ANDREW McCARTHY ECOLOGY

# Land off East Street, Hindon

## Bat Survey Report

Appendix 7 - Base Evidence

6 January 2016

Rev 02

Prepared for:

CG FRY & SON DEVELOPMENT

## NON TECHNNICAL SUMMARY

This report presents the findings of a bat survey at a site off East Street, Hindon in Wiltshire. The site comprises an arable field, which is bounded in part by hedges, scrub and trees. Off-site bat habitat includes woodland and a lake associated with Fonthill Gifford 850m to the south and east, and the extensive wooded area along Great Ridge to the north. The site is ecologically linked to these important features *via* hedges, tree lines and field edges.

The site lies c2.5km from the closest component of the internationally important Chilmark Quarries Special Area of Conservation (SAC) which is designated for its bat interest; in particular for its hibernation roosts of lesser and greater horseshoe, barbastelle and Bechstein's bats. There is an obligation on local planning authorities as 'competent authorities' to ensure that developments do not have an adverse impact upon the special interest of this SAC; either individually or in combination with other plans or projects. In respect of potential impacts, case law makes clear that there must be no reasonable scientific doubt regarding the absence of negative effects. In order for this to be the case, there must be sufficient ecological baseline information provided upon which an impact assessment and mitigation strategy can be based. As the site lies so close to the Chilmark SAC, it was considered necessary to provide detailed information on on-site bat habitat use to assist the developer with their emerging design.

The bat survey was undertaken between May and October 2015. Other than the usual widespread and relatively common species (such as pipistrelles) the survey recorded high numbers of barbastelle bats using the north-western and eastern boundaries, as well as greater and lesser horseshoe bats at lower levels of abundant, mainly along the eastern boundary. As these species are 'qualifying features' of the SAC, maintaining the ecological functionality of the north-west and eastern site boundaries was identified as being central to ensuring no Likely Significant Effect (LSE) upon the integrity of the SAC, during / post development.

Impacts that have potential to affect the integrity of the SAC include (i) loss, damage or change to management of potential foraging habitat (ii) removal, fragmentation and modification of habitat along potential commuting corridors and (iii) disruptive effects of artificial lighting to foraging habitat and commuting corridors. In light of potential impacts and habitat requirements of the 'qualifying' species, the final section of the report discusses a range of mitigation options including maintenance of broad, dark corridors along the north-western and eastern boundaries.

It is anticipated that what are at present outline proposals will be refined as the scheme design takes shape during 2016, and they will eventually form the basis for an ecological impact assessment that will enable the planning authority to conclude that the proposal will have no LSE on the SAC.

CONTENTS

# 1.0 INTRODUCTION

## 1.1 Background

This report presents the findings of a bat survey at a site situated off East Street, Hindon, Wiltshire (the 'site'). The site is centred on ordnance survey grid reference ST910329. A location plan is included as Figure 8.1.

The site consists of an arable field bounded by a deciduous hedgerow with occasional immature trees along its north-western boundary and a hedge (dominated by dense bramble scrub) along its eastern boundary. A small hedge and narrow lane bounds the southern side of the site whilst the western boundary comprises a grassy bank and a post and wire fence. The western corner of the site comprises a small square area which is presently under an Environmental Stewardship scheme for farmland birds. This area is bounded by a line of trees and gardens to the west.

The site is located in a largely rural setting. The small settlement of Hindon lies immediately adjacent to the southern and western boundaries of the site, and there are large tracts of hedged arable land to the north, east and west. Woodlands and a lake associated with Fonthill Gifford lie around 850m to the south and east, and large areas of woodland associated with the 'Great Ridge' lie around 2km north. The site is ecologically linked to these landscape-scale features by treelines and hedgerows.

The site lies some 2.5km from the closest component site for the internationally important Chilmark Quarries Special Area of Conservation (SAC), which is designated for its bat interest. Special Areas of Conservation (SACs) are strictly protected sites designated under the EU Habitats Directive which are internationally important for threatened habitats and species; in this case for several rare species of bat. As a consequence of the proximity of the proposed development site to the SAC (the site sits within the foraging distances of key species for which this SAC is designated) it was considered necessary to provide detailed information on bats to assist with the emerging design.

## 1.2 Scheme Specification

The proposed development is for a residential scheme, together with its associated infrastructure. The design is still at a very stage and no masterplan has yet been compiled. It is expected that the findings of this report will guide the scheme design in the coming months; it will be expanded to include a detailed Ecological Impact Assessment (EcIA) once the scheme has progressed sufficiently to enable impacts (and mitigation measures) to be determined more precisely.

## 1.3 Objectives

The aim of this report is as follows:

- To identify habitats within the site that support commuting or foraging bats and to evaluate the sites' importance for this group of species.
- To assess the likely impacts of a development in this location on the species for which the SAC is designated.
- To help guide the emerging scheme design and enable appropriate mitigation measures to be incorporated that would ensure there would be no Likely Significant Effect upon the SAC.

# 2.0 SURVEY METHODOLOGY

## 2.1 Desk Study

A standard species and sites' data search was carried out through Wiltshire and Swindon Biological Records Centre (WSBRC) within an area of 2 km radius and a search of relevant European sites within an area of 10 km radius. This included the provision of a map showing the location of statutory and local sites, protected UK & Wiltshire BAP / other notable species records held digitally (see AME, 2014).

Bat records and relevant designated sites were extracted from these data for this species specific assessment.

## 2.2 Bat Activity Survey

The Bat Conservation Trust (BCT) Good Practice Guidelines (Hundt, 2012) recommends that three activity transect surveys are undertaken for habitat of low to moderate quality for foraging or commuting bats. Therefore three transect surveys were undertaken in May, July and August 2015. Two further transect sessions were undertaken in September and October 2015 to coincide with the swarming season, in order to determine whether bat species travelling to the Chilmark SAC for autumnal swarming (Parsons, Davidson-Watts, Greenaway and Jones 2003) cross the Hindon site to do so, or feed within it during their movement to the SAC.

The transect route is shown on Figure 8.4; this was walked by two surveyors who both used full spectrum Elekon Batlogger M units; these use an FG microphone with a sampling rate of 312.5 kHz which is more than sufficient to detect high frequency echolocating bat species, such as lesser horseshoe bats *Rhinolophus hipposideros*. When a bat flew within range of a detector microphone its ultrasound was automatically recorded to a SD card with a time and date stamp. In addition GPS mode was enabled on the detectors and all calls were georeferenced with a GPS coordinate.

Transect surveys in May, July and August commenced 15 minutes before sunset and finished 2.5 hours after sunset. The transect surveys in September and October commenced 1-2 hours after dusk and continued for three hours, as research shows that bats travel to swarming sites after bouts of foraging and thus make these landscape-scale movements well after dusk (Parsons, Davidson-Watts, Greenaway and Jones, 2003).

The locations of all recordings were mapped with google maps using BatExplorer software. Calls were analysed and call locations used to produce species 'dot maps'.

## 2.3 Static Loggers

A single static logger was deployed in suitable bat foraging / commuting habitat at the end of each activity survey; in May, July and August. Two loggers were deployed in September and October 2015. Loggers were set to record for a minimum of five nights. An Elekon Batlogger M with extendable microphone and external battery were used for each survey. See Figure 8.5 for logger locations for each survey period.

