFFECTS

The Proposed Development

- 5.1 Outline planning permission is sought for residential development at the Site. The following impact assessment is based on the Development Framework Plan prepared by CSA Environmental (CSA/4057/116) on behalf of Gladman Developments.
- 5.2 The construction phase of the proposed development will comprise the following:
- Cessation of agricultural management
 - Construction of c. 180 residential dwellings
 - Construction of associated gardens, parking, access infrastructure, two play areas and a pumping station
 - The establishment of Public Open Space (POS) including open grassland with recreation routes around the periphery of residential areas
 - Establishment of Sustainable Urban Drainage Systems (SUDS) including a large attenuation basin set within open space to the south of the developed area, plus pumping station
 - New hedgerow, woodland, scrub and tree planting to reinforce existing boundaries, provide screening, landscaping and new wildlife habitat.
- 5.3 The operational phase of the proposed development will comprise the following:
- Occupation of new residential dwellings
 - Increase in human activity, including use of vehicles and presence of domestic pets
 - Increased artificial lighting and anthropogenic noise
 - Management of habitats within POS.

Assumptions

- 5.4 The following assumptions have been made during the assessment of potential effects of the proposed development on important ecological features. Although 'assumed' and therefore taken as part of the pre-mitigation scenario, these measures are referenced in the proceeding sections where integral to the mitigation strategy.
- 5.5 In accordance with BS42020:2013, it is assumed that a Construction Environmental Management Plan (CEMP) will be secured by planning condition and prepared at the detailed design stage. In addition to the construction phase impact avoidance and mitigation measures identified in the following sections, the CEMP will detail standard environmental control measures, including though not limited to the following:

- Implementation of strict protection measures for the root protection areas of retained trees and hedgerows, in accordance with BS5837:2012
- Standard best practice construction phase pollution prevention and control measures
- Good practice during construction to maintain a safe environment for wildlife (e.g. badgers) when crossing the Site, and implementation of safeguarding measures e.g. protective fencing and use of ramped excavations
- Sensitive working measures and timings for the clearance of vegetation to protect nesting birds and reptiles
- Updated ecological surveys, where necessary, to identify shifts in the baseline ecological condition in order that revised impact avoidance and mitigation measures can be adopted as required.

5.6 In accordance with BS42020:2013, it is assumed that a Landscape and Ecology Management Plan (LEMP) will be secured by planning condition and prepared at the detailed design stage. The LEMP will set out measures for the establishment and long-term management of newly created and retained habitats to maximise benefits for biodiversity.

Potential Impacts and Ecological Effects

Statutory Designated Site

- 5.7 Due to the close proximity of the development to the Wye Valley and Forest of Dean Bat Sites SAC and the confirmed presence of lesser and greater horseshoe bats on-site, potential adverse effects cannot be ruled out. The Wye Valley Woodlands SAC overlaps and is functionally linked to the Wye Valley and Forest of Dean Bat Sites SAC. There is therefore potential for impacts to bat populations at one site to have an effect at the other. This assessment includes the component SSSI designations, particularly Wigpool Ironstone Mine SSSI and Westbury Brook Ironstone Mine SSSI which are in closest proximity to the development.
- 5.8 No likely significant effects on other statutory designated sites are anticipated as a result of the sensitivity/nature of qualifying features in addition to their distance and lack of connectivity to the Site, and with regard to the scale and nature of the proposed development.
- 5.9 Forest of Dean District Council, as Competent Authority, will be required to complete an Appropriate Assessment of the development in order to determine whether it will have any adverse effect on the integrity of European Sites, either alone or in isolation. Information to support this process, including a discussion of bat survey results, is set out within a separate report (CSA/4057/17). Potential impacts comprise the disturbance and/or deterioration of habitats outside the SAC such as from the degradation of on-site hedgerows and trees during construction works, or development-edge effects including artificial lighting.

- 5.10 In summary, there is potential for increased artificial lighting from the development to adversely affect horseshoe bat commuting corridors which are functionally linked to the Wye Valley and Forest of Dean Bat Sites SAC. In the absence of mitigation, this could remove on-site hedgerows from the local resource causing bats to find alternative routes and expend more energy, with consequences for survival. With consideration of the likely number of bats using the Site during the completed survey work, this impact could have significance at up to District level with reference to distribution and importance of horseshoe bat roosts within the Forest of Dean.

Non-statutory Designated Sites

- 5.11 No direct impacts to non-statutory designated sites are anticipated though it is reasonable to predict that the proposed development will result in an increase in recreational pressure on surrounding wildlife sites. Scully Grove LWS and Land Grove Wood LWS are likely to be the most accessible to new residents. These are designated for their ancient woodland habitats which are sensitive to recreational pressure, with adverse effects including trampling, erosion, littering, eutrophication (from dog waste), disturbance and physical damage (e.g. fires, trail making, dens and vandalism).
- 5.12 Depending on intensity of use by new residents, these impacts could have an adverse effect on non-statutory designated sites of Local significance.

Ancient Woodland

- 5.13 As discussed above, increased recreational pressure generated by new residential development can have a harmful effect on ancient woodland. Ancient woodland areas to the west of Mitcheldean are readily accessible from the Site and these areas are likely to receive high levels of recreational pressure at present, due to its proximity to the town and presence of well-used pathways. The proposed development would contribute to existing pressures with potential for an adverse effect on ancient woodland significant at up to Local level.

Hedgerows and Trees

- 5.14 There are due to be no direct impacts to hedgerows or trees at the Site due to the sensitive location of new access points. The development is offset from the boundaries to maintain an undeveloped green corridor for the protection of roots, and new hedgerow and boundary planting is proposed which would extend and strengthen existing green corridors around the Site.
- 5.15 In the absence of mitigation, there is potential for accidental damage to retained vegetation during construction works. Depending on the extent of damage, this would be expected to have an adverse effect significant at less than Local level.

- 5.16 Maintained hedgerows and trees will be located outside of private gardens to ensure their retention and appropriate long-term management, as detailed within a LEMP to be secured at the detailed design stage.

Bats

- 5.17 The development proposals will retain all boundary hedgerows and trees which provide key foraging and commuting habitat for bat species. As mentioned above, these will be retained within areas of public space to preserve them in the long-term. Replacement of agricultural habitat is unlikely to have a significant effect on the local foraging resource.
- 5.18 However, there will be an increase in human activity and disturbance at the Site with a corresponding increase in artificial lighting during the operational phase, and possibly also during the construction phase. In the absence of mitigation, increased light spill on bat habitats (particularly in the north of the Site where greatest bat activity has been observed and where there is least existing light spill) would reduce the suitability of boundary habitats for bats. This effect would be greatest for light-averse species such as barbastelle, Myotis and horseshoe bats (ILP, 2023), potentially altering bat flight paths (with a corresponding impact on energy expenditure and survival) or effectively removing these features from the local resource. With consideration of alternative habitats and commuting routes available, this impact has potential to be significant to bats at Local level.
- 5.19 A willow tree with bat roosting potential is due to be retained on-site within an area of open space. No impacts to this tree are anticipated and there is unlikely to be a significant increase in artificial lighting in this area given the distance of proposed development parcels and high existing light spill from the neighbouring industrial site. Detailed design of the nearby attenuation basin will ensure that trees and their roots are protected.

Badger

- 5.20 As badgers have previously been found to traverse the Site, there is potential for construction activities to cause harm, such as from animals becoming trapped in open excavations or exposed to dangerous materials. Although no setts have been found on-site to date, there is potential for new setts to be dug at any time which may be subject to damage or disturbance from construction activities. These impacts could result in an offence under the Protection of Badgers Act, 1992.

Dormouse

- 5.21 Vegetation clearance for the proposed Site access will necessitate the removal of very limited bracken and scattered low bramble along c. 20m of road verge. This represents suboptimal dormouse habitat if assuming, on a precautionary basis, that a small number of individuals may be present on-site. All hedgerows and trees are to be retained and

enhanced as part of the proposals, which would improve habitat suitability for dormice is present. As a result, no operational impacts to dormice are anticipated and impacts to dormice during the construction period are highly unlikely. Precautionary working measures, including sensitive timing of works, as included within the CEMP, is considered to be appropriate in this instance, and no licence from Natural England is required as the proposed activity is unlikely to result in an offence under the Wildlife and Countryside Act 1981 or the Conservation of Habitats and Species Regulations, 2017.

Nesting Birds

- 5.22 In the absence of mitigation, the removal of scrub and other vegetation supporting nesting birds could constitute an offence under the Wildlife and Countryside Act, 1981.

Reptiles

- 5.23 There is a low risk of killing or injury individual reptiles during vegetation clearance at the site for construction works, which would constitute an offence under the Wildlife and Countryside Act, 1981.

Mitigation by Design

- 5.24 It is an established principle (CIEEM, 2018) that, wherever possible, potential negative effects should be avoided through 'Mitigation by Design', as this gives greater certainty over deliverability, demonstrates a well-designed scheme and ensures the correct application of the 'Mitigation Hierarchy' (as advocated by BS42020:2013, Defra 2019 and CIEEM, CIRIA & IEMA 2016).
- 5.25 The Development Framework Plan illustrates the retention of hedgerows and trees with substantial new woody planting to strengthen these corridors. There will be a net gain in grassland, tree, hedgerow, woodland and scrub habitat at the Site of benefit to a range of wildlife.
- 5.26 Public greenspace is included within the Site to include amenity grassland, meadow areas, scrub, new tree planting and extensive woodland creation. These areas, whilst partly for screening and wildlife benefit, will also provide attractive areas for day-to-day recreation by new residents, helping to reduce pressure on more distant wildlife sites and habitats of higher sensitivity.

Additional Mitigation

- 5.27 A sensitive lighting strategy for the Site demonstrates that the proposed development will generate no additional light spill onto key bat habitats, maintaining dark flight paths suitable for use by horseshoe bats. Further detail is provided within the separate Lighting Strategy by DFL. Whilst lighting models did not account for existing or proposed vegetation, new planting will be implemented to strengthen existing boundaries and reduce light-spill from neighbouring roads and housing. These measures will help to avoid impacts to the Wye Valley and Forest of Dean Bat Sites

SAC and component SSSIs, as well as to bat populations in general. An updated strategy for the detailed development scheme would need to be conditioned, to ensure that the final layout adheres to the protective measures currently prescribed.

- 5.28 A Residents Pack will be prepared for distribution to all new residents. The aim of the pack will be to educate new residents on the sensitivity and importance of local habitats and designations, to reduce the significance of recreational pressure on Local Wildlife Sites, ancient woodland and the SAC. It will include information on responsible behaviour when visiting these sites, with maps and details for alternative areas of greenspace that can be used for walking/dog walking, including routes within the development itself.
- 5.29 As described above a CEMP can be secured at the detailed design stage to ensure that protective measures are implemented during the construction phase to prevent accidental damage to hedgerows, trees and their roots. This will also include precautionary working measures to avoid harm to badgers, dormice, reptiles and nesting birds during the construction phase.
- 5.30 A LEMP will be prepared setting out how ongoing management works at the Site will be sensitive to wildlife habitats, and precautionary checks for protected species by an ecologist will be initiated, as required e.g. for any necessary management works to mature trees.
- 5.31 A pre-commencement badger survey will be completed to determine that no badger setts have been dug on/adjacent to the Site. In the event that sett/s are found and unavoidable impacts are required for development works, then a mitigation licence will be obtained from Natural England to permit works that would otherwise constitute an offence.

Residual Effects

- 5.32 Table 3 below summarises the assessment of potential impacts on each important ecological feature, proposed mitigation and the assessed residual effects.

Table 3. Summary of effects

Important Ecological Feature	Potential Impacts and Effects	Avoidance & Mitigation Measures	Mechanism by which Measures are Secured	Residual Effects
Wye Valley and Forest of Dean Bat Sites SAC/SSSIs	Disturbance to bats and deterioration of functionally-linked commuting corridors located outside the SAC	Retention and buffering of key habitats. Sensitive lighting strategy. Enhancement of flight corridors and provision of	Detailed landscape strategy, LEMP and detailed lighting design secured through Planning Condition.	No significant effect

Important Ecological Feature	Potential Impacts and Effects	Avoidance & Mitigation Measures	Mechanism by which Measures are Secured	Residual Effects
		foraging habitat		
Local Wildlife Sites/ Ancient Woodland	Increased recreational pressure	Provision of on-site greenspace, preparation of Residents Pack	Planning Condition	No significant effect
Bats	Potential development edge effects from artificial lighting causing disturbance of foraging bats	Retention and buffering of key bat habitats. New habitat creation, management of POS for biodiversity gain, sensitive lighting strategy	Development design/ detailed landscaping strategy, LEMP and Lighting Strategy secured through Planning Condition	No significant effect
Badger	Potential for injury, or damage to future setts	Precautionary badger survey; impact avoidance measures under CEMP	CEMP secured through Planning Condition	No significant effect
Dormouse	Minor clearance of suboptimal habitat, low risk of killing/injury	Precautionary working measures secured via CEMP	CEMP secured through Planning Condition	No significant effect
Reptiles	Potential for killing/injury	Precautionary working measures secured via CEMP	CEMP secured through Planning Condition	No significant effect
Nesting birds	Potential damage or destruction of nests and eggs	Sensitive timing of works / nest checks by ecologist	CEMP secured through Planning Condition	No significant effect.

5.33 Subject to the implementation of the above mitigation, no significant residual effects on any important ecological features are anticipated to result from the construction or operation of the proposed development.

Cumulative Effects

5.34 Due to the scale and nature of the proposed development, a detailed assessment of potential cumulative effects has not been undertaken.

Compensation

5.35 As detailed above in 'Mitigation by Design' the proposed development will, however, provide an opportunity to secure the following elements of habitat creation. Although designs are at this stage illustrative, the

Development Framework Plan (CSA/4057/116) demonstrates that alongside development the Site can achieve in excess of 10% biodiversity net gain on-site, through provision of new woodland, scrub, tree and grassland habitats.

- 5.36 Full details on the establishment and long-term management of these habitats will be set out in the LEMP at the detailed design stage. Such details will include a description of the proposed habitats, their target condition, timescales over which condition will be achieved, management prescriptions, implementation responsibilities and funding mechanisms.
- 5.37 Full information relating to the Biodiversity Net Gain assessment is included in a separate report (CSA/4057/18). The commitment would be secured via a Biodiversity Gain Condition.

Enhancement

- 5.38 The Development Framework Plan includes landscape planting enhancements which will make positive contributions to on-site biodiversity.
- 5.39 New habitat creation will provide opportunities for species confirmed to be present on-site at baseline, such as badgers and nesting birds, as well as hedgehog and reptiles which are recorded locally. In addition to these enhancements which are embedded into development proposals, a range of additional ecological enhancement measures will be delivered as part of the proposed development, as identified below. Further details will be set out in a LEMP at the detailed design stage, however as an indicative guide:
- Inclusion of plant species of known wildlife value within the landscaping scheme, including night-scented varieties to benefit bats.
 - Provision of new bat roosting opportunities: At least 30 no. bat boxes will be erected on new builds. These will be a purpose-built, durable and long-lasting variety such as available from Schwegler or Habibat. Where possible, these will be incorporated into the fabric of new builds.
 - Provision of new bird nesting opportunities: At least 30 no. bird nesting boxes will be provided in new/retained planting to benefit generalist bird species, and declining urban species including house sparrow, swift and house martin.
 - Creation of log piles: Timber generated from tree clearance works at the Site will be used to make at least 5 log piles for wildlife benefit. These will be sited within boundary vegetation where they will be least disturbed. New material can be added as required following any future management works.
 - Provision of hedgehog gaps: Hedgehogs are recorded locally and are likely to make use of the new development. It is important that opportunities for hedgehogs to move through the landscape are

preserved. Although not strictly an 'enhancement' measure, provision of hedgehog-friendly gravel boards or equivalent, providing a minimum 5 x 5 inch gap, will be used to maintain permeability for hedgehogs across the development and associated gardens. The number and location of hedgehog gaps will be determined at the detailed design stage and set out within the LEMP.

Monitoring

- 5.40 No post-development monitoring of important ecological features is proposed. However, there will be ongoing monitoring of newly established and enhanced habitats as part of POS. This commitment will be made, and further detail provided, within the LEMP to be prepared at the detailed design stage. This will be linked with the final Biodiversity Net Gain strategy for the Site and requirements for a Habitat Management and Monitoring Plan (HMMP) to ensure that proposed and retained habitats reach their target condition.

6.0 CONCLUSIONS

- 6.1 In the absence of any mitigation measures, the proposed development would have the potential to result in negative effects significant at up to the District level. Potential for impacts to nearby local wildlife sites and ancient woodland were also identified, as well as potential for offences in relation to badgers, dormouse, reptiles and nesting birds during construction works. Further bat survey work is scheduled for the coming months and this assessment will be revised where necessary upon completion of updated surveys. However, with the implementation of some straightforward mitigation and precautionary measures as proposed here, the development is not anticipated to result in any significant residual negative effects on important ecological features.
- 6.2 The Development Framework Plan demonstrates the potential to deliver net benefits for wildlife in the form of additional habitats, with the opportunity to provide additional biodiversity enhancement measures alongside the new housing. Greater than 10% Biodiversity Net Gain is shown as being achievable on-site. Significant buffers and new planting are provided to protect and enhance key bat flight paths.
- 6.3 The measures set out herein can be secured through appropriate conditions attached to any planning consent, and the development may therefore be delivered without harm to nature conservation interests. Specifically, it is anticipated that planning conditions would be used to secure:
- Construction Environmental Management Plan (CEMP): In addition to wider environmental controls and best practice construction management, the CEMP will set out construction-phase impact avoidance measures with respect to nesting birds, badgers and reptiles.
 - Landscape and Ecology Management Plan (LEMP) and/or Habitat Management and Monitoring Plan (HMMP): The LEMP/HMMP will detail the establishment and long-term management of retained and newly created habitats to maximise benefits for wildlife. It will include a graphical Ecological Enhancement Plan, setting out the number, type and position of enhancement features.
 - Lighting Strategy: A sensitive lighting strategy will accompany the detailed layout, ensuring that dark corridors are maintained, and minimising light spill to retained and newly created habitats.
 - Residents Pack: Information to be distributed to new residents highlighting the sensitivity of the environment, encouraging responsible behaviour in the countryside and highlighting alternative areas for recreation.
 - Biodiversity Gain Plan: to secure details of biodiversity losses and gains associated with the detailed design.
- 6.4 With the successful implementation of avoidance, mitigation and enhancement measures set out herein, the scheme is considered to

accord with all relevant nature conservation legislation, as well as with the provisions of adopted local planning policy.

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Appendix A

Habitats Plan



- Site boundary
- Mature Tree
- Native hedgerow (h2a)
- Line of trees
- Cropland (c)
- Bracken (g1c)
- Bramble scrub (h3d)



Project	Carisbrook Road, Mitcheldean	Date	July 2024	Drawing No.	CSA/4057/121
Drawing Title	Habitats Plan	Scale	Refer to scale	Rev	-
Client	Gladman Developments Ltd	Drawn	KK	Checked	AM

Appendix B

Legislation and Planning Policy

- 1.1. The **Conservation of Habitats and Species Regulations 2017** (as amended) make prescriptions for the designation and protection of Sites of Community Importance ('European sites', i.e. Special Areas of Conservation and Special Protection Areas) and European Protected Species (EPS). The latter include all native bats, great crested newts, dormice, otters and certain reptiles, listed under Annex II of the Regulations. Following the UK's departure from the European Union, the provisions of the Regulations have been retained through enactment of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, which came into force on 31 December 2020.
- 1.2. The **Wildlife and Countryside Act 1981** (as amended, principally by the Countryside and Rights of Way Act 2000) forms the basis for protection of statutory designated sites of national importance (e.g. Sites of Special Scientific Interest; SSSIs) and native species that are rare and vulnerable in a national context. Additionally, badgers are protected under the **Protection of Badgers Act 1992**.
- 1.3. The **Environment Act 2021** received Royal Assent in November 2021. Through an amendment to the Town and Country Planning Act 1990 the Environment Act introduced a mandatory requirement for all planning permissions to be conditional upon the submission of a Biodiversity Gain Plan for approval by the Local Planning Authority. The Plan will need to demonstrate a net gain of at least 10% in the biodiversity value of the development site.
- 1.4. Section 40(1) of the **Natural Environment and Rural Communities (NERC) Act 2006** (as amended) states that each public authority, "must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving and enhancing biodiversity." This legislation makes it clear that planning authorities should consider impacts to biodiversity when determining planning applications, with particular regard to the Section 41 (S41) lists of 56 habitats and 943 species of principal importance. The UK Biodiversity Action Plan (BAP) has been superseded by the Biodiversity 2020 Strategy, however Local BAPs continue to influence biodiversity management and conservation effort, including through the spatial planning system, at the local scale.
- 1.5. The **National Planning Policy Framework (2024)** (NPPF) sets out government planning policies for England and how they should be applied. With regards to ecology and biodiversity, Chapter 15: Conserving and Enhancing the Natural Environment, paragraph 187, states that the planning system and planning policies should minimise impacts on and provide net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

- 1.6. Paragraph 193 sets out the principles that local planning authorities should apply when determining planning applications:
- 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.
 - 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.
 - 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 reasons and a suitable compensation strategy exists.
 - 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.
- 1.7. Accompanying the NPPF, central government guidance on the implementation of planning policies is set out within online Planning Policy Guidance (PPG). The Natural Environment PPG addresses principles across a broad spectrum of topics targeting biodiversity conservation, from individual site and species protection through to the supporting of ecosystem services, and the use of local ecological networks to support the national Nature Recovery Network. In particular, the PPG promotes the delivery of measurable Biodiversity Net Gain through the creation and enhancement of habitats alongside development.
- 1.8. The **Government Circular 06/2005**, which is referred to within the NPPF, defines statutory nature conservation sites and protected species as a material consideration in the planning process.
- 1.9. Local planning policies of relevance to ecology, biodiversity and/or nature conservation have been set out in Table 1 below.