## 2.4 Trapping Survey

To compliment the transect and logger surveys, two bat trapping surveys were undertaken in September and October 2015 using two 4m$^2$ harp traps, in combination with Sussex Autobat acoustic bat lures to increase the effectiveness of trapping. The harp trapping work was undertaken in order to determine the presence of quiet echolocating bats, and to help to refine the survey data in respect of species, sex and breeding status of bats using the site. Trapping locations are shown in Figure 8.6.

All bats caught were identified to species level, sexed, aged and breeding status was determined, for example breeding female, non-breeding female, sexually active male etc.

## 2.5 Bat Call Analysis

Bat call recordings (known as bat passes) from both transect and logger surveys were recorded in full spectrum format. This retains all the information associated with a bat call recording (i.e. recordings are not compressed or converted). A bat pass is created when an echolocation call is detected by the logger; the sound information is then automatically recorded as a three second wav file. Recordings continue to be created whenever bat ultrasound is detected, effectively providing an index of bat activity.

Recordings were analysed with a range of call analysis software including BatExplorer for Elekon equipment and where necessary 'Batsound' software from Pettersson AB for analysis of difficult calls.

Passes were assigned to a species / species group depending on call characteristics based on Russ (2012) and from Ian Davidson-Watts own library of confirmed bat species calls. Generally certain species can be reliably identified (such as pipistrelle bats, barbastelle and horseshoe bats) however *Myotis* and *Nyctalus/Eptesicus* species were grouped together due to overlapping call parameters.

## 2.6 Qualifications and experience

The bat survey was designed and undertaken by Dr Ian Davidson-Watts, an appropriately licensed ecologist (licence registration numbers 2015-12287-CLS-CLS (CL19 Bat Survey Level 3) and 2015-12289-CLS-CLS (CL20 Bat Survey Level 4). Dr Davidson-Watts has 22 years' experience undertaking bat surveys and holds a research degree in bat ecology.

## 2.7 Limitations of Survey

Weather conditions during the May 2015 transect survey were within limits, but not ideal for bat activity survey in open habitats; all other survey sessions were undertaken during optimal conditions. Despite the low number of bats recorded during the May 2015 transect, a sufficient and robust dataset on bat activity for this month was obtained (from a combination of transect and logger survey (see below).

Due to the open nature of the habitats on the site, trapping survey locations were limited therefore trapping results do not reflect the range of species recorded using other methods. It has not been possible for some species (such as barbastelle bat) to be able to determine the sex and breeding status of individuals using the site since these bats were not captured during trapping surveys.

## 2.8 Ecological Evaluation

Ecological features and resources have been evaluated based on the approach described in 'Guidelines for Ecological Impact Assessment in the United Kingdom' published by the Institute of Ecology and Environmental Management (2006) where the value of an ecological feature or resource is determined with reference to a defined geographical context using the following criteria:

- International;
- National (England);
- Regional (South-west);
- County (or Metropolitan) (Wiltshire);
- District (or Unitary Authority, City or Borough) (Salisbury);
- Local (or Parish) (Hindon); and
- Site (at the site level only).

## 2.9 Assessment of Impacts and Significance

### *2.9.1 Assessment Methodology*

The IEEM publication 'Guidelines for Ecological Impact Assessment in the United Kingdom' sets out a methodology for Ecological Impact Assessment. These methods are followed here and are summarised below in Table 2. Any impact is assessed (provisionally at this stage) within its relevant frame of geographical reference, in terms of the levels of "international, national, regional, county (or metropolitan), district (or unitary authority, city of borough), local (or parish) or at the site level". Against this reference frame, impact magnitude can be (provisionally) assessed and categorised either quantitatively or under the following headings:

**Table 1: Determination of Magnitude**

| Magnitude | Determination of magnitude |
|---|---|
| Major | The magnitude of an impact is determined taking into account the geographic frame of reference and the effects on the integrity of a site or habitat or the conservation status of a species in terms of the duration (permanent or temporary), reversibility, extent, timing, frequency and certainty (e.g. certain, probable or unlikely) of the potential impact. The impacts can be positive, negative or neutral in nature (IEEM 2006). For the purposes of this assessment *Major* and *Moderate* impacts area considered 'significant' (IEEM 2006). |
| Moderate | |
| Minor | |
| Negligible | |

The impact magnitude is used in conjunction with 'conservation status' to determine whether an impact on a habitat or species is likely to be ecologically significant. Conservation status is defined in line with the EU Habitats Directive for species as the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

### *2.9.2 Confidence in making predictions*

Following an assessment of the significance of any residual impacts, a judgement is made for each valued ecological receptor about the degree of confidence in the impact assessment. A measure of certainty is also applied, where possible, to the likely success or otherwise of measures to mitigate negative ecological effects. In addition, the available degree of detail about a particular mitigation measure at this stage in the development of the scheme can also affect certainty. In this assessment, confidence in prediction is expressed with reference to the scale described below:

- Certain or Very High Level of Confidence;
- Likely or High Level of Confidence;
- Unlikely or Low Level of Confidence; or
- Very Unlikely or Very Low Level of Confidence.

# 3.0 RESULTS

## 3.1 Desk study

Bat records returned by WSBRC are shown in Appendix 1.1 and reveal 15 records of bats from 1957 to 2013 within 2km of the site. Species recorded include common pipistrelle *Pipistrellus pipistrellus*, brown long-eared *Plecotus auritus* and noctule bat *Nyctalus noctula*. The majority of records are from roost surveys undertaken by volunteers, with most being from the villages of Hindon and Fonthill. The location data for these records are limited to a 1km square, therefore it has not been possible to determine the exact distance of the records from the site.

Chilmark Quarries Special Area of Conversation (SAC) is situated 2.5km (Fonthill Grottoes Site of Special Scientific Interest (SSSI) component) and 6.3km (Chilmark Quarries SSSI component) to the south-east of the site. This SAC is a site of both geological and biological interest. The extensive system of undisturbed caves support large overwintering roosts of greater horseshoe *Rhinolophus ferrumequinum* and lesser horseshoe bats, as well as *Barbastella barbastellus,* Daubenton's *Myotis daubentonii*, natterer's *M. nattereri*, Brandt's bat *M. brandtii* and the largest UK roost of the nationally rare species Bechstein's bat *M. bechsteinii*. The SAC citation is included in Appendix 7.1.

Research at the site has demonstrated that bats from the Chilmark SAC travel north using treelines, hedges and open fields, to major woodland complexes north of the A303. Many bats have been radio-tracked over 5km or more (Davidson-Watts, 2005 unpublished data). The locations of the Chilmark Quarries SAC is shown in AME 2015.

## 3.2 Field survey

### *3.2.1 Weather conditions*

Weather conditions were suitable during all the survey sessions, despite occasional showers during the May session.

**Table 3.2.1 – Summary of weather conditions of the transect surveys**

| Survey number | Date | Temperature °c (start-end) | Wind speed (BF scale) | Cloud cover % | Rain |
|---|---|---|---|---|---|
| 1 | 15.05.15 | 14-12 | 2 | 70 | Light infrequent showers |
| 2 | 30.07.15 | 18-9 | 1 | 10 | None |
| 3 | 24.08.15 | 13-12 | 1 | 90 | Light at start, none after 21:30 |
| 4 | 17.09.15 | 15-14 | 1 | 30 | None |
| 5 | 08.10.2015 | 13-11 | 1 | 50 | None |

### 3.2.2 *Activity Surveys*

The five transect sessions captured 472 bat calls from six species/groups including common pipistrelle (Pipi), soprano pipistrelle (Pipy), *Myotis* (Myo), barbastelle (Baba), long-eared bat (here referred to Plaur) and *Nyctalus/Eptesicus* (NLS). The proportions of each species are shown in chart 3.2.1 below; the majority of bat passes were from common pipistrelle (82%), with the next most frequent species/group being *Myotis* bats (8%). Of note is the presence of barbastelle, which made up 5% of the transect bat detector recordings.