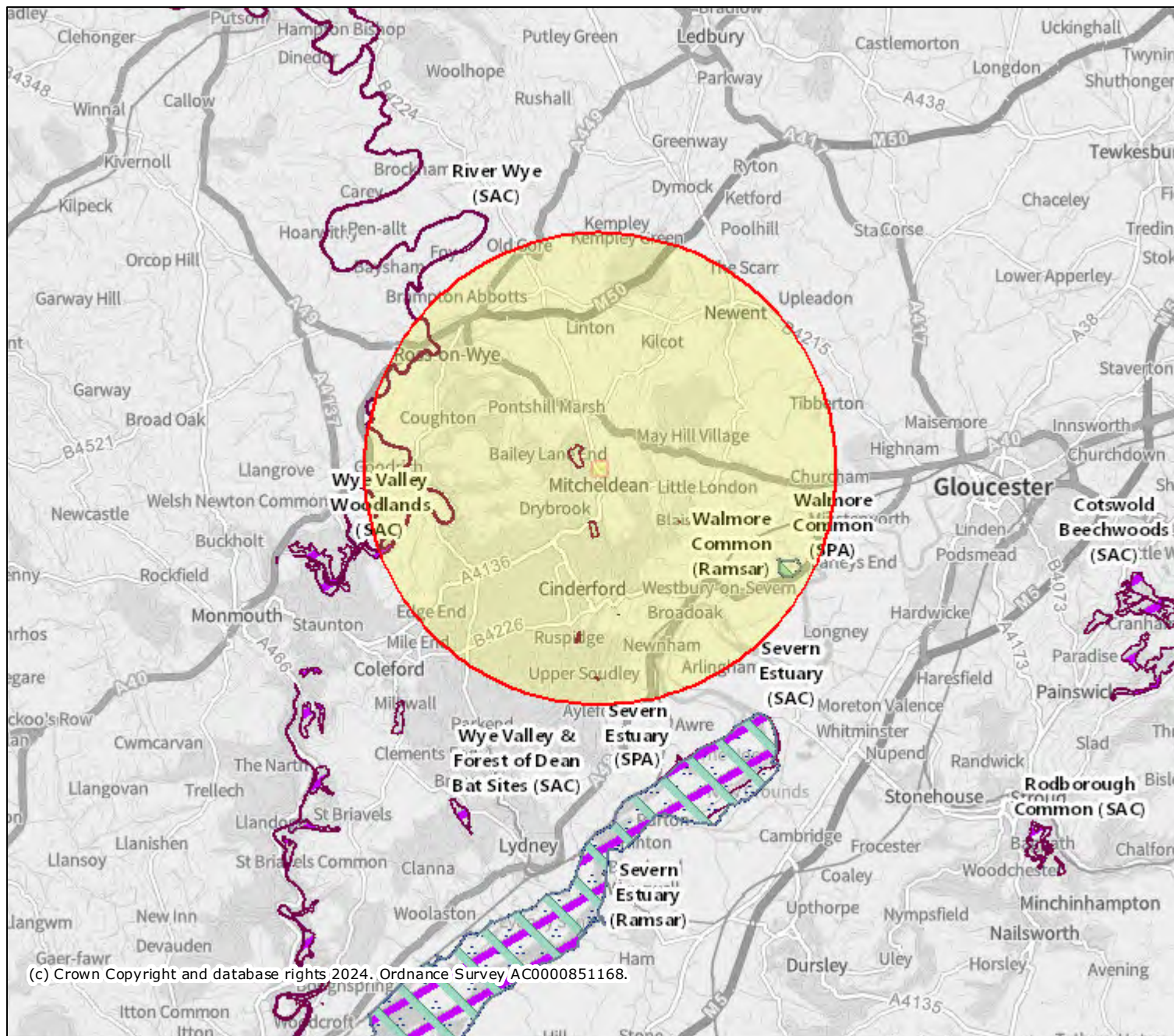
Table 1. Summary of regional and local planning policy relating to ecology

Policy	Summary
Forest of Dean District Council, Core Strategy Adopted Version (2012)	
Policy CSP.1 – Design and environmental protection	Design, environmental protection and enhancement (strategic objective: providing quality environments) The design and construction of new development must take into account important characteristics of the environment and conserve, preserve or otherwise respect them in a manner that maintains or enhances their contribution to the environment, including their wider context. New development should demonstrate an efficient use of resources. It should respect wider natural corridors and other natural areas, providing green infrastructure where necessary. In achieving the above, the following will be considered: • The effect of the proposal on the landscape including AONBs and any mitigation/ enhancement that is necessary or desirable • The impact on any protected sites (natural and historic sites and heritage assets and potential for avoiding and/ or mitigating any impacts, or providing enhancement, should the development be acceptable • The requirements of the management plans of the AONBs • Whether the existing infrastructure is adequate- additional provision will be required where it is not. • Whether the development is at risk from flooding, whether it can be permitted taking into account any risks, and the sequential approach and any mitigation that may be necessary to ensure the development is safe and flood risk is not increased elsewhere • The impact of the development on any land contamination or risk to the development from ground instability including the mining legacy- Proposals must undertake appropriate remediation measures and verification works where contamination and /or stability issues are identified • The potential for the development to cause pollution and any mitigation measures to avoid pollution or make environmental improvements where existing problems occur • The provision of water supply and the development's impact on groundwater, watercourses and any protected abstractions • Any potential impact on the sterilisation of mineral resources and consideration of the potential for the prior extraction of those mineral resources ahead of development • Proposals for waste minimisation and management Development that is not able to be satisfactorily accommodated in respect of the above will not be permitted
Policy CSP.2 – Climate Change	Proposals for development will be required to demonstrate that their design and layout will reduce the impacts of climatic change as identified in national, regional and local predictions over the lifetime of the development concerned. The following should be addressed in an integrated way, demonstrating that one element benefits another:

Policy	Summary
	Managing surface run off- Sustainable Drainage Systems (SUDS) and measures to reduce or avoid water contamination and safeguard ground water supply should be incorporated into all development unless it can be demonstrated that this is not appropriate in a specific location 3 Biodiversity 1. Developments must support green infrastructure corridors that link to existing habitat features and networks. They must show that the integrity of any affected nature conservation sites is not compromised by the development proposed. Proposals that prevent or restrict network connections will not be supported. Developments will be required to make long lasting biodiversity enhancements which could include the creation of new habitats where these would be appropriate. They should support existing features (trees, ponds, hedgerows etc), provide and manage public open space and should also provide additional features for a wide variety of species and habitats in appropriate locations throughout the development. Additional features provided should be consistent with the characteristics of the surrounding area.
Mitcheldean Neighbourhood Development Plan 2016 - 2026	
Policy E4 Biodiversity	Wherever practical and feasible, development proposals should include measures to enhance biodiversity as part of landscaping and building design. Where practicable, proposals should include enhancements such as sustainable drainage systems, re-naturalising watercourses, woodland planting, roosting opportunities for bats, the installation of bird nest boxes and the use of native species in the landscape planting. The Plan identifies two Protection Zones as shown on Map 8. Development proposals within the identified Protection Zones should have regard to its priority species, important habitats, wildlife corridors and its wider ecological networks.

Appendix C

Desk Study Information



Legend

-  Ramsar Sites (England)
-  Proposed Ramsar Sites (England)
-  Special Areas of Conservation (England)
-  Possible Special Areas of Conservation (England)
-  Special Protection Areas (England)
-  Potential Special Protection Areas (England)

Projection = OSGB36

xmin = 302700

ymin = 185600

xmax = 429700

ymax = 248200

Map produced by MAGIC on 25 June, 2024.

Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGIC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.

Site Check Report Report generated on Tue Jun 25 2024
You selected the location: Centroid Grid Ref: SO66451923
The following features have been found in your search area:

Ramsar Sites (England)

Name	WALMORE COMMON
Reference	UK11076
Hectares	53.41

Special Areas of Conservation (England)

Name	WYE VALLEY & FOREST OF DEAN BAT SITES
Reference	UK0014794
Hectares	143.57
Hyperlink	https://sac.jncc.gov.uk/site/UK0014794

Name	RIVER WYE
Reference	UK0012642
Hectares	933.29
Hyperlink	https://sac.jncc.gov.uk/site/UK0012642

Name	WYE VALLEY WOODLANDS
Reference	UK0012727
Hectares	582.96
Hyperlink	https://sac.jncc.gov.uk/site/UK0012727

Special Protection Areas (England)

Name	WALMORE COMMON
Reference	UK9007051
Hectares	53.41

Proposed Ramsar Sites (England)

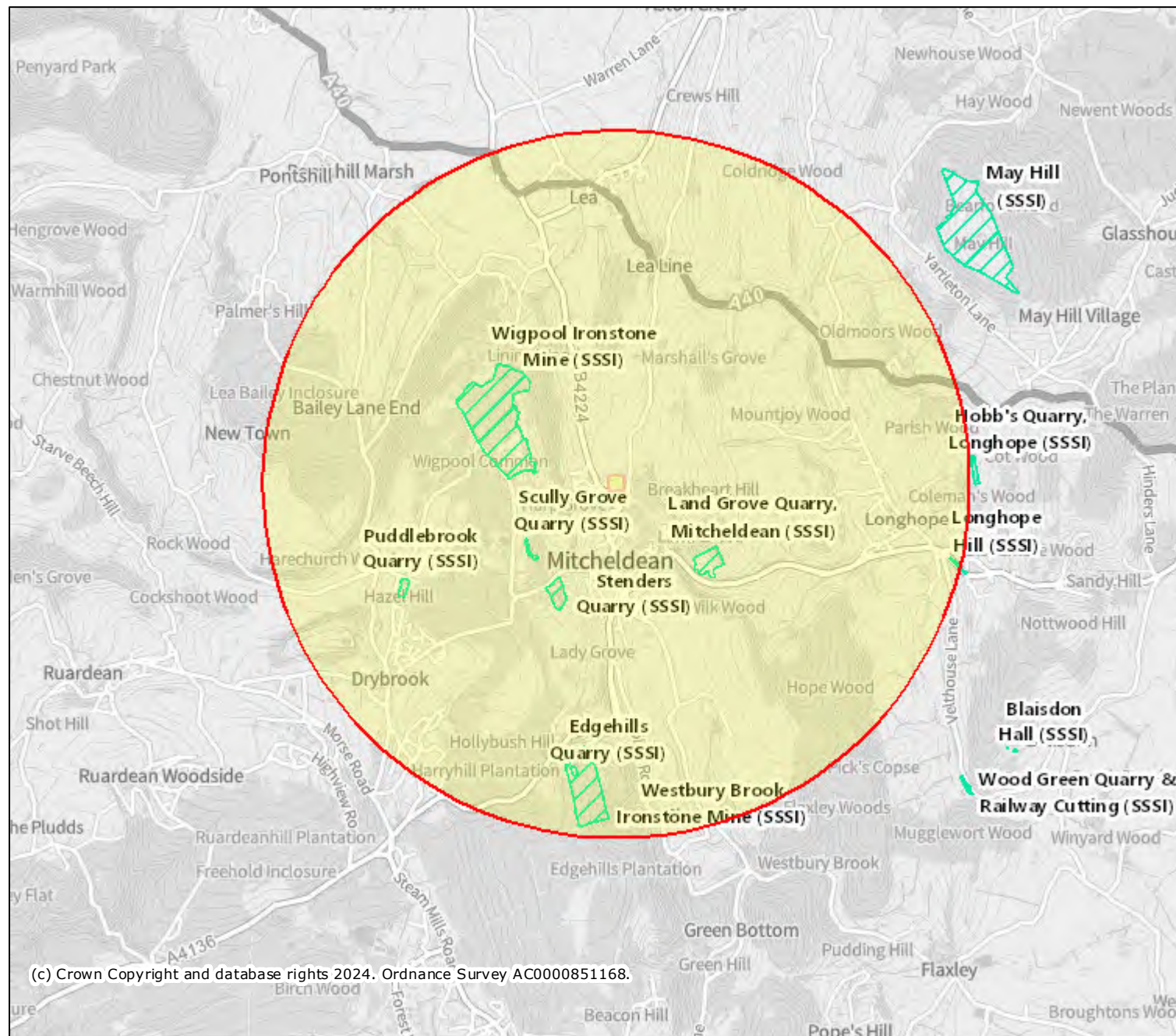
No Features found

Possible Special Areas of Conservation (England)

No Features found

Potential Special Protection Areas (England)

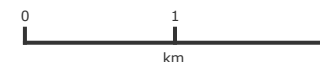
No Features found



Legend

-  Local Nature Reserves (England)
-  National Nature Reserves (England)
-  Sites of Special Scientific Interest (England)

Projection = OSGB36
xmin = 353600
ymin = 212600
xmax = 379000
ymax = 225200



Map produced by MAGIC on 25 June, 2024.
Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGIC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.

Site Check Report Report generated on Tue Jun 25 2024

You selected the location: Centroid Grid Ref: SO66441922

The following features have been found in your search area:

Sites of Special Scientific Interest (England)

Name

Edgehills Quarry SSSI

Reference

1002581

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

0.33

Citation

1001472

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s1001472>

Site Feature Condition Hyperlink

[https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?](https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1001472&SiteName=Edgehills Quarry SSSI)

[SiteCode=s1001472&SiteName=Edgehills Quarry SSSI](https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1001472&SiteName=Edgehills Quarry SSSI)

Name

Land Grove Quarry, Mitcheldean SSSI

Reference

1002593

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

3.86

Citation

1001727

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s1001727>

Site Feature Condition Hyperlink

[https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?](https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1001727&SiteName=Land Grove Quarry, Mitcheldean SSSI)

[SiteCode=s1001727&SiteName=Land Grove Quarry, Mitcheldean SSSI](https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1001727&SiteName=Land Grove Quarry, Mitcheldean SSSI)

Name

Puddlebrook Quarry SSSI

Reference

1002598

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

0.9

Citation

1002228

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s1002228>

Site Feature Condition Hyperlink

<https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1002228&SiteName=Puddlebrook Quarry SSSI>

Name

Stenders Quarry SSSI

Reference

1002618

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

2.64

Citation

1002783

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s1002783>

Site Feature Condition Hyperlink

<https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1002783&SiteName=Stenders Quarry SSSI>

Name

Wigpool Ironstone Mine SSSI

Reference

1006987

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

35.23

Citation

2000191

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s2000191>

Site Feature Condition Hyperlink

<https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s2000191&SiteName=Wigpool Ironstone Mine SSSI>

Name

Westbury Brook Ironstone Mine SSSI

Reference

1006986

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

15.8

Citation

2000188

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s2000188>

Site Feature Condition Hyperlink

<https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s2000188&SiteName=Westbury Brook Ironstone Mine SSSI>

Name

Scully Grove Quarry SSSI

Reference

1002614

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

0.42

Citation

1006518

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s1006518>

Site Feature Condition Hyperlink

<https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1006518&SiteName=Scully Grove Quarry SSSI>

Name

Longhope Hill SSSI

Reference

1002125

Natural England Contact

Area Team, (West Midlands)

Natural England Phone Number

0845 600 3078

Hectares

0.21

Citation

1001249

Site Details Hyperlink

<http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=s1001249>

Site Feature Condition Hyperlink

<https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=s1001249&SiteName=Longhope Hill SSSI>

Local Nature Reserves (England)

No Features found

National Nature Reserves (England)

No Features found

Appendix D

Photographs



Photograph 1. Overview of grass ley



Photograph 2. Hedgerow H2 with high canopy



Photograph 3. Hedgerow H2 looking north to mature oak



Photograph 4. Gappy boundary vegetation along western boundary



Photograph 5. Dense bracken in south-west boundary



Photograph 6. Two mature willow trees in southern tip of Site

Appendix E

Evaluation & Assessment Methods

- 1.1. Ecological features are evaluated and assessed in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) 2018 Guidelines for Ecological Impact Assessment (EclA). For clarity, the evaluation and assessment process adopted within this EclA is set out below.

Establishing Potentially Important Ecological Features

- 1.2. Ecological features are assessed where they are considered to be important, and where they may be impacted by a proposed development. A feature may be considered important for a variety of reasons, such as quality, extent, rarity and/or statutory protection. Table 1 below sets out a non-exhaustive list of ecological features that are typically considered, along with key examples:

Table 1. Potentially important ecological features (adapted from CIEEM 2018)

Potentially Important Ecological Features	Typical examples
Statutory designated sites under international conventions or European Legislation	Wetlands of International Importance (Ramsar sites), Special Areas of Conservation (SAC), Special Protection Areas (SPA)
Statutory designated sites under national legislation	Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR)
Non-statutory, locally designated wildlife sites	Local Wildlife Sites (LWS), County Wildlife Sites (CWSs), Sites of Importance for Nature Conservation (SINCs)
National biodiversity lists	Habitats or Species of Principal Importance for the Conservation of Biodiversity (Section 41, NERC Act 2006), Ancient Woodland Inventory
Local biodiversity lists	Local Biodiversity Action Plan (BAP) priority species or habitats
Red Listed / Rare Species	Species of conservation concern, Red Data Book (RDB) species, Birds of Conservation Concern, nationally rare and nationally scarce species
Legally Protected Species	E.g. species listed under Sch.5 of the W&C Act 1981, or Sch.2 of the Hag. Regs. 2017
Legally Controlled Species	E.g. species listed under Sch.9 of the W&C Act 1981

- 1.3. It should also be noted that the social, community, economic or multi-functional importance attributed to ecological features are not assessed as they fall outwith the scope of this assessment.

Establishing Likely Zone of Influence

- 1.4. The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects as a result of the project and associated activities. The project's zone of influence varies across different ecological features, which have different vulnerabilities and

sensitivities. For the purposes of this assessment, the following zones were considered:

- International statutory nature conservation designations up to 10km from the Site
 - National and local statutory nature conservation designations up to 3km from the Site
 - Non-statutory locally designated wildlife sites up to 1km from the Site
- 1.5. These arbitrary distances are considered sufficient for identifying the nature conservation designations which could be subject to significant effects. However, it is acknowledged that in certain circumstances effects beyond these distances are possible and should be considered as far as is reasonably practicable to do so.
- 1.6. For other ecological features, such as habitats and species, the appropriate zone of influence is described and justified as appropriate within the report, depending on their respective sensitivity to an environmental change.
- 1.7. The results of professionally accredited or published scientific studies have been used and referenced, where available, to establish the spatial and temporal limits of the biophysical changes likely to be caused by specific activities, and to justify decisions about the zone of influence.

Geographic Context and Significance Criteria

- 1.8. The importance of ecological features, as well as the significance of any likely impacts and their effects, are considered here within a defined geographic context:
- International
 - National
 - Regional
 - County
 - Local
- 1.9. While higher geographic tiers correspond to clearly defined areas, local context is subjective and will vary on a case-by-case basis. It will range from the Site and its surroundings, to ecologically connected environs, to the scale of the District/Borough, according to the professional judgement of the author.
- 1.10. The size, conservation status and the quality of features are all relevant in determining their importance and assigning this to the geographic scale. Where the importance of a feature is considered to fall below the Local scale, they are scoped out of detailed assessment.

- 1.11. Impacts and their effects are taken to be significant where they support or undermine biodiversity conservation objectives, with the scale of significance defined according to the above geographic context. Where an impact or effect is unlikely to be perceptible at a Local scale, this is taken to be not significant.

Characterising Ecological Impacts and their Effects

- 1.12. Where likely significant ecological impacts and effects are identified in connection with the proposed project, these are considered and described with reference to the following characteristics (where this is helpful in accurately portraying the ecological effect and determining the scale of significance):
- Positive or negative (i.e. does the anticipated change accord with nature conservation policies and objectives?)
 - Extent (i.e. the spatial area over which the impact or effect may occur)
 - Magnitude (i.e. the quantified size, amount, intensity or volume)
 - Duration (i.e. the timeframe over which the impact or effect may occur, in both human and ecological terms)
 - Frequency and timing (i.e. the number of times an activity occurs, where this is likely to influence the effect)
 - Reversibility (i.e. is spontaneous recovery possible or may the effect be counteracted by mitigation?)