The distribution of records during each transect session is shown by month in Figure 9.7. These data show the majority of bat activity overall occurred on the northern and western boundaries, with a concentration of activity in the south-east corner adjacent to a mature tree line.

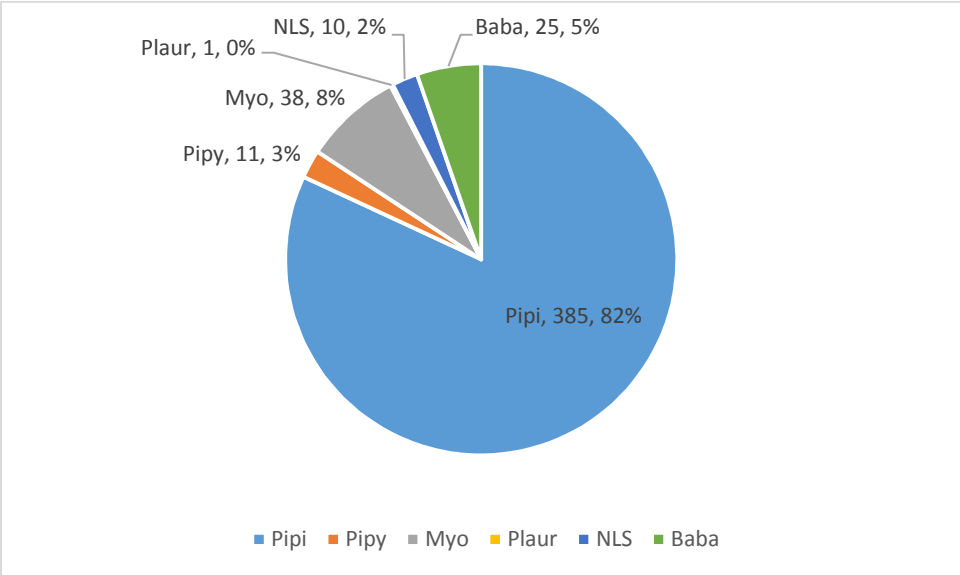
The transect data show that common (and occasionally soprano pipistrelle bats) utilised the majority of the site boundaries at some point, with particular centres of activity from pipistrelles around the western and south eastern sections of the site.

Low numbers of *Myotis* recordings were made from various locations around the site boundary, with no particular cluster of activity being noted. However there was a general spike in activity from *Myotis* bats during the October transect, which suggests some seasonal movement across the site.

Barbastelle bat was recorded regularly and was detected on all transect surveys except during the May session. This species was predominantly recorded along the north-western boundary.

There were sporadic *Nyctalus/Eptesicus* and long-eared recordings from the site with no clear pattern of activity from these species.

**Chart 3.2.1 Proportions of bats from combined transect data**



### *3.2.3 Static Logger Surveys*

The static loggers recorded a total number of 1284 bat passes during the logger surveys varied out between May and October 2015. The logger data confirms the presence of eight species/species groups, and in addition to the six species identified during the activity surveys, loggers also detected presence of greater and lesser horseshoe bat.

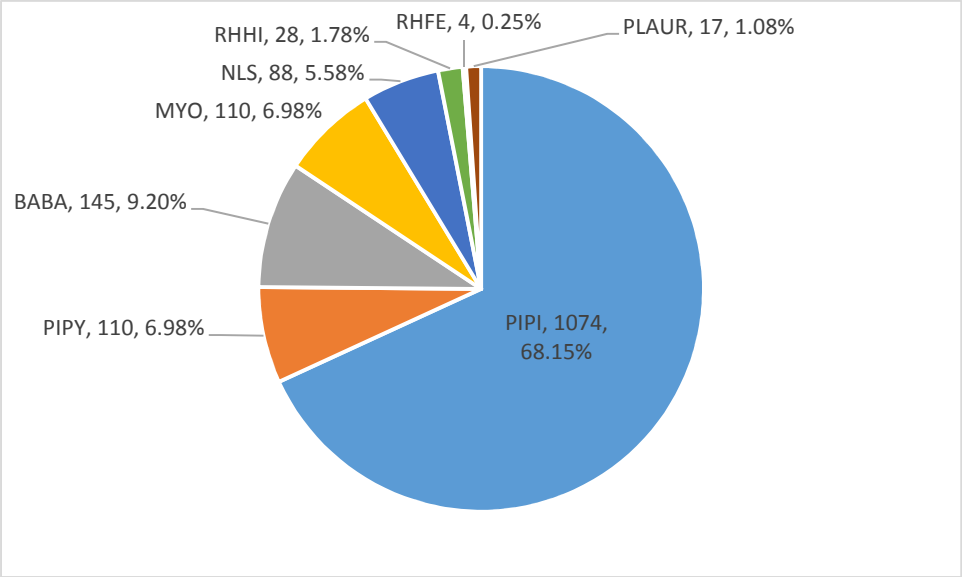
Chart 3.2.2a below shows the proportions of bat passes recorded during the logger surveys. Common pipistrelle was at 68% the most frequently recorded species; this is consistent with the results of the activity surveys.

Four greater horseshoe (RHFE) bat passes were detected during the logger work; this was the least detected bat species.

A total of 28 recordings were from lesser horseshoe bat.

Barbastelle bats were the second most detected bat, with 145 passes (9% of all records) being assigned to this species.

**Chart 3.2.2a- Proportion of bat passes by species recorded by static loggers. Data labels also include total number of calls recorded.**

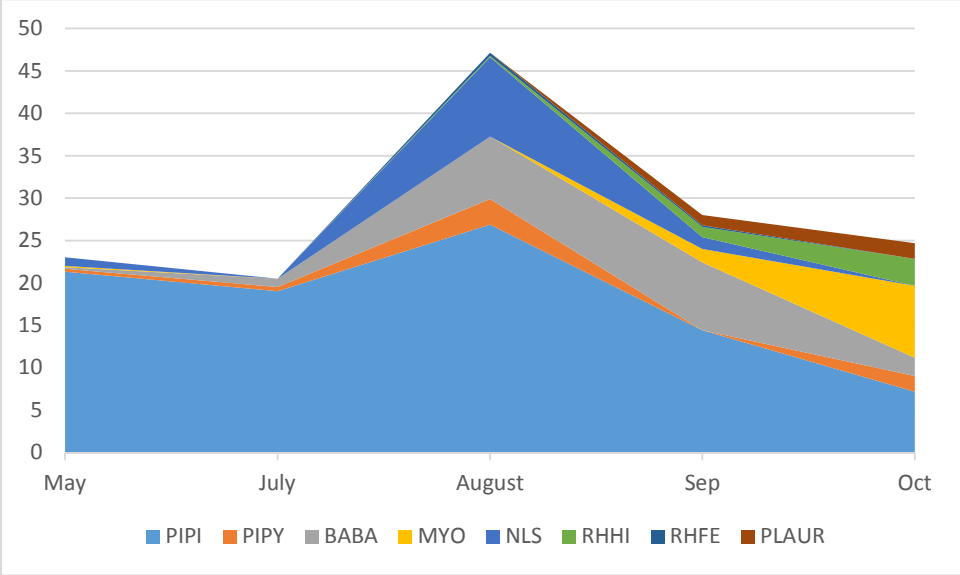



To assess temporal use of the site by bats through the survey period, data from only one logger (situated in the same location throughout all survey during May-October) was analysed. Chart 3.2.2b (a stack area chart) shows the distribution of calls per night from the single logger, classified by species/species group throughout the survey period. The y axis shows average calls per night proportionately by species. For instance common pipistrelle averaged c.27 calls per night in August and NLS averaged c.9 calls per night in August.

In general Chart 3.2.2b shows bat activity and species diversity was relatively low in May. However both species diversity and average bat passes per night (i.e. the level of activity) increased in August, with the highest activity being from *Pipistrellus* spp., barbastelle and the NLS group during this period. From August through to October activity levels generally decreased overall (mainly as a result of pipistrelle and NLS activity reducing), however species diversity increased, with long-eared, horseshoe and *Myotis* bats activity becoming more prevalent.

It should be noted that the data from the single logger used throughout summer and autumn revealed that even for the most commonly encountered species (common pipistrelle) the average number of passes per night was 17.2 (over a 27 nights of logging) which from experience of other sites is a relatively low number.

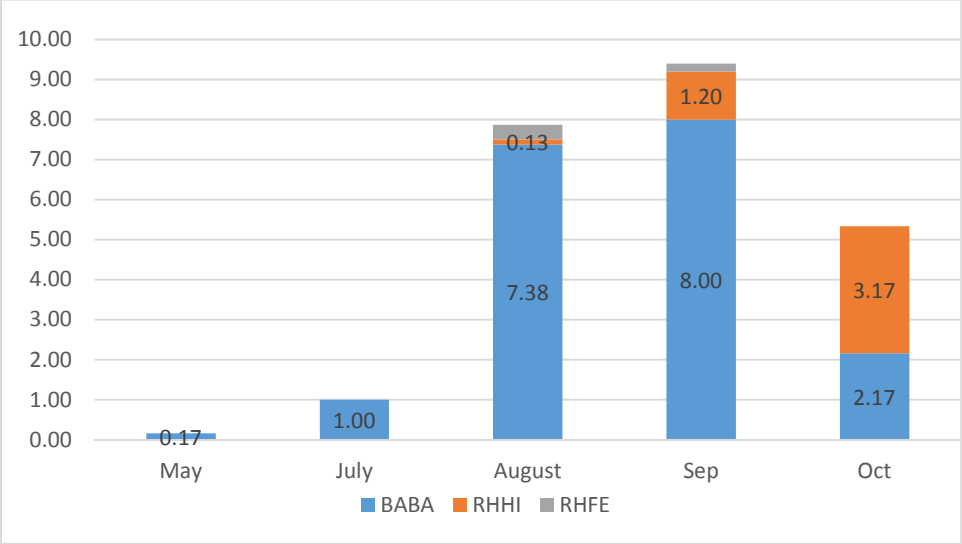
**Chart 3.2.2b Mean calls per night by species throughout the survey period from a single logger**




As this assessment aims to inform the emerging scheme design (as it relates to potential impacts on the nearby Chilmark Quarries SAC) a separate analysis of logger data has been undertaken for the relevant Annex 2 species (the SAC qualifying species); of the species recorded during the survey this comprises barbastelle, and greater and lesser horseshoe bats.

Chart 3.2.2c below shows that barbastelle was detected throughout the logger survey season, with a maximum average of eight calls per night in September. Horseshoe bats were not detected until August, with an increasing level of frequency for lesser horseshoe bat from August to October. Although it was present in August and September, greater horseshoe bat was only detected on four occasions during the entire survey period.

**Chart 3.2.2c Average bat passes recorded per night for SAC Qualifying species during static logger survey at single location**




### *3.2.4 Trapping Surveys*

Due to the open nature of the site, trapping surveys were challenging. The September trapping session did not capture any bats, however during the night of the 8 October 2015 a male adult brown long-eared bat was captured (at 21:30) and a male adult natterer's bat was caught at 21:45 (at the eastern trap location).

# 4.0 RELEVANT LEGISLATION & POLICY[1]

## 4.1 Legislation

### *4.1.1 Wildlife and Countryside Act (as amended)*

In England, Scotland and Wales all bat species are fully protected under the Wildlife and Countryside Act 1981 (WCA) (as amended) through inclusion in Schedule 5. In England and Wales, this Act has been further amended by the Countryside and Rights of Way Act 2000 (CRoW).

In addition sites of special scientific interest (SSSIs) can be designated for important bat populations, usually associated with hibernation or breeding. Local planning authorities are required to consult Natural England (in England) before granting planning permission that may affect an SSSI. Chilmark Quarries and Fonthill Grottoes are designated as SSSIs.

### *4.1.2 Conservation Regulations*

*European Protected Species*

All bats are also included in Schedule 2 of The Conservation of Habitats and Species Regulations 2010, (the Habitats Regulations), which defines 'European protected species (EPS) of animals'. These various pieces of legislation almost parallel each other, with a few small differences in wording. The legal significance of these differences has not yet been fully established and so the following account attempts to combine them to provide a simplified summary of the relevant provisions. Taken together, the Act and Regulations make it illegal to:

- intentionally or deliberately kill, injure or capture (or take) an EPS;
- deliberately disturb an EPS;
- recklessly disturb an EPS or obstruct access to breeding site or place of shelter (England & Wales only); and
- damage or destroy 'any structure or place which any EPS uses for shelter or protection.

European Union Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats and Species Directive) places a legal requirement on all Member States of the European Union to protect specified habitats and species through their own domestic legislation. In the UK this has been implemented by the Conservation of Habitats and Species Regulations (2010). All species of bats are on Annex IV ('European protected species (EPS) of animal'), which requires that they are given full protection.

*European sites (e.g. SACs)*

[1] The legal summary is for guidance only; if more information is required, please consult the original legal documents.

With respect to European sites such as the Chilmark Bats SAC, Circular 06/2005 Biodiversity and Geological Conservation – statutory obligations and their impact within the planning system from the former ODPM provides guidance which makes clear the obligation upon local planning authorities (the 'competent authorities') to ensure that developments have no adverse effect upon such sites, either individually or in combination with other plans or projects i.e.:

> *"Regulation 48 of the Habitats Regulations restricts the granting of planning permission for development which is likely to significantly affect a European site and which is not directly connected with or necessary to management of the site, by requiring that an appropriate assessment is first carried out of the implications of the development for the site's conservation objectives. Regulation 49 requires an authority proposing to allow development that it cannot be ascertained will not adversely affect a European site to notify the First Secretary of State."*

The 'Waddenzee judgement' of the European Court of Justice (ECJ) is pertinent here. The Court ruled that a project may only be authorised if the competent authority is certain that the plan or project would not adversely affect the integrity of the European site - i.e. there should be "no reasonable scientific doubt… as to the absence of such effects" (ODPM Circular). Clearly in order for there to be no reasonable scientific doubt, sufficient ecological baseline survey is required upon which to base the impact assessment and mitigation strategy.

In undertaking their assessment, a local authority is required to screen and record the assessment of LSE in order to formally identify the requirement for an appropriate assessment, and in so doing must consult Natural England.

## 4.2 National Planning Policy

The National Planning Policy Framework (NPPF) (2012) Chapter 11 outlines out how the planning system should contribute to, create, enhance and protect the natural and local environment by minimising impacts on biodiversity and, where possible, provide net gains in biodiversity. Opportunities to incorporate biodiversity gains into a development should be encouraged. If a proposed development would result in significant harm to the natural environment which cannot be avoided (through the use of an alternative site with less harmful impacts), mitigated or compensated for (as a last resort) then planning permission should be refused.