Appendix F

Bat Survey Report (2018/2019)



Carisbrook Road, Mitcheldean

Bat Survey Report

Prepared by
CSA Environmental

on behalf of
Gladman Developments Ltd

Report No: CSA/4057/10

December 2019

Report Reference	Revision	Prepared by	Approved by	Comments
CSA/4057/10	-	KK	AM	Interim report containing winter bat survey data
CSA/4057/10A	A	KK	AM	Finalised report containing summer bat activity and lighting survey information



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	Aims	2
2.0	Methods	3
	Winter Bat Activity Surveys	3
	Non-winter Activity Surveys	4
	Limitations	5
3.0	Results	7
	Winter Bat Activity Surveys	7
	Non-winter Activity Surveys	13
		21
4.0	Discussion	22

Appendices

Appendix A: Overnight Weather Conditions for each Static Monitoring Period
(Winter and Non-Winter)

1.0 INTRODUCTION

- 1.1 This report sets out the methods and results of monthly bat activity surveys undertaken at Carisbrook Road, Mitcheldean between October 2018 and September 2019 (inclusive).
- 1.2 The surveys were undertaken to inform development proposals for the Site, with a high survey effort required because of the proximity of the Wye Valley and Forest of Dean Bat Sites SAC, a complex of above- and underground sites used by significant populations of breeding and hibernating greater and lesser horseshoe bats *Rhinolophus ferrumequinum/hipposideros*. Whilst these sites are scattered across the Forest of Dean and wider Wye Valley, one of the key hibernation sites, Wigpool Iron Mine SSSI, is located c. 470m west of the Site and is therefore of particular relevance to proposed development in this area.
- 1.3 The proposed development site (the 'Site') comprises part of a single arable field to the north of Mitcheldean, as shown by the red-line boundary on the following maps. The area was originally larger and included the entirety of the field, however this was adjusted in winter 2018. Although the northern half of the field was no longer proposed for development, the habitats were of relevance to the bat survey work and thus the whole field continued to be included within the surveys. This additional area is indicated by the blue-line boundary on the following maps.

Aims

- 1.4 The field work was undertaken to establish:
 - The presence, or likely absence, of greater and lesser horseshoe bats within the survey area (which may be associated with the SAC)
 - The relative activity levels of horseshoe bats and distribution of such activity across the survey area, as well as the type of use occurring e.g. foraging, commuting etc.
 - Other bat species/genera making use of the survey area and their relative activity levels and distribution.
- 1.5 The field work design, data analysis and interpretation are undertaken with due consideration for the Bat Conservation Trust (BCT) guidelines 3rd Edition (Collins, 2016).

2.0 METHODS

Winter Bat Activity Surveys

- 2.1 Three Wildlife Acoustics Songmeter static detectors (a combination of SM2 and SM4 detectors) were deployed across the survey area in November 2018 for a continuous period of two weeks. These were positioned to monitor two hedgerows/tree-belts in the northern half of the survey area which were most likely to be used by bats as well as the southern tip of the field where the proposed development is due to be focussed.
- 2.2 From December 2018 until March 2019 (inclusive), a total of four detectors were deployed for the same amount of time each month. The additional monitoring position (MP3, see Figure 1 below) was included part-way along the eastern boundary hedgerow in order to sample this feature. The locations of each Monitoring Point (MP) are shown in Figure 1.



Figure 1. The locations of each Monitoring Point (MP), MP1-4, from November 2018 to March 2019, inclusive. (Note that MP3 was not surveyed during November 2018). Red line = development area; Blue line = wider survey area.

- 2.3 The detectors were set up to automatically record ultrasonic signals for the period from half an hour before sunset to half an hour after sunrise each night, with each monitoring period spanning fourteen nights.
- 2.4 Weather conditions were obtained for each monitoring period using historic weather data from the World Weather Online website, with weather observations taken from the nearest weather station in Staverton, Gloucestershire. These are summarised within Appendix A.
- 2.5 Recordings were subsequently analysed using the specialist software AnalookW and BatExplorer. Sonograms were reviewed to confirm bat identification to genera, or where possible, species level.
- 2.6 Each of the recorded files, which contain a variable number of call 'pulses', was designated a 'bat contact'. Quantitative analysis of bat activity is then undertaken by calculating average bat contacts per hour for each detector, on each night, over each monitoring period. Given the stochastic nature of bat activity, the median average and interquartile range is reported.
- 2.7 Further temporal analysis of the recordings was also undertaken to reveal any patterns in activity at the survey area.

Non-winter Activity Surveys

Transect Surveys

- 2.8 To provide additional information on bat behaviour, walked transects were undertaken in October 2018 then monthly between April and September 2019 to cover the spring, summer and autumn seasons.
- 2.9 A single transect route was walked around the margins of the field on each occasion, commencing at sunset and continuing for the following three hours. The route was varied to include open habitats on occasions where tramlines were clear and it was possible to access these areas without damaging the crop. Multiple circuits of the field could be made on each visit and the route was varied to minimise temporal bias in certain locations.
- 2.10 During August 2019, a consecutive dusk-dawn transect survey was completed. This involved walking a dusk survey using the methods described above, followed by a pre-dawn survey the following morning in the three hours leading up to sunrise.
- 2.11 Bat calls were recorded using an Elekon Batlogger M detector. This detector automatically records ultrasonic signals with a one second delay between recordings. Temperature and location data were also recorded by the detector during the survey.

- 2.12 Bat detectors were used to aid in bat identification and observations during the survey. Recordings were subsequently analysed using BatExplorer software, with sonograms reviewed to confirm bat identification to genera, or where possible, species level.
- 2.13 Each of the recorded files, which contain a variable number of call 'pulses', was designated a 'bat contact'. At the point of contact, each sound file is assigned a GPS location.
- 2.14 Data analysis and graphics have been produced in the statistical and graphics software R, with this report written and generated using the authoring format R Markdown through RStudio.

Automated Monitoring

- 2.15 To supplement the winter surveys, four bat detectors were deployed monthly between April 2019 and September 2019 (inclusive) to gather data for the spring, summer and autumn periods. The same monitoring points were used each month as shown in Figure 1, and the data was collected and analysed using the same methodology as for the winter surveys. Data was also collected in October 2018 and this is reviewed alongside the 2019 data below although only monitoring points MP1, MP2 and MP3 were surveyed.

Limitations

- 2.16 Batlogger M detectors automatically assign a GPS location to each bat contact, allowing distribution maps to be plotted (see Results section of this report). The accuracy of the GPS locations provided for each contact is variable and may depend on the number of satellites available and the strength of the signal received. This in turn is affected by environmental conditions such as cloud or tree canopy cover. The accuracy of GPS coordinates may vary during a transect survey and, as a result, this must be taken into account when viewing the distribution maps within this report.
- 2.17 It should be noted that the findings described herein for static monitoring surveys are based on the bat activity recorded at the location immediate to each static detector, and therefore only describe localised activity.
- 2.18 It is important to note that there is little evidence that levels of bat activity (i.e. recorded echolocations of bats) reflect the abundance of bats using the survey area (Hayes, 2000), however the number of bat contacts recorded provide some basis for comparison of relative activity across the survey area.
- 2.19 It is acknowledged that bat activity will vary between bat species/genera given their relative detectability by survey equipment and as a result of the behaviour of each species/genera, therefore comparisons between these are made with caution.

- 2.20 Only three monitoring locations were surveyed in October and November 2018, compared to four during the remaining survey months, however this is taken into account within the analysis. No data was collected for MP1 during January 2019 due to technical problems. As above, the remaining dataset is considered to be sufficiently large (252 monitoring nights) to reduce the significance of this omission, and it is taken into account during analysis of the data.

3.0 RESULTS

Winter Bat Activity Surveys

- 3.1 The overnight weather conditions experienced during each of the monitoring periods are included in Appendix A. As would be expected for the winter months, there were intermittent periods of rain and cold weather. Prolonged wet weather persisted through the February and March monitoring periods which may have effected bat behaviour during this time.
- 3.2 A total of 1,583 bat passes were recorded overall across the 252 monitoring nights (approximately 1,098 hours) with an average of 1.4 passes/hour. A minimum of nine species were detected, of which 86% are attributable to common pipistrelle bat *Pipistrellus pipistrellus* (n=1,363). Lesser horseshoe bats were the second most frequently recorded species although this only accounted for 6% of activity (n=102). As summarised in Figure 2, relatively low numbers of soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, noctule *Nyctalus noctula*, greater horseshoe bat, Nathusius' pipistrelle *Pipistrellus nathusii* and serotine *Eptesicus serotinus* were also recorded as well as unconfirmed species within the *Myotis*, *Nyctalus* and *Eptesicus* genera.

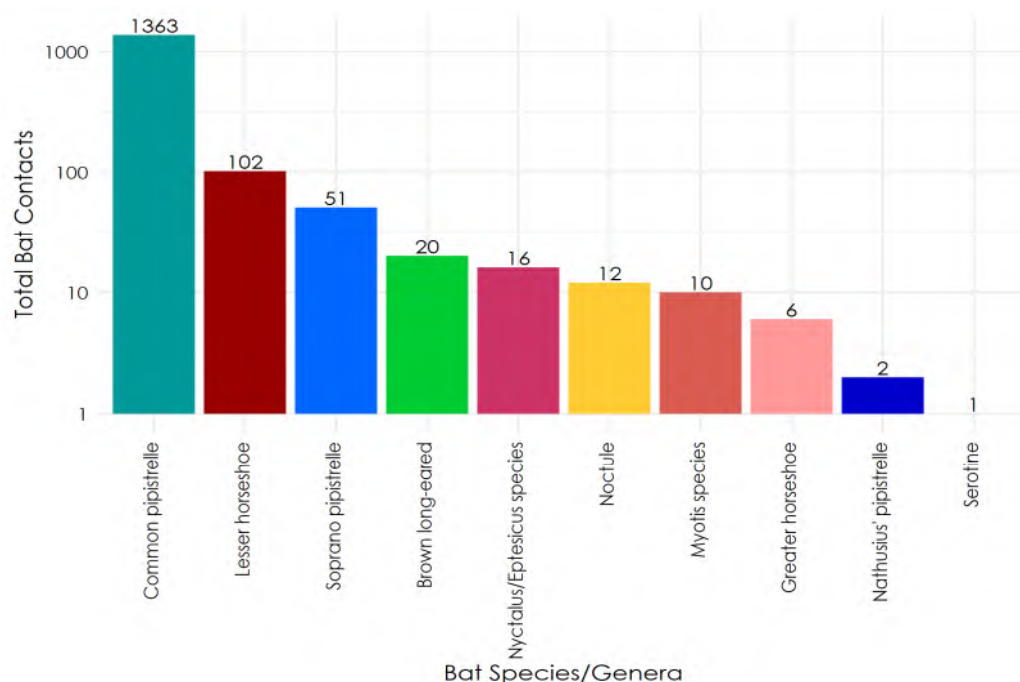


Figure 2. Total bat contacts by species recorded during all winter static monitoring periods

- 3.3 Table 1 below gives an overview of total bat passes recorded at each monitoring point on each period. Monitoring Point MP1 consistently had greatest bat activity, and the greatest diversity of species was recorded at this location, although activity was always dominated by common pipistrelle. A total of 1,047 bat passes were recorded at MP1, with 133, 145 and 258 passes recorded at MP2, MP3 and MP4 respectively (though

it should be remembered that data was collected at MP3 and MP1 on four rather than five occasions).

Table 1: Summary of 'bat passes' recorded by location and month for each species/genera

Monitoring Point	Common pipistrelle	Lesser horseshoe	Soprano pipistrelle	Brown long-eared bat	Nyctalus/Eptesicus	Noctule	Myotis sp.	Greater horseshoe	Nathusius' pipistrelle	Serotine	Grand Total
November	828	12	40	3	4	6	7	2			902
MP1	748	2	40	3	3	2	4	1			803
MP2	4	10					3	1			18
MP3	76				1	4					81
December	88	22	4	1		2	2			1	120
MP1	28	5	3			1					37
MP2	5	16		1			1				23
MP3	31	1				1	1			1	35
MP4	24		1								25
January	10	27				1		1			39
MP2	2	25						1			28
MP3	2	2									4
MP4	6					1					7
February	116	16	1	1		1	1	1	2		139
MP1	42	6		1			1				50
MP2	6	10									16
MP3	32		1			1		1			35
MP4	36								2		38
March	321	25	6	15	12	2		2			383
MP1	139	5	4	5	3			1			157
MP2	16	20		7	4			1			48
MP3	63		2	1	5						71
MP4	103			2		2					107
Grand Total	1363	102	51	20	16	12	10	6	2	1	1583

- 3.4 With the exception of horseshoe bats, which are of greater relevance to the Site because of the nearby SAC, the level of bat activity recorded by other species within the survey area is not discussed in greater detail. A boxplot diagram of average bat passes/hour for all species per monitoring point, is given in Figure 3, with summary data in Table 2. Common pipistrelle bats are deliberately omitted from the graph due to the large disparity in data between these and other species, which would otherwise obscure comparisons. It should be noted that, even though a considerable dataset was collected, due to the low levels of bat activity recorded, the median number of bat contacts/hour is predominantly 0. However, this method provides a more accurate review of the data than other averages such as the mean which would take account of outlying data points.

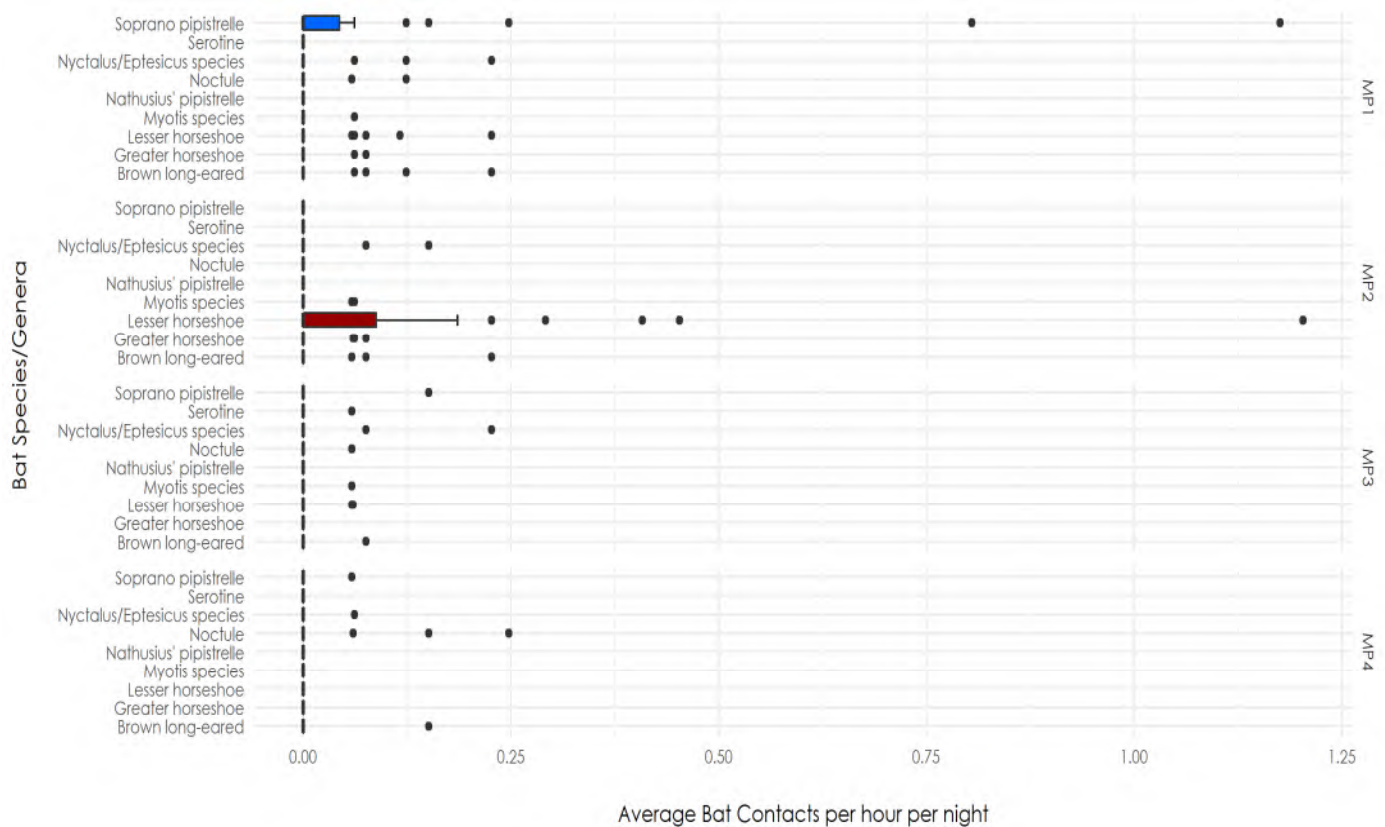


Figure 3: Bat passes per hour recorded at each monitoring point surveyed (excluding common pipistrelle)

Table 2: Summary bat data recorded per monitoring point

MP	Species	Min	Max	Median	Interquartile Range	Total Contacts	Total Nights Surveyed
MP1	Brown long-eared	0	0.226	0.000	0.000	8	56
	Common pipistrelle	0	21.906	0.062	0.340	915	56
	Greater horseshoe	0	0.075	0.000	0.000	2	56
	Lesser horseshoe	0	0.226	0.000	0.000	12	56
	Myotis species	0	0.062	0.000	0.000	4	56
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	56
	Noctule	0	0.124	0.000	0.000	3	56
	Nyctalus/Eptesicus species	0	0.226	0.000	0.000	6	56
	Serotine	0	0.000	0.000	0.000	0	56
	Soprano pipistrelle	0	1.176	0.000	0.044	47	56
MP2	Brown long-eared	0	0.226	0.000	0.000	8	70
	Common pipistrelle	0	0.528	0.000	0.015	27	70
	Greater horseshoe	0	0.075	0.000	0.000	3	70
	Lesser horseshoe	0	1.203	0.000	0.088	71	70
	Myotis species	0	0.062	0.000	0.000	4	70
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	70
	Noctule	0	0.000	0.000	0.000	0	70
	Nyctalus/Eptesicus species	0	0.151	0.000	0.000	4	70
	Serotine	0	0.000	0.000	0.000	0	70
	Soprano pipistrelle	0	0.000	0.000	0.000	0	70

MP3	Brown long-eared	0	0.075	0.000	0.000	1	56
	Common pipistrelle	0	1.736	0.000	0.106	96	56
	Greater horseshoe	0	0.000	0.000	0.000	0	56
	Lesser horseshoe	0	0.060	0.000	0.000	3	56
	Myotis species	0	0.058	0.000	0.000	1	56
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	56
	Noctule	0	0.058	0.000	0.000	1	56
	Nyctalus/Eptesicus species	0	0.226	0.000	0.000	5	56
	Serotine	0	0.058	0.000	0.000	1	56
	Soprano pipistrelle	0	0.151	0.000	0.000	2	56
MP4	Brown long-eared	0	0.151	0.000	0.000	2	70
	Common pipistrelle	0	2.717	0.000	0.151	209	70
	Greater horseshoe	0	0.000	0.000	0.000	0	70
	Lesser horseshoe	0	0.000	0.000	0.000	0	70
	Myotis species	0	0.000	0.000	0.000	0	70
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	70
	Noctule	0	0.248	0.000	0.000	7	70
	Nyctalus/Eptesicus species	0	0.062	0.000	0.000	1	70
	Serotine	0	0.000	0.000	0.000	0	70
	Soprano pipistrelle	0	0.058	0.000	0.000	1	70

3.5 Greater horseshoe bats were only recorded in very low numbers during the monitoring period (six passes overall), and only at monitoring points MP1 and MP2 to the north of the development area.

3.6 Lesser horseshoe bats were recorded at all monitoring points except MP4 within the development area. They were also the second-most frequently recorded species during the survey with 102 passes overall and a peak of 27 passes recorded over the 14 nights monitored in January. This species was consistently recorded at MP2 along the north boundary hedgerow with occasional contacts along hedgerows to the east and west. This suggests the presence of a regularly used commuting route past MP2, possibly used in combination with habitats and hedgerows to the north of the survey area or connecting offsite hedgerows along Ross Road and Bradley Court Road to the east. Only a small number of contacts were recorded at MP1 and MP3 which one would have expected to be higher had bats been following commuting routes around the boundaries of the survey area.

3.7 The maximum number of lesser horseshoe bat passes/hour was 1.203 at MP2, although it is worth remembering that the median number of passes/hour is still 0 due to what, overall, is a low number of contacts. Average activity at MP1 and MP3 was lower still (see Table 2). This highlights the fact that the result presents a picture of a very low level of activity by this species.

- 3.8 A review of the temporal distribution of lesser horseshoe bat passes during the course of the night reveals peaks in activity near dusk, as shown in Figure 4 below. The earliest contacts were made in January, February and March 2019 with first detections at 23 minutes, 28 minutes and 29 minutes after sunset, respectively. The majority of contacts were recorded between half an hour and an hour after sunset.
- 3.9 It should be noted that the time difference between recordings is variable and it is impossible to ascertain from static monitoring recordings whether close bouts of activity relate to a single bat foraging up and down past the monitoring point, or separate bats commuting past. Recorded activity by lesser horseshoe bats after the initial peak just after dusk is low and bats are likely to return-to-roost via a range of routes from their chosen foraging area, and at different times during the night.