To minimise impacts on biodiversity and geodiversity, planning policies should identify and map components of the local ecological networks, including the hierarchy of sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation, promote the preservation, restoration and recreation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and

local targets and identify suitable indicators for monitoring biodiversity in the plan (Paragraph 117).

The NPPF retains protection for Local Wildlife Sites which are clearly recognised in the framework as locally designated sites. The policy provides the direction for local authorities to identify, map and protect these sites through local plans. The new policy also requires protection of Local Wildlife Sites to recognise the importance and the contribution that they make to wider ecological networks, as stated in the Government's own Natural Environment White Paper.

The government circular 06/05: Biodiversity and Geological Conservation – Statutory Obligations and Their Impact within the Planning System still remains the key reference material to support obligations under the NPPF.

The Natural Environment and Rural Communities (NERC) Act came into force on 1st Oct 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions. Fifty-six habitats of principal importance and 943 species of principal importance are included on the S41 list. These are all the habitats and species in England that were identified as requiring action in the UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.

## 4.3 Local Planning Policy

### *4.3.1 General: biodiversity and development*

The relevant local planning document is the Wiltshire Core Strategy Development Plan (20 January 2015). Core Policy 50: Biodiversity and geodiversity is listed under Section 6 Delivering strategic objective 5: protecting and enhancing the natural, historic and built environment.

Coe Policy 50 Biodiversity and geodiversity

- Protection Development proposals must demonstrate how they protect features of nature conservation and geological value as part of the design rationale. There is an expectation that such features shall be retained, buffered, and managed favourably in order to maintain their ecological value, connectivity and functionality in the long-term. Where it has been demonstrated that such features cannot be retained, removal or damage shall only be acceptable in circumstances where the anticipated ecological impacts have been mitigated as far as possible and appropriate compensatory

measures can be secured to ensure no net loss of the local biodiversity resource, and secure the integrity of local ecological networks and provision of ecosystem services.

- All development proposals shall incorporate appropriate measures to avoid and reduce disturbance of sensitive wildlife species and habitats throughout the lifetime of the development.
- Any development potentially affecting a Natura 2000 site must provide avoidance measures in accordance with the strategic plans or guidance set out in paragraphs 6.75-6.77 above where possible, otherwise bespoke measures must be provided to demonstrate that the proposals would have no adverse effect upon the Natura 2000 network. Any development that would have an adverse effect on the integrity of a European nature conservation site will not be in accordance with the Core Strategy.
- All development should seek opportunities to enhance biodiversity. Major development in particular must include measures to deliver biodiversity gains through opportunities to restore, enhance and create valuable habitats, ecological networks and ecosystem services. Such enhancement measures will contribute to the objectives and targets of the Biodiversity Action Plan (BAP) or River Basin/ Catchment Management Plan, particularly through landscape scale projects, and be relevant to the local landscape character.

### *4.3.2 Guidance in respect of European sites*

Further planning guidance is available through the Wiltshire Bats Special Areas of Conservation Planning Guidance document (2015) which is applicable to all development types in the areas within and surrounding Chilmark Quarries SAC. The site lies within the Bat Consultation Zone for Chilmark Quarries SAC Development proposals, where development could potentially trigger impacts on the SAC by affecting foraging areas and/or commuting corridors. The site is identified as being within the core areas for greater horseshoe and barbastelle bat which are the landscapes surrounding the SACs that are used regularly for foraging and commuting. Where a site lies within a core area, the following potential impacts should be considered at an early stage:

- Physical changes through loss, damage or change of management of potential foraging habitat, removal / fragmentation / modification of habitats in a potential commuting corridor; and
- Lighting through artificial lighting close to potential roosting, foraging and commuting features.

Where survey work has confirmed that a sensitive feature used by a SAC species is likely to be affected, a mitigation strategy will need to be submitted with the planning application. The basic principles of development identified include:

- Maintain dark corridors around foraging areas and commuting corridors with no net increase in light levels as a result of the development in areas used by bats;
- Locate potential sources of disturbance away from bat roosts and bat habitats to avoid impacts;
- Maintain the extent and quality of all semi-natural habitats in foraging areas and commuting routes and design the development around existing habitats.

The mitigation strategy must set out how potential impacts will be avoided as part of the application. The scope of this document will be dependent on the nature and scale of the anticipated impacts, but may include the following elements:

- Construction Method Statement;
- Details of roosts to be altered / created – dimensions, materials etc;
- Pre and post-development lux plots; Post-construction monitoring scheme; and
- Ecological management plan.

The information will be used by the Council to determine whether the proposal is likely to have a significant effect on the SAC. The Council will screen for any 'likely significant effects'16 (based on the activities and impacts outlined in Table 1) to determine the requirement for an 'appropriate assessment' under the Habitats Regulations.

# 5.0 DISCUSSION AND EVALUATION

## 5.1 Discussion

The trapping, logger and transect survey data show that bats were detected on the site during all survey sessions and that the site supports at least eight species of bat.

Although transect work focussed on the boundaries of the site, there were few observations of bats foraging or commuting over the arable field, and almost all activity was on hedges and trees around the site boundary.

Given the relatively low average bat pass per night for greater and lesser horseshoe bat, *Nyctalus*/Serotine, common pipistrelle, soprano pipistrelle, *Myotis* and long-eared bats, these data support the assumption that the majority of the site provides low quality habitat for foraging bats of these species.

Horseshoe bats were detected during August, September and October. Only four passes from greater horseshoe bats were detected and these were from the logger situated on the eastern boundary of the site. For lesser horseshoe the greatest number of passes were detected in October and of these 19 of the 21 passes detected were on the eastern boundary, with the remaining two on the north-western boundary. No horseshoe bats were detected on the transect surveys. These results suggest that the eastern boundary hedgerow appears to be the main feature used by commuting horseshoe bats during the autumn months. The results support research that both greater and lesser horseshoe bats prefer woodland and pasture as foraging (Duverge and Jones 2004; Schofield, 2008) and the site and immediate surroundings is unlikely to provide a significant foraging resource for these two Annex II bat species.

The low number of *Myotis, Nyctalus*/Serotine, soprano and long-eared bats are also likely to be from commuting individuals, although it is possible that there is also an element of foraging taking place. This assumption is supported by the capture of male brown long-eared and natterer's bats; whilst research has shown that breeding colonies of these species prefer woodland habitats (Smith and Racey, 2002; Entwistle, Racey and Speakman, 1997), males are often found using what would be considered sub-optimal foraging habitat such as treelines and hedgerows (Davidson-Watts, 2008). It may also be that long-eared was under recorded during the survey due to this species emitting low amplitude echolocation calls (Russ, 2012); therefore activity from this species may in fact be higher. Notwithstanding, the low levels of bat passes, compared to pipistrelle and barbastelle bats, indicate that the site is not a significant foraging resource for *Myotis*, *Nyctalus*/Serotine and long-eared bats.

The likelihood of some *Myotis* bat passes recorded on the site being from Bechstein's bat (the fourth Annex II species for which the SAC is designated) is low; mainly because it is a species that uses quiet echolocation calls. Therefore even if it were to be present it is likely to be under-recorded. The trapping surveys with the acoustic lure were used

to try and establish presence of this species on site. This is generally a very effective method (Hill and Greenaway, 2005), since Bechstein's specific calls are used to lure nearby bats of this species to the trap. Despite the use of this method with three traps / lures, the species was not captured. It can therefore be concluded that whilst Bechstein's bat may use the site periodically, usage is unlikely to be significant and is probably limited to occasional commuting (if indeed it is present at all).

The results show that common pipistrelle and barbastelle bats consistently used the site throughout the survey season and both species were recorded on all logger surveys (and during the majority of transect surveys). The results indicate that both common pipistrelle and barbastelle are using the site for foraging and commuting. These species are discussed below in more detail:

Common pipistrelle is a wide ranging and relatively abundant species nationally. Davidson-Watts, Jones and Walls (2006) found that the common pipistrelle is a generalist forager which uses a wider variety of mainly woodland habitats for foraging and commuting. In addition, the location of this site adjacent to the settlement of Hindon would provide a variety of nearby roosting opportunities for this species.

Barbastelle is a rare species which roosts primarily in trees. It is a wide ranging species which is known to have average foraging distances between 6 and 7km and in southern England it is known to forage in floodplains and woodlands (Zeale, Davidson-Watts and Jones, 2012). However, more recent studies in Lincolnshire (Davidson-Watts, 2014) have found this species to forage around treelines, hedgerows and small copses in arable habitats, and this study found it avoided woodland. Research suggests that barbastelle bats generally avoid flying in (lit) urban areas, although bats have been found foraging approximately 25m from street lamps when buffer vegetation/treelines were present.

The detection of three Annex II species (greater and lesser horseshoe and barbastelle) over what would generally be considered moderate to low quality habitat for bats is not surprising, given the context in which the site is situated. The site lies between a number of significant areas of woodland, wetland and internationally important hibernation and swarming sites for multiple bat species; Fonthill Grottoes and Chilmark Quarries lie nearby to the south and there is an extensive area of wooded habitat some 5km to the north (known as the Great Ridge). Although the sites' hedgerows are not well-structured, they are situated in what is otherwise a rather open landscape and they appear to provide an important ecological linkage, particularly for barbastelle bats, between the various habitat-areas mentioned above.

## 5.2 Evaluation

*Horseshoe bats*

Greater and lesser horseshoe bats were detected occasionally on the eastern boundary of the site during the autumn and the logger data suggests that they were using this feature for occasional commuting. Both greater and lesser horseshoe bats are considered rare in the UK with their distribution being restricted to Wales and south west England. They are both qualifying features of the nearby Chilmark Quarries SAC and, despite a low level of use of the site by these species, due to their conservation status and given the proximity to the nearby SAC, the eastern boundary of the site is considered of **County** importance for greater and lesser horseshoe bats.

*Barbastelle bat*

This species was detected regularly using the north-eastern and north-western site boundaries for foraging and commuting. Although barbastelle is widespread across England and Wales, it is rare throughout, with breeding colonies requiring home ranges of over 120km$^2$ (Zeale et al 2012). Given the proximity of the nearby SAC (for which this species is a qualifying feature) and in view of the regular use of the site, the north-west and eastern boundaries of the site are assessed as having potentially **National** importance for this species.

*Myotis bats*

This species group was detected in greater numbers towards the end of the survey period (during autumn) and although there may be low level foraging, the predominant use of the site appears to be for commuting. *Myotis* bats are the main species group known to swarm at Chilmark Quarries and Fonthill Grottoes (Parsons *et al,* 2003) and an increase of commuting activity at the site during autumn may relate to bats commuting though to visit one or both of these SAC component sites. With the exception of Bechstein's and the newly discovered Alcothoe bat species, the other *Myotis* species (Natterer's, Daubenton's, Whiskered and Brandt's bats) are relatively widespread nationally, and populations are either stable or increasing (BCT, 2014). Although it is not confirmed as present on the site, Bechstein's bats could move through the area to visit swarming sites in the SAC as part of the *Myotis* assemblage, therefore a precautionary approach has been adopted to this evaluation. Taking these factors into account, site is therefore considered of **County** importance for *Myotis* bats.

*Noctule/Leisler's (Nyctalus) and Serotine bats*

This group of bat species were recorded on the site mainly during summer 2015 with a peak in August. However only 88 bat passes were recorded in total and these were likely to be from bats commuting through / across the site. All three species have a similar conservation status, although noctule is widespread throughout the UK and

serotine is restricted to the central and southern England. Given the low number of passes detected for these species during the activity and logger surveys, the site is considered to be of **Site**-level importance to these species.

*Pipistrelle bats*

Common pipistrelle was the most abundant bat detected during the surveys and this species used all boundaries at some point during the survey. However, despite being the most frequently detected bat, the average number of passes per night was 17.2 – a relatively low level. Soprano pipistrelle bats also occurred regularly on site, but at low level. Common pipistrelle populations are increasing and soprano pipistrelle populations are considered stable nationally (BCT, 2014) and as a result the site is considered to be of **Site**-level importance for pipistrelle bats.

*Long-eared bats*

The capture of a male brown long-eared bat and the detection of relatively low numbers of passes suggest the site is not a significant foraging resource for these species. Brown long-eared bats are relatively common and abundant nationally, with a stable population (BCT, 2014). The site is therefore considered to be of **Site**-level importance for long-eared bats.

## 5.3 Potential Impacts

The evaluation highlights the importance of some site boundaries to a range of bat species; in particular the north-west and eastern boundaries, which provide commuting and foraging habitat for a range of bats, including three SAC qualifying species (the two horseshoe species and barbastelle).

A proposed residential development is likely to have a number of potential impacts on bats associated with it. These include:

- Direct impact resulting from habitat loss and fragmentation as a result of the removal of hedgerows and tree-lines (or sections of such) which are used by bats for feeding and navigation.
- Indirect impacts as a result of artificial lighting spill into bat habitat; this may deter bats from the area and could also affect prey behaviour (e.g. moths) during construction (from security lighting) and post-construction (from street lighting and lighting from dwellings). Artificial lighting has been shown to have negative effects on commuting and foraging bats, and species from the *Myotis*, horseshoe, long-eared groups and barbastelle bat are all considered particularly sensitive (Stone, 2013). By inadvertently lighting commuting routes and foraging habitats, bats travelling to important bat site such as Chilmark Quarries may be deterred and could use longer routes, thus using valuable energy resources in the process.

## 5.4 Outline mitigation recommendations

The aim of mitigation must be to ensure the integrity of key bat foraging and commuting habitat in the emerging scheme design; in particular for the Annex 2 bat species greater / lesser horseshoes and barbastelle, all of which are sensitive to artificial lighting and all of which are SAC qualifying species.

In view of the potential for negative impacts upon the special interest of the Chilmark Quarries Bats SAC, in particular through light spill into adjacent habitat, the following mitigation measures are likely to be key to a successful planning application (in respect of ecology):

1. Retain the integrity of the northern and eastern habitat boundaries to provide the dark linear framework used by foraging and commuting bats, post development.

2. Focus the development towards the southern half of the site if possible, leaving as wide a buffer as is practical (ideally 25m[2]) along the north-western and eastern edges. The reason for this is because of the potential for a Likely Significant Effect (LSE) upon the qualifying features of the SAC; principally as a result of lighting spill. It will be vital to be able to demonstrate an acceptable lighting plan at the planning application stage if an Appropriate Assessment is to be avoided and ideally the development would have minimal street lighting associated with it. As a matter of course, lighting should be directional and as low as possible, in order to limit spill and glare across the wider landscape.

3. Retained buffers may require planting with native trees/shrubs in order to enhance foraging habitat, provide additional screening (from lighting spill) and strengthen the linear nature of these features with respect to their bat commuting function.