Winter Bat Activity Summary

- Recorded activity was low overall, and dominated by common pipistrelle bat
- Very few detections were made by greater horseshoe bat, with no contacts in the south of the survey area, within the proposed development area
- Lesser horseshoe bat was regularly recorded, particularly at MP2, although overall activity was also low.
- The northern field hedgerow is suspected to comprise a regular flight-line for lesser horseshoe bats. In contrast, this species was not detected within the proposed development area and these are not considered to provide significant habitat for horseshoe bats.

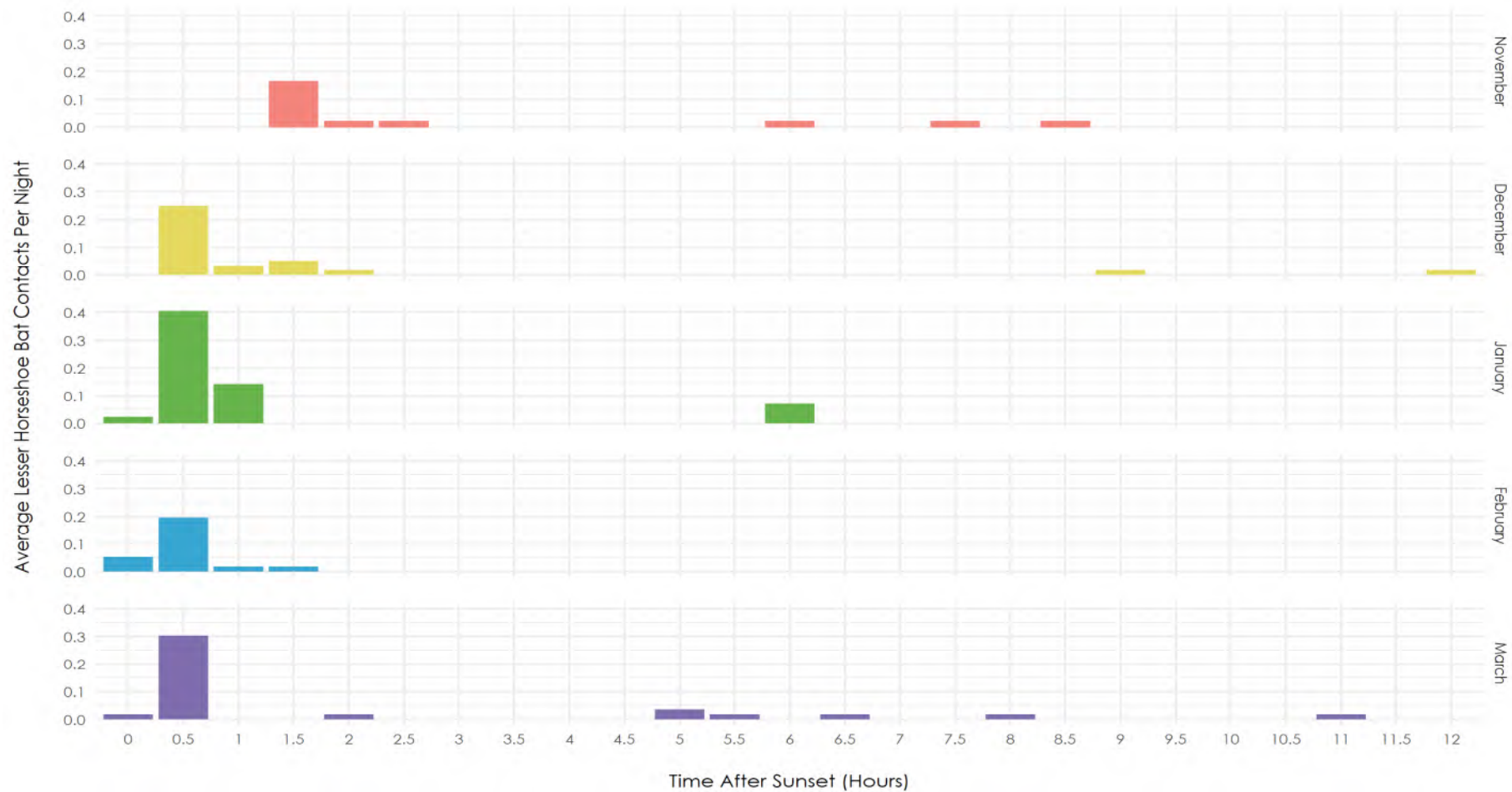


Figure 4: Temporal distribution of lesser horseshoe bat activity after sunset. Data averaged to account for variance in number of survey nights per month (November and January = 42 survey nights per month, other months = 56 survey nights). (NB total night length varies by month, November (c. 15.5hrs), December (16hrs), January (15.5hrs), February (14.5hrs), March (12.5hrs))

Non-winter Activity Surveys

Transect Surveys

- 3.10 The dates and weather conditions for each transect survey are provided in Table 3 below.

Table 3: Bat transect survey weather conditions

Survey Date	Sunset/ Sunrise Time	Start Time	End Time	Temperature (°C)		Precipitation	Cloud Cover (Oktas)		Wind (Beaufort Scale)	
				Start	End		Start	End	Start	End
24/10/18	17:59	17:59	20:59	11	8	Dry	1	4	1	3
09/04/19	19:50	19:55	22:55	9	5	Dry	4	1	2	1
01/05/19	20:32	20:32	23:32	10	8.5	Dry	7	1	2	2
04/06/19	21:22	21:22	00:22	13	12	Light intermittent rain	8	4	3	3
29/07/19	21:04	21:04	23:51	20	17	Dry	3	7	2	2
22/08/19	20:19	10:19	23:19	17	15	Dry	5	3	3	1
23/08/19	06:06	03:06	06:06	14	15	Dry	1	7	4	3
25/09/19	19:02	19:02	22:02	15	14	Light rain from 21:30	6	8	2	3

- 3.11 At least five species of bat were recorded within the survey area during the transect surveys, comprising common pipistrelle, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, *Myotis* species and lesser horseshoe *Rhinolophus hipposideros*. A small number of recorded calls could not be identified to species level because of overlap in the call characteristics (*Nyctalus* or *Eptesicus* species). The number of bat contacts recorded for each species/genus are summarised in Table 4 below. The locations of each bat contact and the overall distribution of activity across the survey area are illustrated in Figures 5 and 6.

Table 4: Summary of bat contacts recorded during the transect surveys

Month	Common pipistrelle	Lesser horseshoe	Myotis species	Noctule	Nyctalus species	Nyctalus/ Eptesicus species	Soprano pipistrelle
April	0	0	0	0	0	0	0
May	164	1	2	0	0	1	1
Jun	63	1	0	0	0	0	1
Jul	129	1	0	1	0	0	3
Aug (dusk)	84	0	3	0	0	0	20
Aug (dawn)	33	0	3	0	1	0	01
Sep	170	0	1	0	0	0	3
Oct	43	1	0	0	0	0	13



Figure 5: Location of common and soprano pipistrelle bat contacts recorded, combined across all transect surveys



Figure 6: Location of bat contacts recorded, combined across all transect surveys

- 3.12 Activity was dominated by common pipistrelle bats which were recorded in all parts of the survey area, although noticeably lower detections were made along the eastern boundary. Non-pipistrelle bat species were almost entirely recorded in the northern half of the field, outside the development area, and largely in association with the northern boundary hedgerows.
- 3.13 Regular foraging activity by common and soprano pipistrelles was observed around mature trees along the northern boundary, western boundary and southern willow tree with up to three bats seen at a time. Single bats were also occasionally seen flying along Bradley Court Road or foraging around streetlamps. Very low activity by other species was recorded: three noctule bats were seen commuting north-east over the field during the September survey and lesser horseshoe bats were detected on four of the seven transects, with single passes along the northern hedgerow only.
- 3.14 Figure 7 below illustrates the general pattern of bat activity within the survey area, and location of 'hot spot's although no area was seen to support considerably high activity.



Figure 7: Indicative 'Utilisation Distribution' (UD) of all bat species/genera at the survey area estimated from all transect data combined. The UD illustrates the relative probability of a bat in flight being present at a given point, with higher/central contours having a greater probability, and lower/peripheral contours having less probability.

Automated Monitoring

- 3.15 The overnight weather conditions experienced during each of the five nights where data was analysed for each monitoring period are provided in Appendix A.
- 3.16 The total number of bat passes recorded across all monitoring locations for each bat species are provided in Figure 8 and Table 5 below. One additional species, barbastelle *Barbastella barbastellus* was recorded which had not previously been detected during the winter surveys, meaning that overall a minimum of 10 species have been found to use the survey area.
- 3.17 Consistently with all other survey data collected, common pipistrelle was the most frequently recorded species, accounting for 87% of all bat activity recorded during the non-winter monitoring period. Pipistrelle activity was greatest on average at monitoring point MP1 with a significant peak of 331 passes/hour recorded on 26 July 2019. Activity was constant throughout the night and likely to be attributable to foraging activity by a small number of bats as observed during the transect surveys. Activity by other species was much lower, with soprano pipistrelle the next most frequently detected species, followed by *Myotis* bats.
- 3.18 Noctule (and *Nyctalus* sp. bats) were well represented in the data, and passes by this group were recorded at all monitoring points in similar numbers. However, noctule bats are wide-ranging and have a loud echolocation call. Given the small size of the survey area it is reasonable that bats flying overhead would be picked up at all monitoring points. Most activity was recorded near dusk or dawn periods indicating commuting behaviour overhead.
- 3.19 Low activity by serotine was recorded at MP1 and MP2 only, although a small number of passes were not distinguished between *Nyctalus* and *Eptesicus* species at MP3. The survey area is not considered to comprise a significant resource for this species locally. Low activity by brown long-eared bat was recorded at all monitoring points though it is likely that this common species was under recorded by the monitoring equipment because of its quiet echolocation call.
- 3.20 Lesser horseshoe bats were recorded at all monitoring points with the greatest number of passes recorded at MP1 and MP2, similar to the winter monitoring period. No activity by this species was recorded at MP4 within the proposed development area except during June (eight passes over five nights) and August (32 passes over five nights). During August, lesser horseshoe bats were recorded sporadically at MP4 on all five nights of monitoring suggesting occasional flights past the detector, rather than sustained activity (such as foraging) in that area. The earliest lesser horseshoe detections were c. 12 minutes after sunset (recorded at MP2 and subsequently MP3 on 07 June) which suggests the presence of

a local roost site as this species typically emerges half an hour after sunset. A small number of other passes occurred within an hour of sunset but most were detected later in the night. Hence no obvious commuting route from any nearby summer roost is suggested although there may be a sporadically used non-breeding roost in proximity. As with the winter data, more activity was recorded during the evening than early morning hours.

- 3.21 Greater horseshoe bats were recorded at all monitoring points but in very low numbers (between five and eight passes) with a peak average of 0.27 passes/hour.
- 3.22 Barbastelle bats were recorded at all monitoring points, generally in low numbers (eight to 11 passes at MP1, 3 & 4) but higher activity at MP2 (total 240 passes). A peak of c. eight passes/hour was recorded at this location in August and almost half of all recorded passes by this species at the survey area were recorded in August. Almost constant detections were made between 01:45 and 03:45 on 26 August suggesting a period of foraging activity which has elevated the recorded activity by this species.

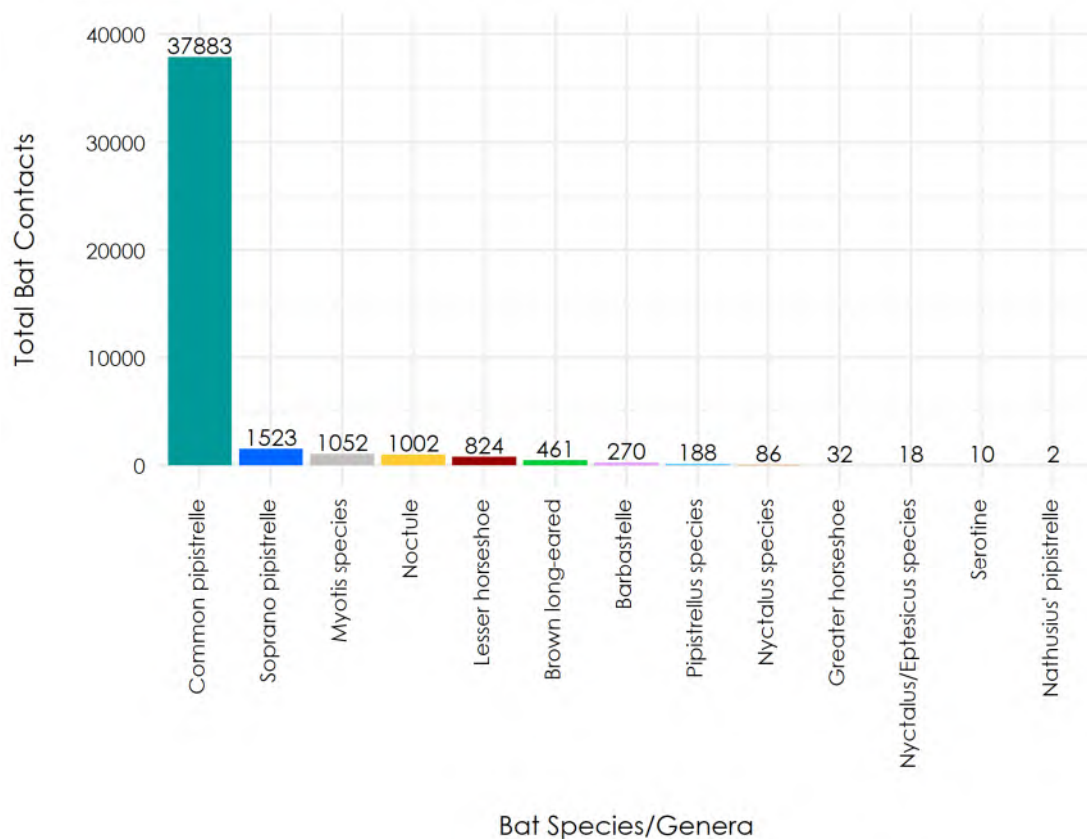


Figure 8: Total bat contacts by species recorded during all static monitoring periods

Table 5: Summary of bat passes per hour recorded at each monitoring point surveyed.

MP	Species	Min	Max	Median	Interquartile Range	Total Contacts	Total Nights Surveyed
MP1	Barbastelle	0	0.182	0.000	0.000	8	35
	Brown long-eared	0	2.461	0.094	0.416	111	35
	Common pipistrelle	0	331.351	28.669	127.861	23111	35
	Greater horseshoe	0	0.273	0.000	0.059	13	35
	Lesser horseshoe	0	5.347	0.216	1.601	329	35
	Myotis species	0	11.493	0.340	1.261	437	35
	Nathusius' pipistrelle	0	0.108	0.000	0.000	2	35
	Noctule	0	4.467	0.185	1.231	271	35
	Nyctalus species	0	0.874	0.000	0.164	31	35
	Nyctalus/ Eptesicus species	0	0.590	0.000	0.000	9	35
	Pipistrellus species	0	1.193	0.000	0.299	54	35
	Serotine	0	0.461	0.000	0.000	5	35
	Soprano pipistrelle	0	18.232	0.305	2.492	916	35
MP2	Barbastelle	0	8.113	0.000	0.111	240	35
	Brown long-eared	0	1.596	0.113	0.621	118	35
	Common pipistrelle	0	157.327	6.752	26.766	6508	35
	Greater horseshoe	0	0.182	0.000	0.000	8	35
	Lesser horseshoe	0	5.347	0.825	1.348	349	35
	Myotis species	0	5.937	0.000	0.633	195	35
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	35
	Noctule	0	1.858	0.166	0.847	159	35
	Nyctalus species	0	0.369	0.000	0.093	18	35
	Nyctalus/ Eptesicus species	0	0.236	0.000	0.000	5	35
	Pipistrellus species	0	0.479	0.000	0.091	18	35
	Serotine	0	0.182	0.000	0.000	3	35
	Soprano pipistrelle	0	2.713	0.000	0.203	107	35
MP3	Barbastelle	0	0.186	0.000	0.075	11	35
	Brown long-eared	0	2.381	0.104	0.620	167	35
	Common pipistrelle	0	49.355	3.464	9.283	1991	35

	Greater horseshoe	0	0.181	0.000	0.000	6	35
	Lesser horseshoe	0	1.197	0.100	0.369	84	35
	Myotis species	0	2.110	0.113	0.556	127	35
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	35
	Noctule	0	5.761	0.000	1.000	218	35
	Nyctalus species	0	0.645	0.000	0.163	30	35
	Nyctalus/ Eptesicus species	0	0.182	0.000	0.000	4	35
	Pipistrellus species	0	0.456	0.000	0.000	13	35
	Serotine	0	0.000	0.000	0.000	0	35
	Soprano pipistrelle	0	3.041	0.104	0.296	100	35
MP4	Barbastelle	0	0.452	0.000	0.000	11	30
	Brown long-eared	0	1.003	0.000	0.319	60	30
	Common pipistrelle	0	90.975	4.839	15.763	5747	30
	Greater horseshoe	0	0.184	0.000	0.000	5	30
	Lesser horseshoe	0	1.009	0.000	0.236	40	30
	Myotis species	0	5.438	0.000	0.958	285	30
	Nathusius' pipistrelle	0	0.000	0.000	0.000	0	30
	Noctule	0	11.493	0.119	1.484	351	30
	Nyctalus species	0	0.186	0.000	0.000	6	30
	Nyctalus/ Eptesicus species	0	0.000	0.000	0.000	0	30
	Pipistrellus species	0	2.188	0.109	0.638	103	30
	Serotine	0	0.000	0.000	0.000	0	30
	Soprano pipistrelle	0	10.483	0.000	0.712	393	30

3.23 Figure 9 and 10 below show the bat passes per hour recorded at each monitoring point surveyed.

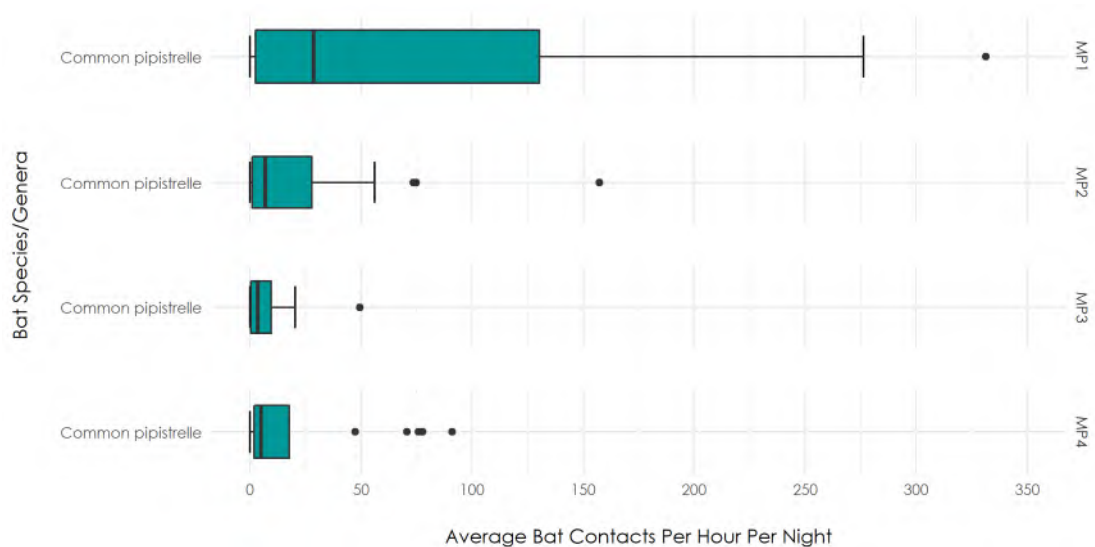


Figure 9: Common pipistrelle bat passes per hour recorded at each monitoring point surveyed (excluding common pipistrelle)

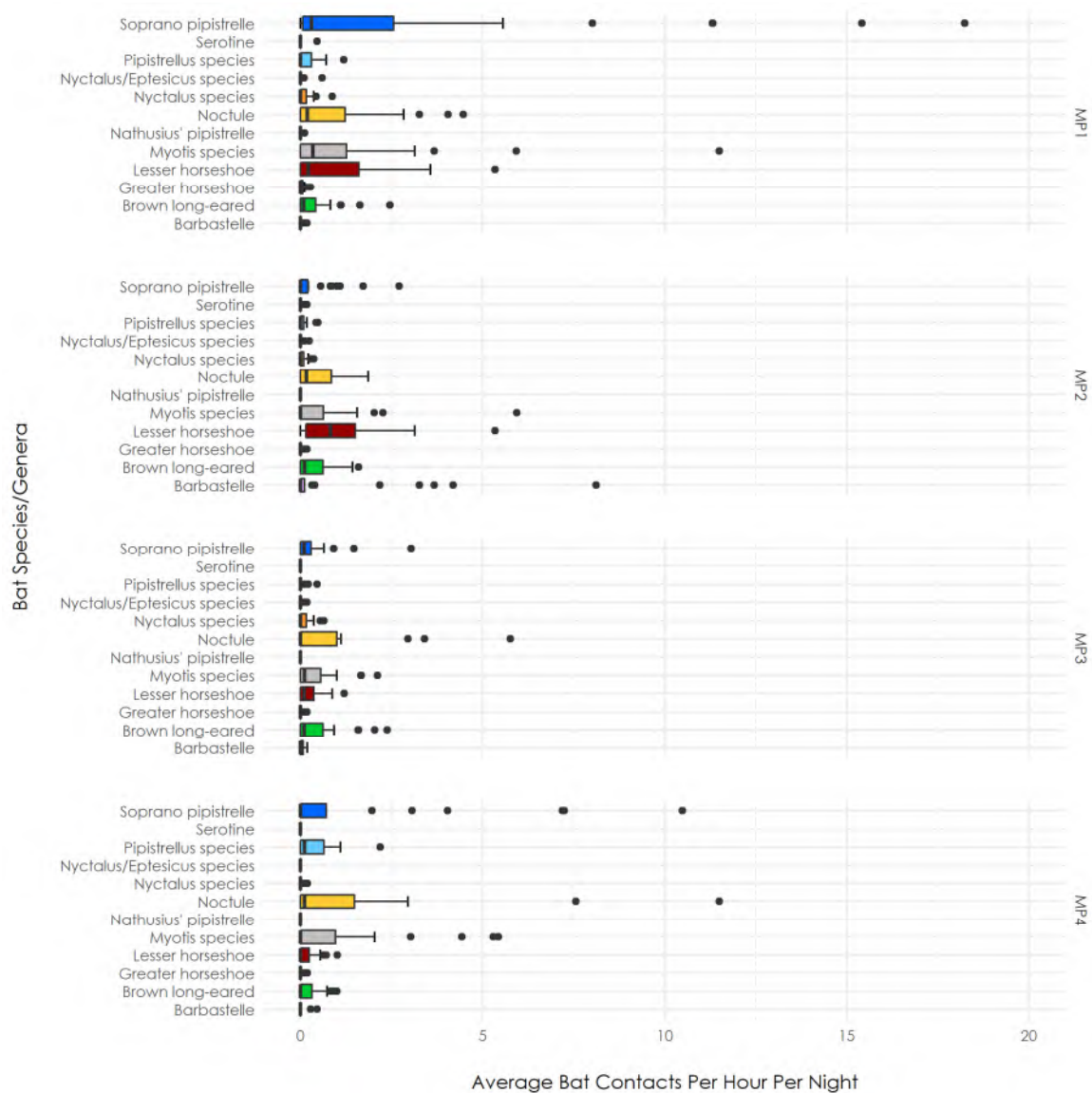


Figure 10: Bat passes per hour recorded at each monitoring point surveyed (excluding common pipistrelle)

Non-Winter Bat Activity Summary

- At least ten species of bat have been recorded, with activity dominated by common pipistrelle
- Horseshoe bats were recorded at all monitoring points although few contacts were recorded of greater horseshoe bat
- The northern hedgerow was again most frequently used by lesser horseshoe bats, along with MP1 along the western tree-line and it is suspected this comprise a commuting route for this species
- Lesser horseshoe bat activity was generally recorded over an hour after sunset although earlier detections suggest the presence of a nearby roost
- Horseshoe bats were only detected at MP4 within the proposed development area, on a few occasions and this is not considered to comprise significant habitat in comparison to areas outside the development boundary.