4. Any planting provided for use as screening for light spill should be planted as soon as possible, in order to ensure that vegetation is sufficiently well-developed prior to completion of the development.

REPORT ENDS

1. [2] A study of habitat use by barbastelle bats in an arable/agricultural landscape showed that bats foraged within 25m of streetlights where a treeline was present (which limited spill and glare).

## 6.0 BIBLIOGRAPHY

AME (2015). Draft Preliminary Ecological Impact Assessment for Land off East Street, Hindon. Andrew McCarthy Ecology. Exeter.

Bat Conservation Trust (2014). National Bat Monitoring Programme Annual Report. London.

Davidson-Watts, I., Walls, S, & Jones, G. (2006). Differential habitat selection by Pipistrellus pipistrellus and Pipistrellus pygmaeus identifies distinct conservation needs for cryptic species of echolocating bats. *Biological Conservation* 133: 118-127

Davidson-Watts, I. (2008). The Isle of Wight Woodland Bat Project. Peoples Trust for Endangered Species. London.

Duvergé, P.L. and Jones, G. (2003). Use of farmland habitats by greater horseshoe bats. In: Tattersall, F. and Manley, W. (Eds.), Farming and Mammals. Conservation and Conflict. Occasional Publication of the Linnean Society 4. Westbury Publishing, Otley. Pp. 64-81.

Entwistle, A.C., Racey, P.A. and Speakman, J.R. (1997). Roost selection by the brown long-eared bat Plecotus auritus. Journal of Applied Ecology 34: 399-408.

Hundt, L (2012) Bat Surveys: Good Practice Guidelines, 2nd Edition, Bat Conservation Trust.

Institute of Ecology and Environmental Management (2006). Guidelines for Ecological Impact Assessment in the United Kingdom.

Parsons, K., Jones, G., Davidson-Watts, I.F. and Greenaway, F. (2003). Swarming of bats at underground sites in Britain - implications for conservation. Biological Conservation 111: 63-70.

Russ, J. (2012). British Bat Calls: A Guide to Species Identification. Pelagic Publishing.

Schofield, H. (2008). The Lesser Horseshoe Conservation Handbook. Vincent Wildlife Trust. Hereford.

Smith, P. G. and Racey, P. A. (2008), Natterer's bats prefer foraging in broad-leaved woodlands and river corridors. Journal of Zoology, 275: 314–322.

Stone, E.L. (2013). Bats and lighting: Overview of current evidence and mitigation. University of Bristol, UK

Zeale, R.K., I. Davidson-Watts and Jones, G. (2012) Home range use and habitat selection by barbastelle bats (*Barbastella barbastellus*): implications for conservation. Journal of Mammalogy 93 (4): 1110-1118.

Wildlife and Countryside Act 1981:
www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

Countryside and Rights of Way Act 2000:
www.legislation.hmso.gov.uk/acts/acts2000/20000037

Natural Environment and Rural Communities Act 2006:
www.opsi.gov.uk/acts/acts2006/ukpga_20060016_en_1

## 7.0 APPENDICES

## 7.1 Chilmark Quarries Special Area of Conservation Citation

**EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora**

**Citation for Special Area of Conservation (SAC)**

| | |
|---|---|
| **Name:** | Chilmark Quarries |
| **Unitary Authority/County:** | Wiltshire |
| **SAC status:** | Designated on 1 April 2005 |
| **Grid reference:** | ST974310 |
| **SAC EU code:** | UK0016373 |
| **Area (ha):** | 10.41 |
| **Component SSSI:** | Chilmark Quarries SSSI, Fonthill Grottoes SSSI |

**Site description:**
This complex of abandoned mines and subterranean follies in central-southern England is regularly used by an important assemblage of bat species as a hibernation site. The extensive system of undisturbed mines, with their constant temperature and humidity, and the varied construction of the grottoes, provide suitable conditions for large numbers of wintering bats. The site is considered to be one of the best areas in the United Kingdom for Bechstein's *Myotis bechsteinii*, barbastelle *Barbastella barbastellus* and greater horseshoe bats *Rhinolophus ferrumequinum* and supports a significant population of lesser horseshoe bats *R. hipposideros*. The surrounding woodland, grassland and open water habitats also provide a valuable roosting, breeding and feeding area for bats.

**Qualifying species:** The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Barbastelle bat *Barbastella barbastellus*
- Bechstein's bat *Myotis bechsteinii*
- Greater horseshoe bat *Rhinolophus ferrumequinum*
- Lesser horseshoe bat *Rhinolophus hipposideros*

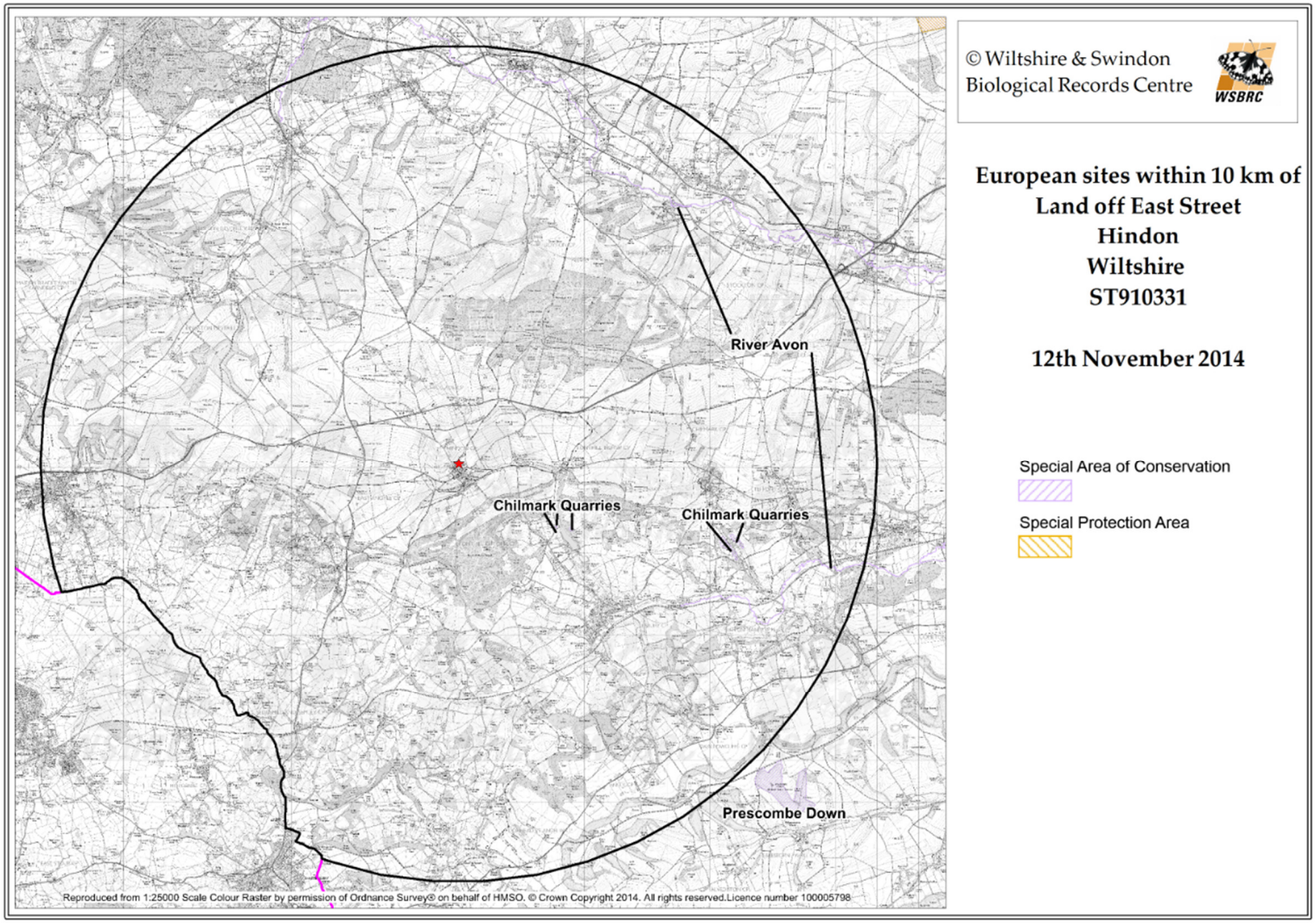
This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0016373
Date of registration: 14 June 2005
Signed:
On behalf of the Secretary of State for Environment, Food and Rural Affairs