4.0 DISCUSSION

- 4.1 The survey area has been confirmed to be in use by a minimum of ten species of bat, including greater and lesser horseshoe bats.
- 4.2 Winter bat activity overall was generally low, with common pipistrelle representing 86% of all bat activity, followed by lesser horseshoe bat (6%) although only a total of 102 lesser horseshoe bat passes were recorded over the 252 monitoring nights between November 2018 and March 2019. There were few contacts from other species of bat though this is somewhat expected given the overall reduction in bat activity during winter. Bat activity was higher during spring to autumn period with an additional species, barbastelle bat, recorded.
- 4.3 Activity by greater horseshoe bats was very low throughout the monitoring surveys and given their more specialist diet (associated with grazing animals), the proposed development site and wider survey area not considered to form a significant resource for this species.
- 4.4 Activity by lesser horseshoe bat was more regularly detected. During winter, the first contacts each night by lesser horseshoe bats were typically between 30 minutes to one hour after sunset, with a small number of bats recorded earlier than this (c. 20-30 minutes after sunset). This suggests bats have travelled only a short distance to reach the survey area from their hibernation roost. It is reasonable to suspect that at least a proportion of bats recorded are roosting within the Wigpool Iron Mine SSSI to the west and are therefore associated with the Wye Valley and Forest of Dean Bat Sites SAC.
- 4.5 The monitoring surveys revealed a strong preference for the northern-most hedgerow (now outside the development area) by lesser horseshoe bats, particularly during winter. Based on the results seen, this feature is considered likely to be used as a commuting route between their hibernation roosts and favoured foraging areas. No activity by horseshoe bats was recorded in the southern tip of the field (the development area) until summer 2019 when a small number of passes were detected in June, August and September.
- 4.6 The survey area is under intensive arable cultivation and does not offer significant foraging opportunities for bats (particularly horseshoe bats), with the boundary vegetation found to be most used by bats. The proposed development area is poorly vegetated and well-lit, factors which are suspected to contribute to the bat activity patterns seen on-site.

Appendix A

Overnight Weather Conditions for each Static Monitoring Period
(Winter and Non-Winter)

Table A.1: Weather conditions for winter monitoring periods

Survey Month	Dates Sampled	Temperature (°C)		Precipitation	Cloud Cover (%)		Wind (mph)	
		Min	Max		Min	Max	Min	Max
November	08/11/2018	7	8	Dry	47	69	17	25
	09/11/2018	8	12	Heavy rain at 21:00, moderate rain at 00:00	21	100	16	50
	10/11/2018	7	8	Light rain at 21:00	51	100	12	17
	11/11/2018	7	8	Dry	16	30	16	18
	12/11/2018	7	8	Dry	6	100	16	21
	13/11/2018	5	11	Dry	57	87	19	27
	14/11/2018	7	9	Dry	38	100	10	13
	15/11/2018	10	12	Dry	61	100	9	14
	16/11/2018	7	9	Dry	50	73	12	15
	17/11/2018	4	6	Dry	0	9	16	18
	18/11/2018	4	5	Dry	4	65	20	22
	19/11/2018	2	4	Very light rain at 21:00	12	71	19	21
	20/11/2018	1	3	Very light rain at 21:00	69	100	9	17
	21/11/2018	-1	2	Dry	4	26	12	15
December	05/12/2018	8	12	Mainly dry, light rain at 18:00	41	100	10	16
	06/12/2018	5	13	Rain throughout night, some lighter rain; heavy in during the morning	100	100	25	35
	07/12/2018	2	9	Dry	14	79	26	37
	08/12/2018	7	9	Dry, light rain at 18:00	22	100	30	34
	09/12/2018	4	7	Light rain at 18:00 then dry	17	65	13	18
	10/12/2018	4	5	Dry	51	100	4	8
	11/12/2018	3	6	Light rain during morning hours	54	96	13	15
	12/12/2018	3	5	Dry	37	78	24	29
	13/12/2018	-1	1	Dry	18	77	10	18
	14/12/2018	0	2	Light rain during morning hours	27	100	15	30
	15/12/2018	-2	6	Light rain during the early evening	7	100	14	44
	16/12/2018	3	6	Heavy rain during the evening then dry	5	100	5	10
	17/12/2018	7	10	Occasional light rain	90	100	20	35
	18/12/2018	5	8	Heavy rain at 18:00 then light rain throughout the night	64	100	15	18
January	10/01/2019	3	5	Light rain at 18:00 then dry	39	100	9	13
	11/01/2019	3	7	Dry	5	100	9	21
	12/01/2019	4	9	Light rain at 18:00 then dry	54	77	21	24
	13/01/2019	-4	9	Dry	29	92	17	21
	14/01/2019	3	4	Dry	17	75	10	15
	15/01/2019	7	9	Light rain from 03:00	68	100	15	28
	16/01/2019	2	4	Light rain for most of the night	50	99	14	18
	17/01/2019	0	1	Dry	5	100	3	15

	18/01/2019	-1	5	Rain throughout the night	100	100	22	26
	19/01/2019	1	4	Moderate rain at 18:00 then light rain until 03:00	70	100	4	15
	20/01/2019	0	4	Dry	43	97	3	8
	21/01/2019	0	4	Light rain between 21:00 and 03:00	5	100	15	29
	22/01/2019	-1	1	Rain throughout the night	71	87	9	12
	23/01/2019	-4	1	Dry	12	100	4	10
February	04/02/2019	1	7	Dry	17	61	1	12
	05/02/2019	4	10	Heavy rain between 21:00 and 03:00	13	100	10	28
	06/02/2019	3	7	Very light rain between 00:00 and 06:00	16	100	15	34
	07/02/2019	5	9	Rain throughout night with heavy rain from 03:00	56	100	18	36
	08/02/2019	3	9	Rain from 21:00 with heavy rain between 21:00 and 00:00	78	100	33	47
	09/02/2019	3	6	Rain from 00:00 with heavy rain at 06:00	11	100	16	21
	10/02/2019	2	4	Very light rain at 18:00 and 00:00	9	87	12	18
	11/02/2019	2	6	Dry	27	85	5	11
	12/02/2019	4	7	Dry	51	77	12	14
	13/02/2019	3	6	Dry	6	28	11	17
	14/02/2019	3	8	Dry	0	2	12	13
	15/02/2019	6	11	Dry	3	91	17	20
	16/02/2019	7	11	Very light rain at 18:00	21	89	21	22
	17/02/2019	6	9	Very light rain at 18:00	48	97	18	21
March	07/03/2019	2	7	Moderate rain at 18:00	2	100	10	29
	08/03/2019	4	8	Very light rain at 18:00 and 00:00	36	100	16	28
	09/03/2019	5	7	Moderate rain at 21:00 and 03:00 to 06:00 and heavy rain at 00:00	77	100	10	14
	10/03/2019	2	4	Very light rain at 18:00	6	100	23	28
	11/03/2019	6	8	Very light rain at 18:00 and light rain at 00:00 and moderate rain at 03:00	62	100	15	41
	12/03/2019	3	6	Moderate rain at 18:00	12	100	22	38
	13/03/2019	4	7	Very light rain at 18:00 and 06:00 and moderate rain at 03:00	90	100	20	39
	14/03/2019	4	8	Very light rain at 21:00, light rain between 00:00 and 06:00	100	100	15	35
	15/03/2019	9	10	Moderate rain at 18:00, 00:00 to 03:00 and very light rain at 21:00	100	100	14	37

	16/03/2019	2	10	Heavy rain at 21:00, moderate rain at 00:00, light rain at 03:00 and 06:00	87	100	17	44
	17/03/2019	2	6	Moderate rain at 18:00	10	100	10	17
	18/03/2019	5	7	Dry	34	100	6	13
	19/03/2019	7	10	Very light rain at 18:00	69	100	9	12
	20/03/2019	7	11	Dry	43	100	9	12

Table A.2: Weather conditions for non-winter monitoring periods

Survey Month	Dates Sampled	Temperature (°C)		Precipitation	Cloud Cover (%)		Wind (mph)	
		Min	Max		Min	Max	Min	Max
October	29/10/2018	0	2	Dry	9	69	13	18
October	30/10/2018	0	2	Dry	3	88	8	10
October	31/10/2018	6	7	Dry	34	100	8	14
October	01/11/2018	9	4	Dry	0	5	8	9
October	02/11/2018	4	7	Dry	33	77	13	22
April	05/04/2019	3	6	Very Light rain at 00:00	44	87	15	21
April	06/04/2019	3	6	Dry	43	93	13	15
April	07/04/2019	5	10	Heavy rain from 09:00 to 03:00	100	100	8	12
April	08/04/2019	6	9	Moderate Rain of 1.8mm/hr advancing to 3.1mm/hr at 06:00	100	100	3	18
April	09/04/2019	1	5	Dry	34	64	14	21
May	01/05/2019	5	9	Light Rain at 21:00	15	79	8	13
May	02/05/2019	4	7	Very Light Rain at 00:00	21	74	6	11
May	03/05/2019	4	7	Light Rain throughout the night	78	100	8	16
May	04/05/2019	1	4	Dry	9	48	6	13
May	05/05/2019	2	7	Very light rain	4	85	8	11
June	04/06/2019	8	12	Light Rain at 21:00	33	86	13	19
June	05/06/2019	6	12	Dry	17	60	8	12
June	06/06/2019	8	12	Light rain at 06:00	38	100	7	19
June	07/06/2019	7	10	Moderate rain from 21:00 to 03:00, heavy rain at 06:00	98	100	7	31
June	08/06/2019	7	10	Dry	8	100	14	18
July	24/07/2019	17	23	Dry	6	7	6	15
July	25/07/2019	16	24	Very Light Rain at 21:00	12	71	9	15
July	26/07/2019	15	21	Light Rain at 03:00 turning to Moderate Rain at 06:00	46	100	8	10
July	27/07/2019	12	18	Moderate Rain at 18:00 reducing to Very Light by 21:00	9	86	6	13
July	28/07/2019	12	18	Dry	8	26	6	18
August	22/08/2019	14	19	Dry	24	100	9	16
August	23/08/2019	13	21	Dry	16	97	4	11
August	24/08/2019	16	22	Dry	17	45	6	12
August	25/08/2019	16	24	Dry	2	14	3	9
August	26/08/2019	16	22	Dry	8	100	2	12

September	18/09/2019	9	15	Dry	3	13	5	6
September	19/09/2019	9	18	Dry	0	13	4	6
September	20/09/2019	11	18	Dry	0	1	15	21
September	21/09/2019	17	18	Light Rain at 21:00 becoming Moderate Rain until 09:00	5	56	15	18
September	22/09/2019	12	15	Dry	18	59	9	14



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Appendix G

Bat Survey Report (2024-5)

Bat Survey Report

August 2025

**Carisbrook Road,
Mitcheldean**

Prepared by
CSA Environmental

On behalf of
Gladman Developments

Report No: CSA/4057/15

Report Reference	Revision	Date	Prepared by	Approved by	Comments
CSA/4057/15	-	21/11/2024	KK	AM	
	A	05/03/2025	KK	-	2024/2025 winter survey data added
	B	15/08/2025	KK	-	2025 spring/summer data added



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Appendices

Appendix A: Summary of survey dates and weather conditions during static monitoring surveys

Appendix B: Detailed bat activity results table

Appendix C: Detailed horseshoe bat activity

1.0 INTRODUCTION

- 1.1 This report has been prepared by CSA Environmental on behalf of Gladman Developments Ltd. It sets out the findings of bat survey work undertaken at Carisbrook Road, Mitcheldean (hereafter referred to as 'the Site').
- 1.2 The Site is located around central grid reference SO 664 193, to the north of Mitcheldean, Gloucestershire. It consists of a single agricultural field partially bound by native hedgerows, scrub and trees.
- 1.3 Residential development is proposed at the Site which is c. 470m east of the Wigpool Iron Mine SSSI, a component of the Wye Valley and Forest of Dean Bat Sites Special Area of Conservation (SAC). The SAC is of international importance for hibernating lesser and greater horseshoe bats *Rhinolophus hipposideros/ferrumequinum* and thus extensive bat survey work is required to understand the value of the Site for bats, potential impacts which may arise from the proposed development and the significance of this for the SAC. Of additional relevance, is a non-designated but significant maternity roost for lesser horseshoe bats located c. 2km east of the Site, as this has associations with the SAC and was highlighted for consideration by Natural England during consultation in 2019 (see Ecological Impact Assessment (EclA) report; CSA/4057/13).
- 1.4 The following bat survey work, has been undertaken in 2024-2025, is detailed herein:
 - Bat night-time walkover surveys (July – October 2024; April to June 2025)
 - Automated monitoring of bat activity (July – October 2024; April to June 2025)
 - Automated monitoring of winter bat activity (December 2024-February 2025)
- 1.5 Additional survey work completed over 2018 and 2019, including full winter monitoring of bat activity and walkover surveys (previously referred to as transect surveys) during the active period (April to October) is presented within a separate report (CSA/4057/10A) but referred to herein for context and comparison, where relevant.
- 1.6 This report forms an appendix to an Ecological Impact Assessment (CSA/4057/13) and should be read in conjunction with a report to inform Habitats Regulations Assessment (CSA/4057/16).

2.0 LEGISLATION

2.1 All British bat species are legally protected under Regulation 43 of the Conservation of Habitats and Species Regulations 2017 (as amended). These Regulations make it an offence to:

- Deliberately capture, injure, or kill a bat
- Deliberately disturb bats, impairing their ability to survive, breed, reproduce or rear/nurture their young, or which significantly affects the local distribution or abundance of the species
- Damage or destroy a breeding site or resting place used by bats

2.2 All bats and their roosts in the UK were previously fully protected under the Wildlife & Countryside Act 1981 (as amended). Amendments to the Act have removed most provisions as they relate to bats, however it remains an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection

2.3 It is important to note that bat roosts are protected throughout the year, regardless of whether or not bats are present at the time. Under the Regulations, the offence of damaging or destroying a breeding site or resting place is subject to 'strict liability', i.e. an offence is committed irrespective of whether the causal act was deliberate or otherwise.

2.4 Where development is proposed that would result in an offence under the Regulations, a European Protected Species (EPS) statutory derogation licence (often termed 'EPS Mitigation Licence') will need to be secured from Natural England to permit an act that would otherwise be unlawful. Such a licence can only be granted following receipt of planning permission with all relevant conditions discharged, and where it has been demonstrated that specific statutory derogation tests have been met.

3.0 METHODS

- 3.1 The following survey methods, design, data analysis and interpretation have been undertaken with due consideration of the Bat Conservation Trust (BCT) guidelines 4th edition (Collins, 2023) and survey guidance within the Forest of Dean District Council's (FoDDC) Development Management Guidance on the SAC (FoDDC, 2021).
- 3.2 A desk study, which included reviewing records of bats held by the Gloucestershire Centre for Environmental Records (GCER), was completed in June 2024. The results are discussed separately within the EclA report as context to the bat survey findings.

Activity Surveys

Night-time Bat Walkover

- 3.3 Ten night-time Bat Walkover (NBW) surveys (formerly transect surveys) have been undertaken, with one to two surveys per month between July and October 2024 and April to June 2025 (see Table 1) as per the FoDDC Development Management Guidance.
- 3.4 In accordance with recently published BCT guidance (Collins, 2023), on each occasion, the first part of each survey was spent at a set location to better target potential bat flight lines and commuting corridors. Two stationed surveyor locations (SSL) were used along the north-west and northern boundaries of the Site in an attempt to better understand flight routes on to and through the Site used by horseshoe bats which had been recorded by the static detectors. A watching period of at least 30 minutes is recommended within the guidelines, however an approximate 45- 60 minute watching period was used at the Site in consideration of the later emergence time of horseshoe bats. The five main SSL positions are shown in Figure 1 however these are not entirely static, and surveyors can respond to any observations to back-track or follow bats where this would give additional information. The following SSL positions were monitored:
- 22/07/24 – SSL1/3 and SSL2 (Surveyor in west moved locations to cover length of H3. Eastern surveyor remained stationary.)
 - 22/08/24 – SSL1/3 and SSL2
 - 19/09/24 – SSL1 and SSL2
 - 10/10/24 – SSL4 and SSL2
 - 22/10/24 – SSL1 and SSL2
 - 24/04/25 – SSL4/1/5 and SSL2 (Surveyor in west moved locations in response to lesser horseshoe bat activity. Eastern surveyor remained in place)
 - 07/05/25 – SSL1 and SSL3
 - 27/05/25 – SSL2 and SSL4
 - 10/06/25 – SSL1 and SSL3

- 24/06/25 – SSL1 and SSL3

3.5 All observations of bat activity during this period were noted, including bat species, behaviour, direction of travel etc. Surveyors were equipped with BatLogger M detectors to record bat calls and aid with identification of bat species. Nightfox whisker night vision binoculars were used on the survey of 07 May 2025 to try and improve visual detection of horseshoe bats. Recordings are not included within analysis for the subsequent walkover survey as the surveyors were largely stationary and 'hotspots' of activity in these locations could misrepresent bat activity across the Site as a whole.



Figure 1. Indicative Stationed surveyor locations (SSL) during the Night-time Bat Walkover Surveys

- 3.6 Following 45-60 minutes of stationed observations, surveyors walked a single transect route, which aimed to cover all accessible areas, features and habitats at the Site. Both boundary and open habitats were covered by the route (restricted to crop tramlines in 2025 to avoid damage to crops).
- 3.7 Each transect route was repeated several times during each survey to minimise temporal bias and walked at a moderate and consistent speed with qualitative observations of bat behaviour made by the

surveyor. The transect was walked for a total of 2 to 2.25 hours, giving a total survey duration of 3 hours after sunset.

- 3.8 The surveys were led by Kate Kibble MCIEEM. Weather conditions were mostly suitable though short periods of rain or stronger winds were observed on some occasions which may have influenced bat activity (see Table 1). Temperatures in October were lower, as would be expected for the time of year, though start temperatures were above 10°C and suitable for bat surveys.

Table 1. Night-time Bat Walkover survey timings and weather conditions

Survey #	Survey Date	Sunset Time	Start Time	End Time	Temp (°C)		Cloud Cover (oktas)		Wind (Beaufort Scale)		Precipitation
					Start	End	Start	End	Start	End	
1	22/07/24	21:13	21:13	00:13	17	17	7	8	1	0	Light rain at 23:15, then heavy shower from 23:33 until 23:45 (survey postponed during this period to protect equipment and resumed thereafter)
2	22/08/24	20:18	20:18	23:18	15	15	8	8	4	2	Light rain for final 20 minutes
3	19/09/24	19:20	19:20	22:20	16	15	2	7	1	2	Dry
4	10/10/24	18:26	18:26	21:56	12	7	7	7	2	1	Dry
5	22/10/24	18:00	18:00	21:00	15	11	1	0	1	2	Dry
6	24/04/25	20:23	20:23	23:27	13	7	1	0	0	0	Dry
7	07/05/25	20:43	20:42	23:43	13	11	6	8	2	1	Dry
8	27/05/25	21:14	21:19	00:14	16	15	8	8	1	2	Occasional light rain at start. Insects still flying
9	10/06/25	21:27	21:27	22:12	16	11	3	3	1	1	Dry
10	24/06/25	21:33	21:33	00:33	17	16	5	1	3	2	Dry

- 3.9 Transect surveys are intended to gather data on the spatial distribution of bat activity across the Site, identifying areas of relative importance for bats, including key flight lines. In addition, direct observation of bats allows for qualitative assessments of how bats use the Site to be made complementing quantitative data collected through remote monitoring.

Call Analysis

- 3.10 Bat calls were recorded using Elekon Batlogger M detectors. This detector automatically records ultrasonic signals with a one second delay between recordings. Recordings of bat contacts were subsequently analysed using BatExplorerPro software, with sonograms reviewed to confirm bat identification to genera, or where possible, species level.

- 3.11 Files with multiple bats of the same species (e.g. two common pipistrelle bats) were only labelled once, though any files with more than one species recorded were duplicated to allow each species to be registered individually. At the point of contact, each sound file is assigned a GPS location which is used to create maps of bat activity.

Static/Automated Monitoring

- 3.12 Four Wildlife Acoustics Songmeter detectors were deployed at the Site (comprising a combination of Songmeter SM4 and Mini Bat 2) each month between July – October 2024 and April – June 2025 (inclusive) to record bat activity during the active period, and subsequently between December 2024 to February 2025 to record winter activity.
- 3.13 Detectors were deployed at c. 1.5m - 2m height along hedgerows and trees to monitor four key boundaries at the Site. The locations are shown in Figure 2 below, and these are consistent with survey work completed in 2018/2019 to provide an extensive dataset. Effort was made to keep the detector microphone free from overhanging vegetation and clutter as far as possible to improve the quality of recordings and the likelihood of detecting quiet/directional echolocation calls, such as from horseshoe bats.



Figure 2. Static monitoring locations (ML) surveyed between July and October 2024.

- 3.14 Each month, the detectors were set up to automatically record ultrasonic signals for the period from half an hour before sunset to half an hour after sunrise on each survey occasion. A minimum of five nights were monitored each month. The dates of static deployment along with the weather conditions experienced during each monitoring period (obtained from World Weather Online) are provided in Appendix A.
- 3.15 Recordings are triggered when a bat echolocation call is detected and will contain a variable number of call 'pulses'. Each file containing call pulses by a bat/s is designated as a 'bat contact' for each species present. The maximum recording duration is 15 seconds after which time a new recording file, and thus a new bat contact, is generated if echolocation calls are still being detected. This means that periods of prolonged bat activity near a detector is represented as multiple bat contacts, rather than a single one.

Call Analysis

- 3.16 As for walkover survey data, each of the recorded files, which contain a variable number of call 'pulses', was designated a 'bat contact', with each file labelled by the species recorded. Quantitative analysis of bat activity was then undertaken by calculating the average bat contacts per hour on each night monitored, for each species.
- 3.17 Bat activity can show considerable inter-night variability and is dependent on a number of variables, including temperature, wind, and seasonality, amongst others. To account for this variability the median values for the average hourly bat contacts per night are reported, rather than a mean value which would misrepresent the average activity.
- 3.18 Where relevant, additional analysis was completed to review the timings of bat activity by certain species (e.g. time after sunset), temporal distribution of contacts (e.g. was activity recorded in short bursts, consistently through a night, or occasional), whether multiple bats are present within the recordings, and evidence of foraging or social activity (e.g. social calls). This was particularly relevant for understanding the nature of horseshoe bat activity at the Site and possible relationships to local roost sites and the SAC.

Limitations

- 3.19 Some surveys have been affected by suboptimal weather conditions which may have reduced or affected bat activity at the Site. Further information is given in Table 1 and Appendix A. Whilst this is identified as a limitation, variation in weather conditions is expected and can offer insights into habitat use by bats during adverse conditions (i.e. habitat features useful for shelter). Overall, this limitation is not considered to be

significant and weather conditions are acknowledged during the discussion where relevant.

- 3.20 The detector at ML3, on the east boundary of the Site, only recorded two of five nights in August as a result of a technical fault.
- 3.21 Comparisons drawn on the number of detector activations by different species/genera can only give an indication of relative species abundance at the Site, as detectability varies between species.
- 3.22 It is acknowledged that the quantum of bat contacts recorded during a survey may not give a true reflection of the abundance of bats using the Site. For example, a single bat foraging close to a detector may trigger several hundred activations in the course of one night. However, this activity level does provide a proxy for the level of use by bats, and therefore its relative importance. Individual recordings have been viewed for evidence of multiple bats where this is important to interpretation of the data.
- 3.23 There is variation in the detectability of some species (due to the volume or directional nature of their echolocation calls) potentially leading to some species being under-recorded. It should also be noted that some species (e.g. noctule *Nyctalus noctula*) can be detected a significance distance from the bat detector and the data does not necessarily reflect their true location.
- 3.24 The Site was under rotational grass ley at the time of survey in 2024. At the time of the final October 2024 walkover survey, the Site had been recently ploughed and resown to winter cereals. At this time and during 2025, the transect route crossed open habitats using the tramlines to prevent damage to growing crops.

4.0 RESULTS

Site Context

- 4.1 The majority of the Site offers low value to foraging/commuting bats being an open and intensively managed agricultural field, although this can offer short-term foraging opportunities depending on land-use and management actions. The main habitats of value to bats are considered to be the mature native hedgerows with boundary trees, particularly as these offer connections to high-quality woodland habitat and the Wye Valley and Forest of Dean Bat Sites SAC to the west of the Site, and to more extensive farmland and hedgerow networks to the north and east. Boundary vegetation is limited in the south and south-west of the Site where there is increase light-spill from adjoining residential and industrial areas.

Activity Surveys

Night-time Bat Walkover

- 4.2 A minimum of seven species were confirmed to use the Site during the night-time walkover surveys, comprising common pipistrelle, soprano pipistrelle, noctule *Nyctalus noctula*, long-eared bat (likely brown long-eared bat *Plecotus auritus*), greater horseshoe bat, lesser horseshoe bat and unconfirmed species within the *Myotis* genus. A couple of unconfirmed large bat species were also recorded (either *Nyctalus* or *Eptesicus*).

Stationary Survey

- 4.3 The stationary portion of the survey recorded occasional commuting activity by individual noctule bats flying overhead (mostly travelling in an east or south-east direction), and consistent foraging by individual common pipistrelle bats along hedgerow H2 and H3, particularly between the two mature trees. Foraging activity was also recorded in around the north corner of the Site where hedgerows H2 and H3 meet, as well as in association with an offsite manure pile near this location. No strong commuting routes were identified though the earliest bats were generally seen in the west of the Site, and individuals were recorded travelling northwards along H4 before turning east. It is suspected that these are likely associated with an offsite roost to the west of the Site. Noctules may also roost in woodland habitat offsite to the west though individuals can travel significant distances.
- 4.4 Horseshoe bat activity was recorded during the stationary survey periods on 10 October 2024, 24 April 2025 and 07 May 2025. This is consistent with the time of year when bats would be expected to be associated with hibernation roosts to the west of the Site. They were difficult to observe and may be under-recorded due to the directional and quiet nature of

their echolocation call. It is also noted that offsite land to the north of H3/H3 is considerably lower than the on-site field (particularly in the west) and horseshoe bats may use these boundary features for commuting without detection. Both on-site and offsite activity has been recorded as summarised below:

- In the October survey, a lesser horseshoe bat was detected at 18:56 (30 minutes after sunset) travelling west to east along hedgerow H3. It was first detected by the surveyor in the north-west of the Site, after which it continued along H2 and was seen by the second surveyor near the north-east corner of the Site. Two further bats were seen to the west of the northern gateway (at the junction of H2 and H3) at 19:03 and 19:12. It is unclear whether the second bat arrived from the north, or from the west. Neither of these bats were recorded by the surveyor located further east, so their direction of travel is unconfirmed.
- During April 2025, a lesser horseshoe bat contact was recorded at 20:55 (32 minutes after sunset) along hedgerow H2. There was no corresponding contact for the surveyor along H4 so they relocated to the corner of H3/H4 after which there were two detections at this location, with subsequent detections a few minutes later along H2, suspected to be indicating commuting individual/s. A short period of presumed foraging behaviour was recorded at H2 with a handful of detections between 21:13 and 21:16 - horseshoe bat activity was observed on the north (offsite) side of H2.
- On 10 May surveyors were located at either end of H3 to identify how horseshoe bats were entering the Site. There were four contacts between 21:23 and 21:28 (40-45 minutes after sunset) from bat/s travelling west to east (based on detections between the two surveyors). The arrival route could not be established except it is suspected bats joined at the western end of H3.

Walkover survey

- 4.5 For the walkover survey, common pipistrelle continued to be the dominant bat species recorded, with contacts recorded in all areas of the Site but focussed on hedgerows and trees in the north, as well as along street lighting in the south-east and south-west. Multiple bats were recorded on occasion though contacts were predominantly of individuals.
- 4.6 The number of bat contacts recorded for each species are summarised in Table 2 below. The locations of each bat contact and the overall distribution of activity across the Site are illustrated in Figures 3 and 4.
- 4.7 Soprano pipistrelle contacts were almost entirely recorded during the September survey where individual/s were seen foraging with common pipistrelle along the length of H2 and H1. *Myotis* bats (species undetermined) were frequently recorded in low numbers, with higher

activity in September as a result of foraging behaviour in the east of the Site (see below).

- 4.8 Very low activity by long-eared bat and noctule were recorded, along with a single passes by unconfirmed *Nyctalus/Eptesicus* species.
- 4.9 Horseshoe bat activity was limited and, in addition to observations described above for the stationary survey periods, activity involved a single contact from a greater horseshoe bat in the north-east corner of the Site (not seen) during the July survey, foraging by a single lesser horseshoe bat along H4 during the survey of 22 October, suspected foraging offsite along H2 in April and occasional other contacts along H2/H1 .
- 4.10 Very little activity was recorded within the open field habitats with the exception of noctule bats commuting overhead, occasional pipistrelle contacts and a single common pipistrelle and *Myotis* bat which were recorded during the September survey and appeared to be following the surveyors as part of wide foraging loops away from the eastern hedgerow H1. Almost all other contacts were recorded in association with boundary hedgerows and trees.

Table 2. Summary of bat contacts recorded during walkover surveys (excluding stationary survey data)

Date	Common pipistrelle	Soprano pipistrelle	Greater horseshoe	<i>Myotis</i> species	Lesser horseshoe	Long-eared bat	Noctule	<i>Nyctalus</i> species.	<i>Nyctalus/Eptesicus</i>
22/07/24	163	1	1	7	0	0	3	0	1
22/08/24	43	1	0	3	0	0	0	0	0
19/09/24	257	80	0	37	1	3	0	0	0
10/10/24	2	0	0	10	0	0	2	0	0
22/10/24	3	1	0	2	4	0	0	0	0
24/04/25	62	1	0	3	8	0	0	0	0
07/05/25	269	12	0	0	1	0	0	0	0
27/05/25	20	6	0	0	0	1	0	0	0
10/06/25	34	1	0	1	1	0	2	0	0
24/06/25	89	7	0	1	2	0	2	2	0
Total	942	110	1	64	17	4	9	2	1
Percentage of Total (%)	81.91	9.57	0.09	5.57	1.48	0.35	0.78	0.17	0.08

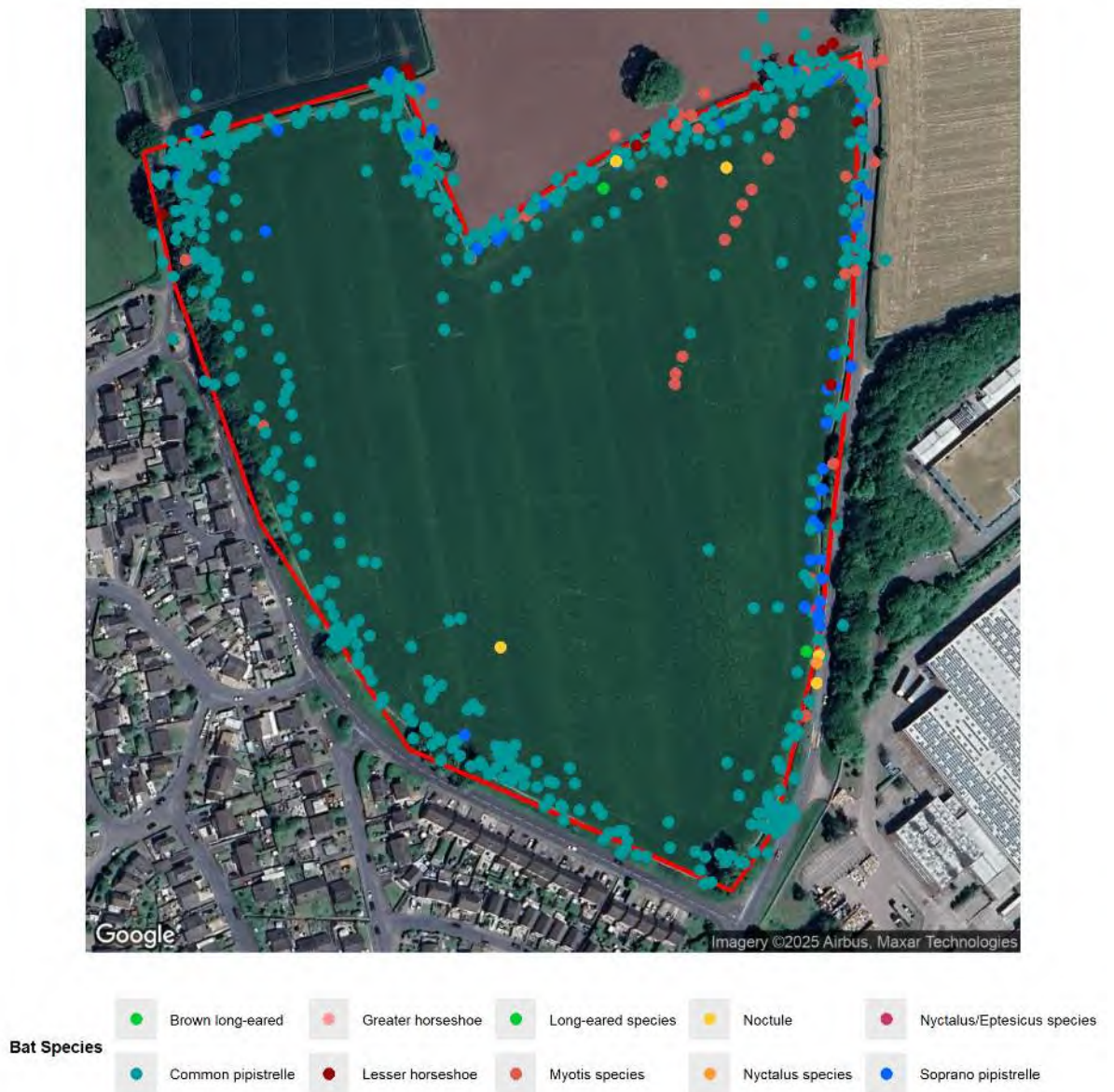


Figure 3. Locations of bat contacts recorded across all transect surveys

- 4.11 Figure 4 below provides an indicative illustration of 'hotspots' in bat activity recorded across all transect surveys undertaken at the Site.
- 4.12 As discussed above, minor hotspots caused by common pipistrelle bat activity, can be seen in association with mature trees along the northern boundary of the Site and in association with a streetlight near the south-east corner of the Site. As activity by other species at the Site was low, these do not contribute greatly to the hotspots recorded, although some association between horseshoe bats and the northern and north-west boundary hedgerows can be inferred from Figure 3, with *Myotis* activity focussed in the east/north-east.



Figure 4. Indicative 'Utilisation Distribution' (UD) of all bat species/genera at the Site estimated from all transect data combined. The UD illustrates the relative probability of a bat in flight being present at a given point at the Site, with higher/central contours having a greater probability, and lower/peripheral contours having less probability.

Static/Automated Monitoring

Active period (July-October 2024; April-June 2025)

- 4.13 The weather conditions experienced during the five nights each month where data was analysed are provided in Appendix A. There were no significant periods of bad weather during the monitoring periods though occasional nights of higher wind, light rain or cooler temperatures were experienced each month, as would be expected. On balance, it is considered that the bat activity recorded should be representative of the time of year, and not significantly affected by adverse weather conditions. In actuality, some of the highest bat activity levels recorded during the monitoring were on nights of suboptimal weather (see discussion below).

4.14 The total number of bat contacts recorded across all monitoring locations and monitoring periods for each bat species/genera are provided in Figure 5 below and summarised in Table 3. Full data is provided in Appendix B.

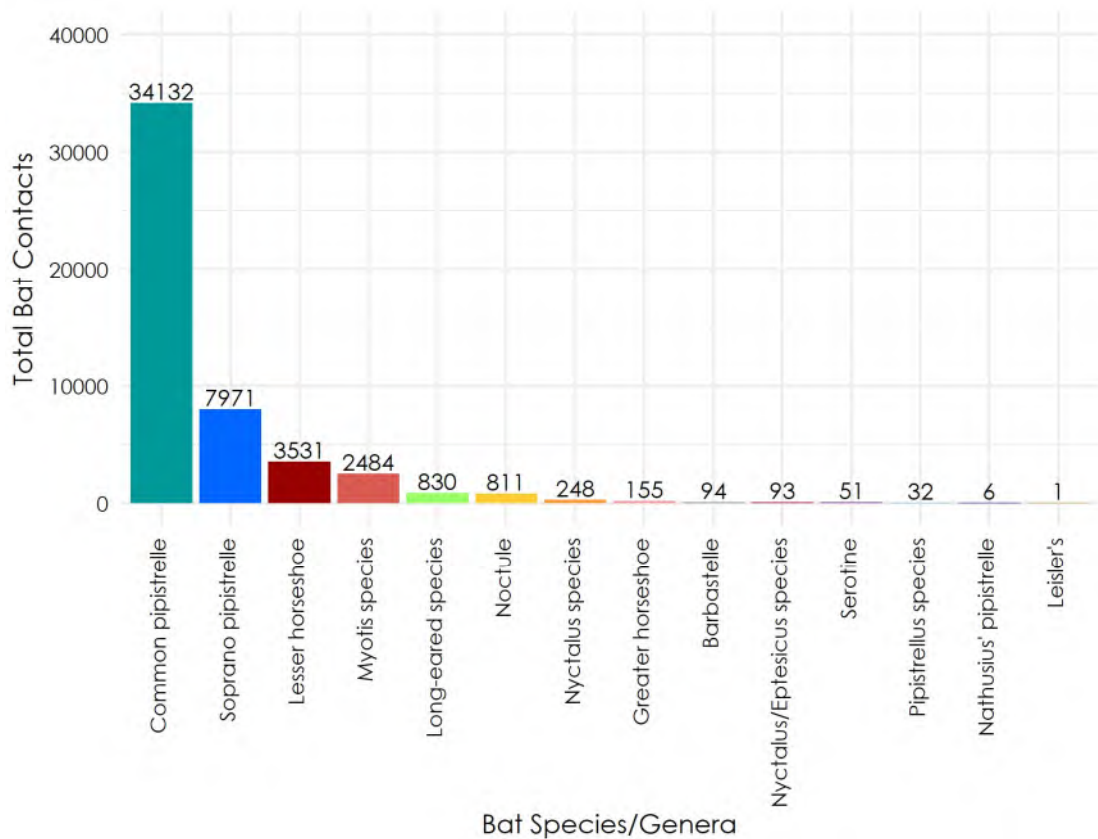


Figure 5. Total bat contacts by species/genera recorded across all remote monitoring periods and monitoring locations

- 4.15 A minimum of 11 species of bat were recorded during the static monitoring surveys, including Leisler's bat, barbastelle *Barbastella barbastellus*, Nathusius' pipistrelle and serotine which were not previously confirmed during the walkover surveys.
- 4.16 An overview of bat activity is discussed below, followed by a more detailed review of horseshoe bat activity and possible relationships to the SAC. Detailed data for all species is provided in Appendix B.