## 7.2 Desk Study Results

| Species Name | Common name | Grid ref | Location | Date | Abundance | Comment |
|---|---|---|---|---|---|---|
| Chiroptera | Bats | ST9232 | Hindon, Salisbury | 16/02/2010 | 1 count of droppings | Bat droppings indicating a small number of bats over a number or years |
| | | ST9333 | Fonthill Estate | 16/03/1992 | | Bat roost cleared of accumulated droppings, sealed and replaced with bat box by Wilts. Bat Group. |
| | | ST9132 | Hindon, Swindon | 08/09/1992 | | Numerous access points under soffits/between slates. Roost in roof apex. Droppings typical of long-eared and pip. |
| *Nyctalus noctula* | Noctule bat | ST9131 | Fonthill | 02/03/1957 | | |
| *Plecotus auritus* | Brown long-eared bat | ST9233 | Berwick St Leonard SP3 5SN | 16/03/1999 | | Small scattering of droppings near loft access. |
| | | ST0932 | Marsdon, The Down, Hindon | 02/07/1997 | | Small amount of droppings. |
| | | ST9132 | Hindon | 06/10/2000 | Bat count | Bat roost in roof apex. |
| | | ST9132 | Salisbury SP3 6EL | 29/10/2013 | | Recorded in dwelling |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipistrellus | Pipistrelle bat species | ST9231 | Fonthill Gifford | 07/04/1987 | Bat count | Droppings |
| | | ST9333 | Fonthill Estate | 01/01/1993 | Bat count | Large summer pip roost. |
| *Pipistrellus* | Common pipistrelle | ST9231 | Fonthill Gifford | 11/04/1987 | | Droppings in attic |
| | | ST9131 | Fonthill | 30/11/1954 | | In caves |
| | | ST9131 | Fonthill | 31/01/1959 | | |
| | | ST9131 | Fonthill | 31/01/1960 | | |
| | | ST9131 | Fonthill | 02/03/1957 | | |

## 7.3 Chilmark Quarries SAC Location Map



# 8.0 FIGURES

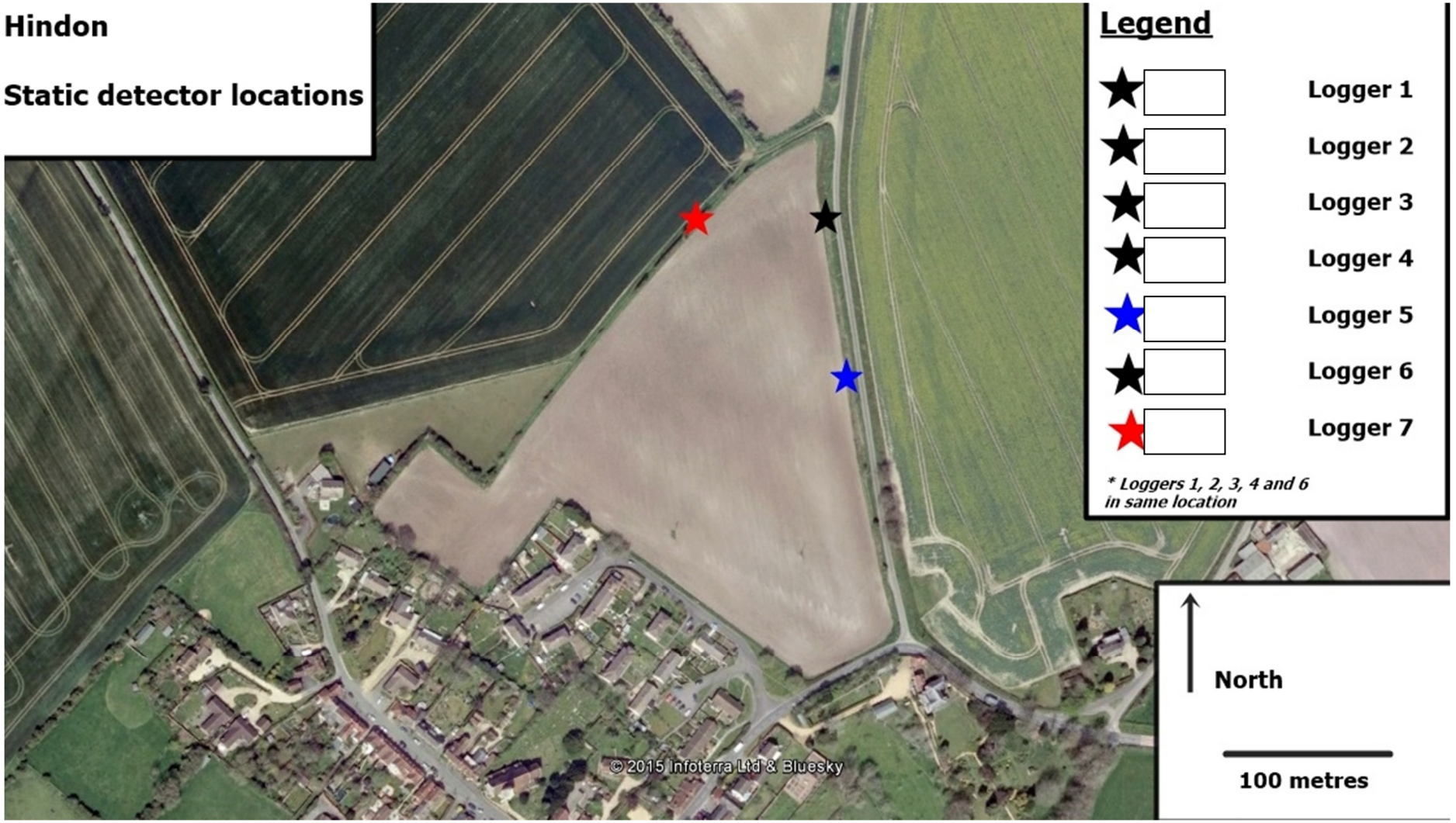
## 8.1 Site Location Plan

## 8.2 Red Line Boundary

## 8.3 Proposed Development

## 8.4 Transect Route

## 8.5 Location of Static Loggers Surveys



## 8.6 Trapping Location

## 8.7 Bat Activity Maps

### *8.7.1 Transect 1 15th May 2015*

### *8.7.2 Transect 2 30th July 2015*

### *8.7.3 Transect 3 24th August 2015*

### *8.7.4 Transect 4 17th September 2015*

### *8.7.5 Transect 5 8th October 2015*

## 8.8 Key constraints plan showing main activity zones of rarest bat species