Table 3: Summary of total bat contacts for each species, by month of monitoring

Month	Barbastelle	Common pipistrelle	Greater horseshoe	Leisler's bat	Lesser horseshoe	Long-eared species	Myotis species	Nathusius' pipistrelle	Noctule	Nyctalus species	Nyctalus/Eptesicus species	Pipistrellus species	Serotine	Soprano pipistrelle
2024														
July	34	7556	38	0	55	82	258	0	217	85	17	0	10	159
August	8	1787	9	1	36	158	136	0	66	87	49	10	28	208
September	30	17827	80	0	3332	377	1928	0	381	23	7	12	2	7417
October	10	480	2	0	46	26	50	3	33	1	12	2	3	33
2025														
April	11	3663	18	0	40	136	54	1	20	24	2	3	0	81
May	1	1099	1	0	4	4	31	0	29	11	3	2	2	22
June	0	1720	7	0	18	47	27	2	65	17	3	3	6	51
Total	94	34132	155	1	3531	830	2484	6	811	248	93	32	51	7971

Non-horseshoe bat species

- 4.17 Common pipistrelle were the most frequently detected species by far, and average activity levels were not significantly different across all monitoring locations (average c. 2-17 contacts/hour/night). Short-term periods of much higher activity were detected at ML1 in the west of the Site, where 210 contacts/hour/night were recorded on 24 July and 23 September. Similar peaks in activity were recorded at other monitoring locations, though not to the same level, and are associated with continuous foraging activity. Slightly highest average activity (c. 17 contacts/hour/night) was recorded at ML4 which is suspected to relate to foraging activity observed around street lighting near this area.
- 4.18 Soprano pipistrelle were recorded at all monitoring locations on almost all monitoring nights. Whilst not significant, contacts were more frequently detected at ML1 and ML2 in the north of the Site, which is consistent with observations during the walkover survey. Nathusius' pipistrelle were recorded in October, April and June only, with one to two contacts at ML1, ML2 and ML3. Nathusius' pipistrelle is uncommon nationally but known to be migratory. The pattern of activity observed does not suggest significant use of the Site. A small number of unconfirmed *Pipistrellus* contacts were recorded at all monitoring locations. These are instances where the frequency of the recorded echolocation calls is within the overlapping range for two of the species (either common/soprano or common/Nathusius') and not reliably identified.
- 4.19 Noctule were recorded at all monitoring locations, though it should be noted that these have loud echolocation calls and can be detected at a significant distance from the detector. Almost all activity was

detected within a few hours of sunset and/or sunrise, suggesting commuting activity overhead as observed during the walkover surveys. More sustained activity was recorded in July (all locations) and September (ML4) which is likely to relate to foraging behaviour. A proportion of contacts could not be reliably identified to species and are referred to either as *Nyctalus* sp. (noctule or Leisler's) or *Nyctalus/Eptesicus* (noctule/Leisler's/serotine). One contact considered to be a confirmed Leisler's (based on echolocation frequency and call parameters) was recorded at ML1 in August. Serotine were recorded in all months but, with the exception of a single contact at ML3, all confirmed serotine contacts were recorded at ML1 and ML2.

- 4.20 *Myotis* bat activity has not been split to species level as there is significant overlap between call parameters, however there is potential for all native *Myotis* species to be present at the Site with consideration of the geographical location and local habitat context. *Myotis* bats were recorded in all months and at all monitoring locations though it is notable that very few contacts were recorded at ML4 except in September when there was more sustained foraging activity on several nights. *Myotis* bat activity was highest at all locations in September, particularly in ML2 and ML3 where a notable 400 contacts were recorded on 21 September 2024. *Myotis* swarming behaviour would be expected around this time of year, and possible flight paths to historic swarming sites at nearby mines and scowles could be a possible explanation for seasonal peaks in activity, although this peak was observed for almost all species on-site (noctule, brown long-eared bat, common/soprano pipistrelle and both horseshoe species). It's considered most likely that there was a short-term, high-value foraging opportunity on-site (e.g. mass prey species emergence, such as crane-fly), or it was possibly in response to rain (bats and prey exploiting sheltered positions on-site). Almost one quarter (22%) of all recorded bat activity at the Site was recorded on 21 September 2024.
- 4.21 Long-eared bats, most likely brown long-eared bat, were recorded at all monitoring locations, on most nights. Activity was predominantly low though almost continuous activity (presumed foraging) was recorded at ML3 on 21 September 2024.
- 4.22 Barbastelle were recorded in all months except June, in low numbers with a peak of 10 contacts recorded on 21 September at ML3. They were detected at all Monitoring Locations, but principally ML2 and ML3.
- 4.23 Figures 6 and 7 below shows the variance in nightly activity levels for each of these bat species recorded on-site. More detailed data describing these figures are provided in Appendix B. The activity data in Figures 6 and 7 is presented as boxplots for each bat species, which show the inter-night variability in bat activity across the nights monitored. The median value (middle line of the boxplot) is taken as the typical level

of activity for that species on-site at the point monitored. The length of each coloured boxplot is the interquartile range which shows the variance in nightly activity around the median value. The ends of each whisker line define the minimum and maximum nightly activity values recorded at the monitoring location. Outlying values are nightly activity levels that are greatly different when compared to the distribution of the remaining nightly activity levels. Outliers are illustrated as black points away from the boxplot. While important to note, these outliers do not represent the bat activity more commonly found at the Site for the species in question.

- 4.24 Due to the disparity in activity levels, common and soprano pipistrelle bats are shown separately from other species to aid interpretation. Horseshoe bats are discussed separately below with greater horseshoe bat activity data included in Figure 7, and lesser horseshoe bat data shown separately in Figures 8 and 9.

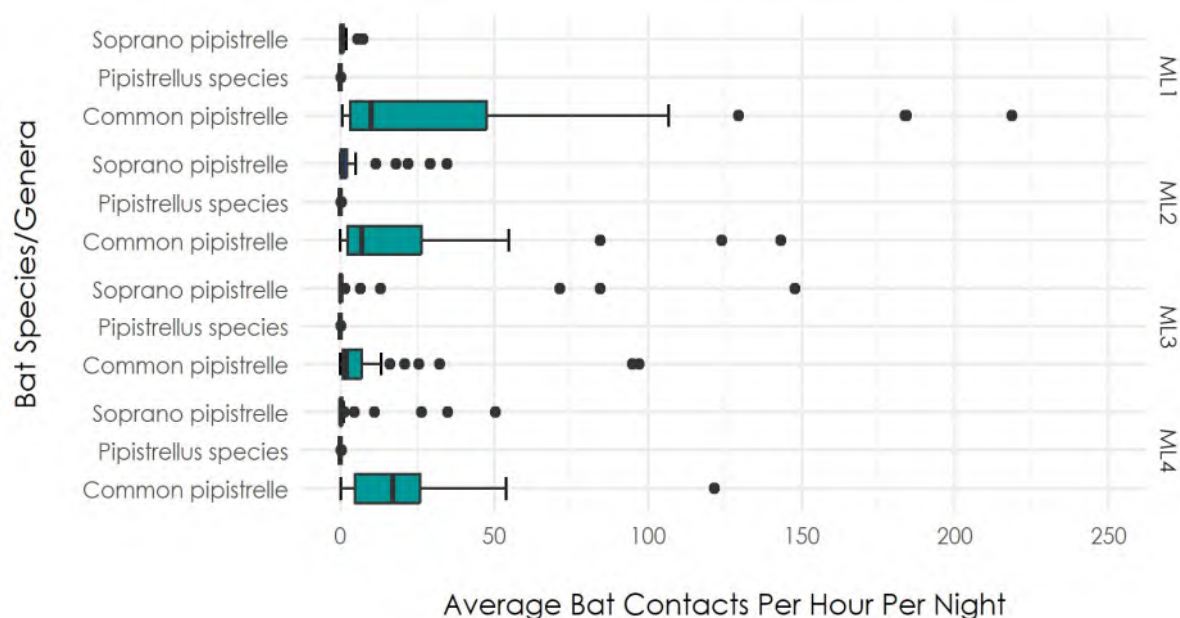


Figure 6. Average common/soprano pipistrelle bat contacts per hour per night recorded across all remote monitoring locations

- 4.25 The Figures demonstrate activity patterns for each species, as discussed above. In most cases the outlying data points reflect the high activity recorded in September for several species, so the box plots themselves omit this data. For many species, there were multiple nights with no detections, causing the median contacts/hour/night to be zero.

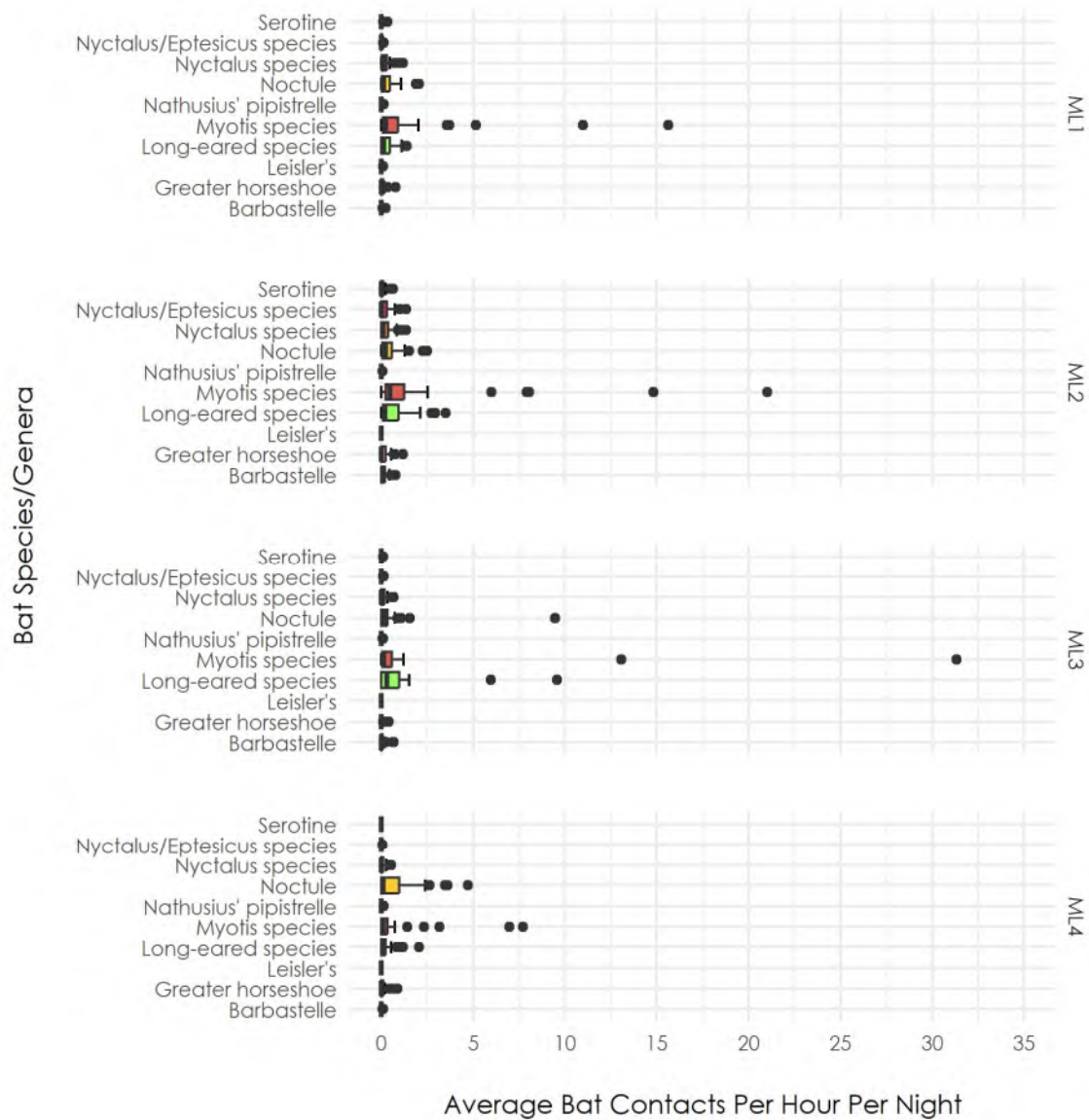


Figure 7: Average bat contacts per hour per night for each bat species/genera (excluding common/soprano pipistrelle and lesser horseshoe bat) recorded across all remote monitoring locations

Horseshoe Bat Species

- 4.26 Both greater and lesser horseshoe bat were recorded at all monitoring locations during almost all months. Table 4 provides a summary of total contacts and average contacts/hour/night at each monitoring location, and for each month of monitoring.
- 4.27 Greater horseshoe bats were recorded relatively infrequently with individual to a small number of contacts on most nights (they were not detected every night). The greatest number of contacts were detected in June and September. Median activity at all locations was 0 contacts/hour/night with the highest number of contacts overall recorded at ML2.

- 4.28 Lesser horseshoe bats were recorded more frequently, with contacts on almost all nights of monitoring. When omitting the anomalous activity recorded in September, typically less than 10 lesser horseshoe bat contacts were recorded on any one night, with a peak of 13 contacts recorded at ML3 on 23 August. This is compared to a peak of 1,288 contacts recorded on 19 September and 1,182 contacts recorded on 21 September, both at ML1. Closer review of this data confirms foraging behaviour (as evident from the echolocation calls) and some instances where two bats were present at one time. The activity was almost continuous during this time and suggests bat/s flying back and forth past the detector at regular intervals. As discussed above, it is suspected that a key foraging event is responsible for the observed peak in activity.
- 4.29 A more detailed breakdown of contacts/night recorded for lesser horseshoe bat species is provided in Appendix C. Figures 8 and 9 provide a graphical representation of horseshoe bat activity as given for other species above. Greater horseshoe bats have not been included on account of the limited number of contacts recorded.

Table 4: Summary of contacts recorded for horseshoe bats at each monitoring location and month.

Monitoring Location	Month/Year	Greater horseshoe	Lesser horseshoe
		Total contacts	Total contacts
ML1	July 24	8	23
	August 24	3	8
	September 24	14	2601
	October 24	0	20
	April 25	2	8
	May 25	1	0
	June 25	2	6
	Total	30	2666
ML2	July 24	22	24
	August 24	4	7
	September 24	21	410
	October 24	1	14
	April 25	9	22
	May 25	0	3
	June 25	4	5
	Total	61	485
ML3	July 24	5	4
	August 24	0	20
	September 24	9	255
	October 24	0	9
	April 25	3	8
	May 25	0	0
	June 25	0	6
	Total	17	302

ML4	July 24	3	4
	August 24	2	1
	September 24	36	66
	October 24	1	3
	April 25	4	2
	May 25	0	1
	June 25	1	1
	Total	47	78

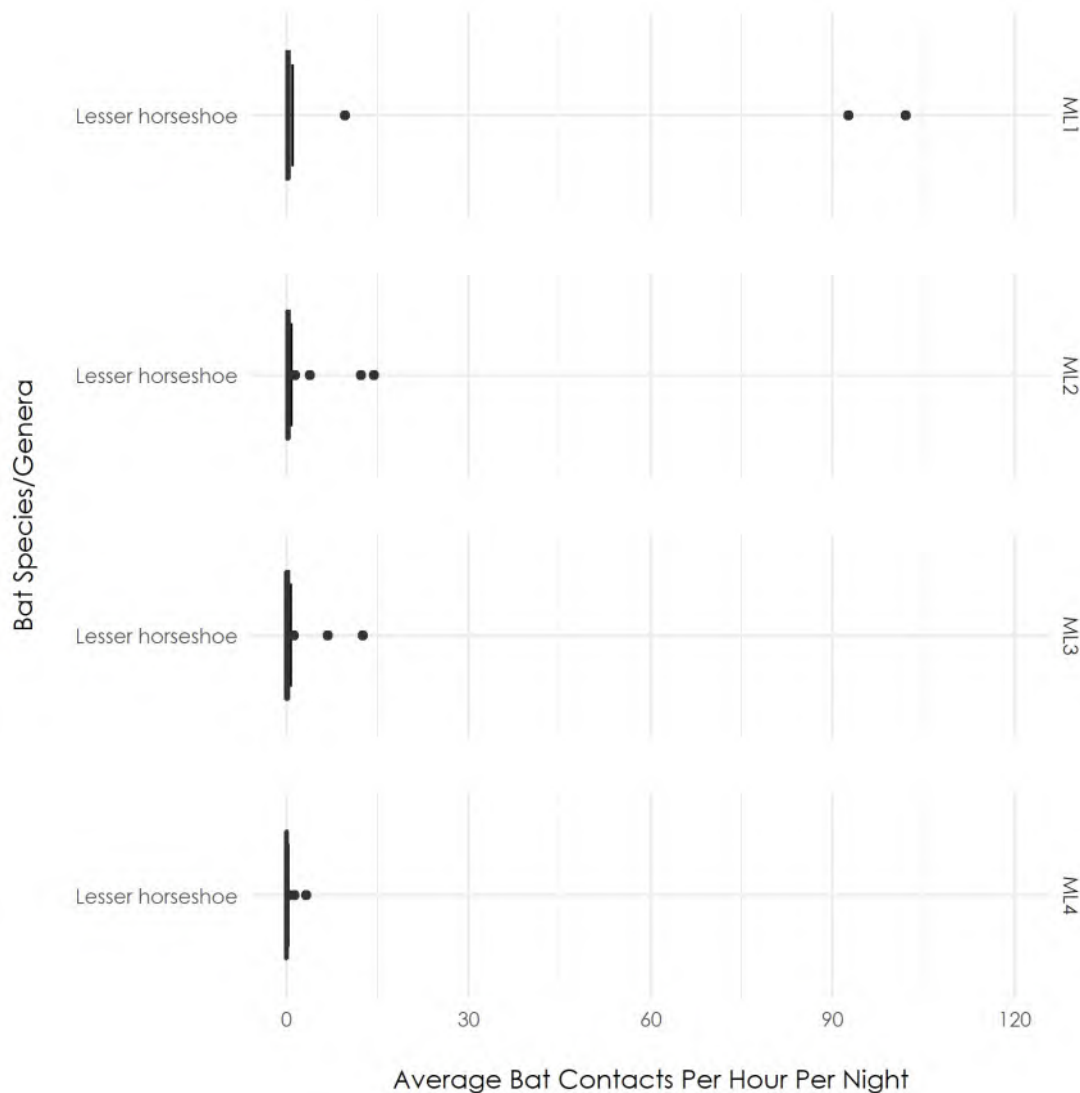


Figure 8. Average bat contacts per hour per night for lesser horseshoe bats recorded across all remote monitoring locations

4.30 Figure 8 clearly identifies outlying data points recorded at each monitoring point (all of which are attributed to the high September activity) with average activity outside this period very low. To aid interpretation of the data, Figure 9 has been adjusted to remove the outlying data from ML1 as this heavily skewed the graph. Median contacts/hour/night was marginally higher at ML2 than ML1 but still at

both c. 0.1-2 contacts/hour/night. Median activity at ML3 and ML4 was 0.

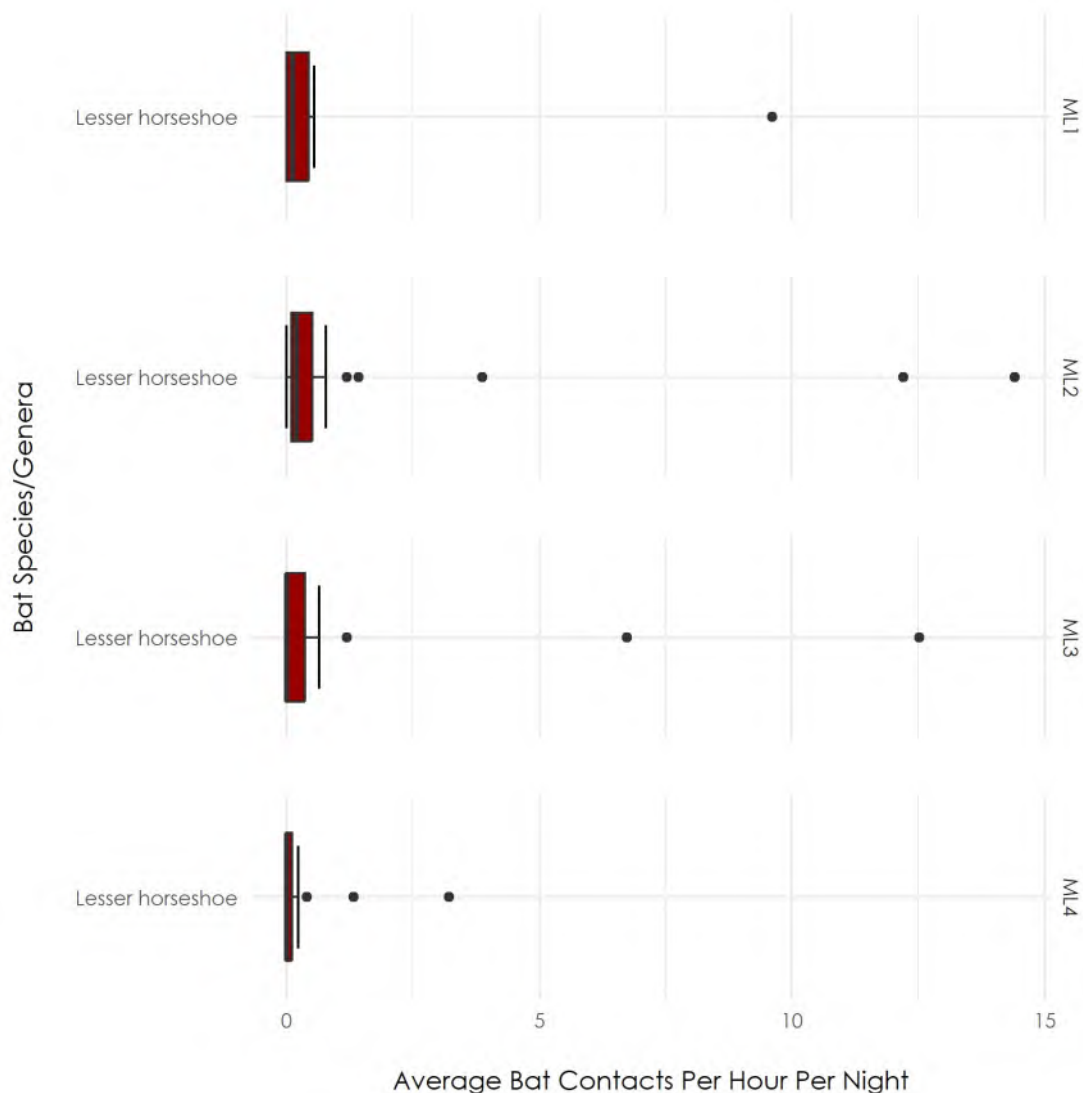


Figure 9. Average bat contacts per hour per night for lesser horseshoe bats recorded across all remote monitoring locations (excluding outlying data points from ML1 in September 2024)

- 4.31 The 2018/2019 winter data was previously scrutinised to identify any patterns associated with hibernation roost behaviour (see CSA/4057/10). It was noted that lesser horseshoe bat contacts peaked within the period between 30 minutes to one hour after sunset, suggesting the on-site hedgerows could be used by bats following emergence from their roost. The more recent spring/summer/autumn data was similarly reviewed but no strong pattern of post-sunset behaviour was apparent, with contacts instead relatively evenly spaced through the night. Data was only reviewed for lesser horseshoe bat (as greater horseshoe bat activity was very limited), and data from September was excluded as this was biased by extended foraging activity and would not help to reveal any strong commuting routes. Observations from the walkover survey indicate there is some early west-east commuting behaviour by

lesser horseshoe bats which is likely linked to nearby roosts though only a small number of individuals were detected. As discussed above there are many alternative routes horseshoe bats may use to navigate the landscape further north of the Site, and bats commuting along the northern (offsite) side of H2/H3 may not be detected by on-site monitoring equipment.

Non-Active Period (December 2024 – February 2025).

- 4.32 Table 5 provides a summary of bat contacts recorded at the Site during the winter monitoring period. As there are so few recordings, more detailed presentation of the data (e.g. boxplots) is not possible.
- 4.33 Markedly more activity was recorded in December compared to January and February (likely a result of milder weather conditions, see Appendix A). No bat contacts were recorded at ML4 in January or ML2 in February (the equipment was functional and recorded other non-bat activity).
- 4.34 Likely seven species were recorded (including two contacts of unidentified *Myotis* species), all of which have been recorded on site previously. Common pipistrelle bat was the most frequently detected and was the only species recorded in all months of monitoring. Lesser horseshoe bat was the next most frequently detected species, with all contacts recorded in December.
- 4.35 A closer review of the lesser horseshoe bat data reveals multiple contacts recorded on each night of monitoring, predominantly within the first two hours following sunset which is consistent with behaviour recorded at other times of year and during the previous survey work in 2018/2019 and suggest commuting activity from the nearby roost. Activity was highest at ML2 and the timing of detections may indicate bouts of foraging activity. Only one individual was recorded per detection. The timing of detections at other monitoring locations suggests bats to travel around the boundaries of the Site, but the earliest contacts were consistently recorded at ML2. No lesser horseshoe bats were detected at ML2 on the night of 16 December, but a small number of contacts were picked up at all other monitoring locations.

Table 5: Total number of contacts per species detected during the winter monitoring surveys

Month	Monitoring Point	Common pipistrelle	Soprano pipistrelle	Myotis spec.	Noctule	Lesser horseshoe bat	Long-eared bat	Barbastelle	Total
December	ML1	19	0	0	1	6	1	0	27
	ML2	2	0	0	0	30	0	1	33
	ML3	15	0	0	1	3	0	1	20
	ML4	15	0	1	2	3	0	0	21
January	ML1	2	0	0	0	0	0	0	2
	ML2	0	3	0	0	0	0	0	3
	ML3	1	0	1	1	0	0	0	3
	ML4	0	0	0	0	0	0	0	0
February	ML1	1	0	0	0	0	0	0	1
	ML2	0	0	0	0	0	0	0	0
	ML3	1	0	0	0	0	0	0	1
	ML4	1	0	0	0	0	0	0	1
Total		57	3	2	5	42	1	2	112

4.36 With regards to the winter monitoring data collected at the Site in 2018/19, the current dataset is consistent in that lesser horseshoe bat were most frequently detected at ML2. A similar composition of species was recorded although greater horseshoe bat were recorded during 2018/19 and not in 2024/25, whereas barbastelle was not recorded previously.

5.0 CONCLUSIONS

- 5.1 This report presents the findings of bat survey work completed at land at Carisbrook Road, Mitcheldean in 2024 and 2025. Past information from 2018/2019 is provided within a separate report but consistent with the current findings.
- 5.2 Bats have been recorded in all areas of the Site, with greatest activity on average recorded along the north, west and east boundary hedgerows. Limited bat activity was recorded in the south of the Site where there is less vegetation and higher artificial light spill, as well as within the open field habitats.
- 5.3 Common pipistrelle was the most frequently detected species, and the Site was routinely used by foraging bats, particularly in association with mature trees along the northern boundaries, and with streetlighting in the south. At least 10 additional bat species have been recorded including low numbers of the rarer barbastelle, Nathusius' pipistrelle and Leisler's bat. *Myotis* and long-eared bat activity seemed most strongly associated with eastern areas of the Site, whilst horseshoe bat activity appeared most associated with northern and north-western areas.
- 5.4 The data presented herein was strongly affected by high levels of activity recorded (for almost all species) during September, particularly 21 September. It is expected that the surveys coincided with a short-term feeding event (e.g. a mass emergence of crane fly) which may not be a dependable occurrence given the rotational agricultural land-use at the Site.
- 5.5 Horseshoe bat activity was reviewed in more detail, given the proximity of the Wye Valley and Forest of Dean Bat Sites SAC. As the nearby Wigpool Mine SSSI is of importance for its value to hibernating horseshoe bats, targeted winter surveys were completed in 2024/2025. A lesser horseshoe bat commuting route was identified along the northern boundary of the Site, with a small number of bats seen travelling west to east during some of the walkover surveys. Otherwise, with the exception of consistent foraging activity recorded during September (predominantly at ML1), horseshoe bat activity at the Site was low (average <0.2 contact/hour/night). Lesser horseshoe bat continued through the winter, with ML2 still found to be a focus of recorded activity, for likely commuting and foraging purposes.

6.0 REFERENCES

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Appendix A

Summary of survey dates and weather conditions during static monitoring
surveys

Table A: Summary of weather data during all months of static monitoring

Survey Period	Dates Sampled	Temperature (°C)		Precipitation	Cloud Cover (%)		Wind (km/hr)	
		Min	Max		Min	Max	Min	Max
July 2024	22/07/24	14	15	Dry, with very light rain at 03:00. Dry at 06:00	52	95	5	13
	23/07/24	13	17	Dry	36	57	3	10
	24/07/24	15	16	Dry	89	100	13	15
	25/07/24	12	15	Dry	2	29	6	14
	26/07/24	11	12	Dry	7	55	6	18
August 2024	22/08/24	13	16	Dry, then moderate rain at 03:00. Dry at 06:00	14	100	19	38
	23/08/24	12	14	Very light rain at 21:00, then dry at 00:00. Moderate rain at 03:00, then very light rain at 06:00	45	100	12	17
	24/08/24	9	10	Dry	11	31	11	12
	25/08/24	12	14	Dry	30	83	13	25
	26/08/24	9	14	Dry	0	30	3	11
September 2024	19/09/24	11	15	Dry	4	84	14	18
	20/09/24	11	14	Dry	4	100	12	15
	21/09/24	14	15	Dry at 21:00 then light rain at 00:00 and very light rain at 03:00. Light rain at 06:00	56	77	6	13
	22/09/24	12	15	Dry	53	100	3	5
	23/09/24	12	13	Very light rain from 21:00 - 00:00, then dry	29	100	2	17
October 2024	22/10/24	9	10	Dry	17	63	8	9
	23/10/24	9	10	Dry	27	36	13	17
	24/10/24	8	13	Dry at 21:00 then very light rain at 00:00. Light rain at 03:00, then dry at 06:00	54	100	9	18
	25/10/24	5	8	Dry	18	34	5	10
	26/10/24	10	11	Dry	100	100	6	21
December 2024	11/12/24	2	5	Dry	11	83	6	10
	12/12/24	6	7	Dry	100	100	7	11
	13/12/24	4	6	Light rain at 21:00	100	100	3	9

	14/12/24	3	8	Dry	58	100	9	18
	15/12/24	10	11	Dry	86	100	20	26
	16/12/24	6	8	Dry	13	63	10	16
January 2025	09/01/25	-1	0	Dry	5	100	4	9
	10/01/25	-2	0	Moderate snow at 18:00	24	100	4	12
	11/01/25	-2	2	Light rain/mist at midnight	0	100	3	8
	12/01/25	0	2	Dry	16	31	10	12
	13/01/25	2	4	Dry	19	51	13	15
February 2025	13/02/25	-1	1	Dry	11	100	10	15
	14/02/25	2	3	Light rain at 21:00 and 06:00	100	100	11	16
	15/02/25	2	4	Dry	89	100	8	12
	16/02/25	-1	3	Light rain between 18:00 and midnight	34	100	8	15
	17/02/25	1	3	Dry	43	100	11	15
April 2025	24/04/25	6	10	No rain	4	43	7	9
	25/04/25	7	11	No rain	67	100	4	7
	26/04/25	7	11	No rain	23	41	5	6
	27/05/25	8	11	No rain	5	18	5	7
	28/05/25	9	14	No rain	1	27	3	4
May 2025	22/05/25	6	13	No rain	3	13	4	6
	23/05/25	13	15	No rain at 21:00, very light rain at 00:00, no rain at 03:00, then very light rain at 06:00	51	100	11	22
	24/05/25	12	14	No rain at 21:00, moderate rain at 00:00, then no rain at 03:00 and 06:00	72	100	24	31
	25/05/25	7	10	No rain	12	40	13	21
	26/05/25	11	13	Light rain at 21:00, very light rain at 00:00, then no rain at 03:00 onwards	66	100	14	33
June 2025	19/06/25	15	19	No rain	2	63	7	8
	20/06/25	14	18	No rain	4	47	5	9
	21/06/25	12	19	No rain	5	87	9	16
	22/06/25	11	15	Very light rain at 03:00, no rain by 06:00	7	100	19	26
	23/06/25	12	15	No rain	15	100	18	26

Appendix B

Detailed Bat Activity Results Table

Table B: Summary of bat activity for active season data 2024-2025

ML	Species	Contacts/hour/night				
		Min	Max	Median	IQR	Total Passes
ML1	Barbastelle	0.000	0.217	0.000	0.000	7
ML1	Common pipistrelle	0.567	218.470	9.880	44.395	13783
ML1	Greater horseshoe	0.000	0.783	0.000	0.103	30
ML1	Leisler's	0.000	0.091	0.000	0.000	1
ML1	Lesser horseshoe	0.000	102.060	0.134	0.444	2666
ML1	Long-eared species	0.000	1.361	0.120	0.461	123
ML1	Myotis species	0.000	15.625	0.241	0.780	574
ML1	Nathusius' pipistrelle	0.000	0.120	0.000	0.000	1
ML1	Noctule	0.000	2.065	0.134	0.440	142
ML1	Nyctalus species	0.000	1.192	0.120	0.277	92
ML1	Nyctalus/Eptesicus species	0.000	0.120	0.000	0.039	9
ML1	Pipistrellus species	0.000	0.121	0.000	0.000	4
ML1	Serotine	0.000	0.323	0.000	0.000	11
ML1	Soprano pipistrelle	0.000	7.439	0.363	0.865	353
ML2	Barbastelle	0.000	0.783	0.067	0.214	57
ML2	Common pipistrelle	0.000	143.226	6.999	23.990	8253
ML2	Greater horseshoe	0.000	1.175	0.000	0.234	61
ML2	Leisler's	0.000	0.000	0.000	0.000	0
ML2	Lesser horseshoe	0.000	14.409	0.190	0.421	485
ML2	Long-eared species	0.000	3.495	0.202	0.848	262
ML2	Myotis species	0.000	21.008	0.476	1.019	928
ML2	Nathusius' pipistrelle	0.000	0.067	0.000	0.000	1
ML2	Noctule	0.000	2.506	0.242	0.504	177
ML2	Nyctalus species	0.000	1.354	0.113	0.351	93
ML2	Nyctalus/Eptesicus species	0.000	1.354	0.000	0.295	78
ML2	Pipistrellus species	0.000	0.451	0.000	0.000	9
ML2	Serotine	0.000	0.638	0.000	0.111	39
ML2	Soprano pipistrelle	0.000	34.769	0.602	2.055	1756
ML3	Barbastelle	0.000	0.680	0.000	0.072	26
ML3	Common pipistrelle	0.000	97.259	1.808	6.005	4329
ML3	Greater horseshoe	0.000	0.396	0.000	0.000	17
ML3	Leisler's	0.000	0.000	0.000	0.000	0
ML3	Lesser horseshoe	0.000	12.520	0.000	0.361	302
ML3	Long-eared species	0.000	9.554	0.286	0.989	350
ML3	Myotis species	0.000	31.323	0.142	0.516	664
ML3	Nathusius' pipistrelle	0.000	0.096	0.000	0.000	3
ML3	Noctule	0.000	9.475	0.135	0.337	213
ML3	Nyctalus species	0.000	0.659	0.000	0.157	36
ML3	Nyctalus/Eptesicus species	0.000	0.135	0.000	0.000	3
ML3	Pipistrellus species	0.000	0.097	0.000	0.000	4
ML3	Serotine	0.000	0.110	0.000	0.000	1
ML3	Soprano pipistrelle	0.000	148.019	0.067	0.357	4159
ML4	Barbastelle	0.000	0.109	0.000	0.000	4
ML4	Common pipistrelle	0.200	121.691	16.988	21.169	7767
ML4	Greater horseshoe	0.000	0.861	0.000	0.109	47
ML4	Leisler's	0.000	0.000	0.000	0.000	0
ML4	Lesser horseshoe	0.000	3.211	0.000	0.108	78
ML4	Long-eared species	0.000	2.036	0.096	0.228	95
ML4	Myotis species	0.000	7.722	0.098	0.339	318
ML4	Nathusius' pipistrelle	0.000	0.120	0.000	0.000	1
ML4	Noctule	0.000	4.724	0.111	0.986	279
ML4	Nyctalus species	0.000	0.549	0.000	0.110	27

ML	Species	Contacts/hour/night				
		Min	Max	Median	IQRRange	TotalPasses
ML4	Nyctalus/Eptesicus species	0.000	0.078	0.000	0.000	3
ML4	Pipistrellus species	0.000	0.315	0.000	0.000	15
ML4	Serotine	0.000	0.000	0.000	0.000	0
ML4	Soprano pipistrelle	0.000	50.431	0.216	0.410	1703

Appendix C

Detailed horseshoe bat activity

Table C: Summary of horseshoe bat contacts recorded during 2024/25 static monitoring surveys (active period)

Month	Date	Greater Horseshoe bat				Lesser Horseshoe Bat			
		Monitoring Location				Monitoring Location			
		ML1	ML2	ML3	ML4	ML1	ML2	ML3	ML4
July 24	22/07/24		6		1	2	3	4	
	23/07/24	3	5	2	1	4	5		
	24/07/24	3				9			2
	25/07/24	1	4	3	1	3	5		1
	26/07/24	1	7			5	11		1
August 24	22/08/24					1	1	7	
	23/08/24	1	1			1	1	13	
	24/08/24	1	3			1	2		
	25/08/24						2		
	26/08/24	1			2	5	1		1
Sept 24	19/09/24	2	6	5	10	1288	154	158	5
	20/09/24				1		18	5	
	21/09/24	10	15	4	11	1182	184	86	41
	22/09/24	1			8	7	4	1	17
	23/09/24	1			6	124	50	5	3
Oct 24	22/10/24				1	6	4		1
	23/10/24					2	4	2	
	24/10/24					4	2	1	
	25/10/24		1			8	1	4	
	26/10/24						3	2	2
April 25	24/04/25					2	2		
	25/04/25		3	1			4	1	
	26/04/25		1	1	1	1	1	4	
	27/04/25	1	2	1	2	2	8		1
	28/04/25	1	3		1	3	7	3	1
May 25	22/05/25	1					2		
	23/05/25								1
	24/05/25								
	25/05/25						1		
	26/05/25								
June 25	19/06/25		1			4			
	20/06/25		1			1		3	1
	21/06/25					1			
	22/06/25	1	1				4		
	23/06/25	1	1		1		1	3	
Total Contacts		30	61	17	47	2666	485	302	78



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Appendix H

Reptile Survey Report

1.0 Introduction

- 1.1 A reptile presence/absence survey was completed at the Site on Carisbrook Road, Mitcheldean in 2019 as field margin habitats had potential to support common and widespread reptile species.

2.0 Legislation

- 2.1 All native British reptile species are listed within Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are afforded protection against killing and injury under parts of sub-section 9(1) of the Act. In addition, all native British reptile species are adopted as Species of Principal Importance for the Conservation of Biodiversity in England in respect of Section 41 of the Natural Environment and Rural Communities Act 2006.

3.0 Methods

- 3.1 A total of 80 reptile refugia, comprising rectangles of roofing felt measuring 0.5 x 0.5m, were installed along the field margins present at the Site on 01 May 2019 by Alex Perry ACIEEM. Refugia were placed around all boundaries at approximately 10-20m intervals.
- 3.2 Following an initial 2-week 'bedding-in' period for refugia, surveys were carried out on six occasions during favourable weather conditions (e.g. intermittent or hazy sunshine, not too windy, sunny spells following wet or cloudy weather) between May and September 2019. Each survey visit comprised a slow walk of the Site to visually and physically check refugia for the presence of reptiles. On each occasion a visual search was also carried out within areas of suitable habitat whilst walking between refugia locations.
- 3.3 The primary aim of the reptile survey was to establish the presence or likely absence of widespread reptile species within the survey area, rather than to estimate abundance or population size.

Limitations

- 3.4 There was a long pause between survey visits in July and September because of prolonged hot weather which made conditions unsuitable for surveying reptiles.
- 3.5 Despite refugia being placed at the very edges of the Site and commencement of the survey being agreed with the landowner, routine management of the field margins resulted in the destruction of a proportion of the refugia on several occasions. These were replaced as required but needed time to bed in which reduced the efficacy of the survey.
- 3.6 Only six survey visits were carried out as on this final visit in mid-September almost all refugia had been destroyed and there was considered to be

no benefit to deploying them given the time needed to bed in, and it being the end of the survey season.

4.0 Results

- 4.1 No reptiles were found during the surveys though as described above, the survey effort was impacted by routine management works and the survey is limited in this regard.
- 4.2 Full survey results are provided at the end of this report.

5.0 Discussion

- 5.1 The field margins at the Site were superficially suitable for reptiles, particularly given its location. However, the intensive management of the Site suggests that reptiles are unlikely to occur, except perhaps for small numbers of individuals which may make ephemeral use of on-site habitats as conditions allow. Scrub and bracken along the southern site boundary does not appear to be managed though grassland areas on the adjacent verges are mown, and this is likely to further influence the presence of reptiles at the Site.
- 5.2 Species such as grass snake occur in low densities and are highly mobile, with wide home ranges. It is possible that these may occur on-site occasionally especially if cultivation of the Site is ceased following approval of planning permission. Therefore, whilst reptiles are not a significant constraint to the proposed development, their presence should be considered on a precautionary basis during construction works/site clearance, and there is good scope for the enhancement of reptile habitat within the development.

Job Name & No.	4057 Mitcheldean	Beaufort Scale: 0. Calm. Vertical smoke. 1. Light air. Smoke drifts. 2. Light breeze. Leaves rustle. 3. Gentle breeze. Small twigs constantly move. 4. Moderate breeze. Small branches begin to move. 5. Fresh breeze. Small trees in leaf begin to sway. Precipitation: select from (type) No Rain / Light / Moderate / Heavy & (duration) Intermittent / Continuous
Set-up Surveyor / Project Manager	AP	
Set-Up Date	01/05/2019	

[illegible]

02/07 /2019	09:15 - 09:45	KK	17-20	4-5	2	Dry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Common shrew. Several mats mown again, only 6 on eastern boundary, c.10 needed elsewhere around site
04/07 /2019	09:15 - 09:45	KK	16-18	0	1	Dry and sunny	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25 more refugia added
18/09 /2019	16:45	TH	17	1	2	Dry and sunny	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Around c. 80% of mats mown, no reptiles



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