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ALUCO ECOLOGY

ECOLOGICAL APPRAISAL

**LAND AT GREENOAKS, BARNHAM ROAD,
BOGNOR**

SEPTEMBER 2010

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ECOLOGICAL APPRAISAL, LAND AT GREENOAKS, BARNHAM ROAD, BOGNOR

1.0 INTRODUCTION

1.1 Background

1.1.1 Aluco Ecology Ltd was commissioned to carry out an ecological appraisal and dedicated ecology survey work of land at Greenoaks, Barnham Road by Southcott Homes Ltd. An 'Ecological Appraisal' is a general investigation of the likely ecological and nature conservation issues associated with the site and its potential development.

1.1.2 The aim of an Ecological Appraisal is to:

- highlight any features of particular ecological value;
- identify potential impacts to ecology as a result of the proposed works;
- identify any ecological issues that may have legal or planning implications such as the presence of protected species; and
- recommend any further work (such as targeted protected species surveys) required in order to fully assess the value of the site, and therefore the potential ecological impacts of the proposals that may arise as a result of the proposal to build a new extension and garage with associated access.

1.1.3 The Government sets out its objectives for conserving and enhancing biodiversity in Planning Policy Statement 9; Biodiversity and Geological Conservation (PPS9, 2005). The Government's objectives for planning are:

- to promote sustainable development by ensuring that biodiversity is conserved and enhanced as an integral part of economic, social and environmental development, so that policies and decisions about development and use of land integrate biodiversity with other considerations;
- to conserve, enhance and restore the diversity of England's wildlife and geology by sustaining, and where possible improving, the quality and extent of natural habitat; the natural physical processes on which they depend; and the populations of naturally occurring species which they support;
- To contribute to rural renewal and urban renaissance by:
 - enhancing biodiversity in green spaces and among developments so that they are used by wildlife and valued by people, recognising that healthy functional ecosystems can contribute to a better quality of life and a sense of well-being; and
 - ensuring that developments take account of the role and value of biodiversity in supporting economic diversification and contributing to a high quality environment.

1.2 Outline of the Scheme and Site Location

- 1.2.1 The land consists of a dwelling house and an extensive rear garden. Its location is shown at **Figure 1** below.



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Figure 1: Location of the Site

- 1.2.2 The Scheme is for 13 dwellings and an access from a recent housing development on the northern boundary of the site. An ecological Scoping Survey was undertaken on site in October 2009 (Naturally Wild, 2009) which recommended further work be undertaken on Reptiles and Bats. A Planning Application was refused in 2010, with one of the grounds for refusal on ecology. The wording of the refusal is provided in **Box 1** below.

1.2 Biodiversity

Due to the ecological survey being undertaken during the dormant part of the year (October 2009) further surveys should be completed to ensure that the presence or absence of protected species is identified and can be adequately mitigated for within the application – this must not be left as a condition for any permission.

Box 1: Arun District Council Biodiversity Refusal

- 1.2.3 This Appraisal provides the additional information on ecology on site requested from the Scoping Survey, and in the box above, and reconsiders all potential ecology for the site.

1.3 Relevant Legislation and Policy

- 1.3.1 The outcomes of this Ecological Appraisal will be tested against relevant legislation and policy; namely the Conservation (Natural Habitats &c.) Regulations 1994 in relation to the protection of European sites (Special Protection Areas SPA, and Special Areas of Conservation SAC) and European protected species (eg bats, great crested newts) (**Technical Appendix 1**) and the Wildlife & Countryside Act 1981 (as amended) and Countryside & Rights of Way Act (CROW) 2000 for protected species and the designation and protection of SSSIs (**Technical Appendix 2**). The Protection of Badgers Act 1992 gives protection to Badgers *Meles meles*.
- 1.3.2 In addition to PPS9 and the legislation outlined above, the strategic and local planning policies are the principal policies against which the outcomes of this ecological appraisal will be tested; the Arun District Council Local Plan 2011 is being replaced by Arun District Council's Local Development Framework, until that time certain policies have been retained, including ecological policies, and these are outlined at **Technical Appendix 3**. West Sussex County Council Ecology Policy is also provided.
- 1.3.3 Under the Governments duty to conserve Biodiversity, a number of Biodiversity Action Plans have been prepared for habitats and species of conservation concern, including national BAPs and a Biodiversity Action Plan for Arun District (ADC, 2000).

2.0 ASSESSMENT METHODOLOGY

2.1 Introduction

- 2.1.1 The methodology for this appraisal is based on the Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom published by the Institute of Ecology and Environmental Management (IEEM, 2006).

2.2 Consultation

2.2.1 IEEM guidance recommends that the views of relevant organisations should be sought at an early stage as part of pre-application discussions. As such, it is recommended that the following organisations be consulted:

- Arun District Council
- Natural England;
- Environment Agency
- West Sussex County Council.

2.3 Site Survey Methodology

2.3.1 The first stage of the appraisal is a desk study of the site and associated Zone of Influence. This provides background information on the site and local environment in order to effectively target field survey and further desk research. The aims of the field survey are to record land-use and broad vegetation types present on the site and in the surrounding areas, and to evaluate the habitats and vegetation communities' potential ecological value along with their potential to support protected species, species of principal importance, and any other notable species. Further details of the methodology used can be found in **Technical Appendix 4**.

3.0 BIOPHYSICAL CHANGES AND THE ZONE OF INFLUENCE

3.1 Introduction

3.1.1 In order to be able to target relevant ecological survey and assess the impacts of a proposed development, it is necessary to identify the activities that may result in biophysical changes from the development and the area these cover (i.e. the zone of influence). There are three stages of this development scheme that include activities that may have an impact on features of ecological value; namely site preparation, construction and operation / use.

3.1.2 A proposed development scheme is shown at **Figure 2** below. A proposed landscape scheme for the site has also been considered.

3.2 Biophysical Changes associated with the Development Scheme – Determination of the Zone of Influence

3.2.1 It is proposed that re-profiling of the site and housing development (13 dwellings) will result in the physical structure of the present site being altered. The potential zone of influence of the proposal is determined from the predicted biophysical changes brought about by activities associated with construction and post-construction phases. Therefore the zone is predicted to extend across the development footprint and locally along the edge of the site and the adjacent road verges. Consequently, survey has been carried out within this zone.

3.3 Site Preparation / Construction Activities and Biophysical Changes

3.3.1 During the construction phase, it is predicted that site preparation activities will include earthworks, vegetation clearance and topsoil stripping. This phase may affect habitat suitable for wildlife. Without appropriate mitigation, site clearance work may result in death or injury to protected species (if they are present), or damage to other features of ecological value. Construction could result in the loss of features of ecological value and/or the loss of habitat of protected species resulting in a net decrease in biodiversity.

3.3.2 The construction of the site has the potential to affect adjacent habitats, where present, through noise, air and run off pollution.

3.4 Predicted Operational Activities during Use Phase and Biophysical Changes

3.4.1 The operational phase will need to consider how protected species and species of conservation concern may use the sites, and what effect this may have on their conservation status locally.

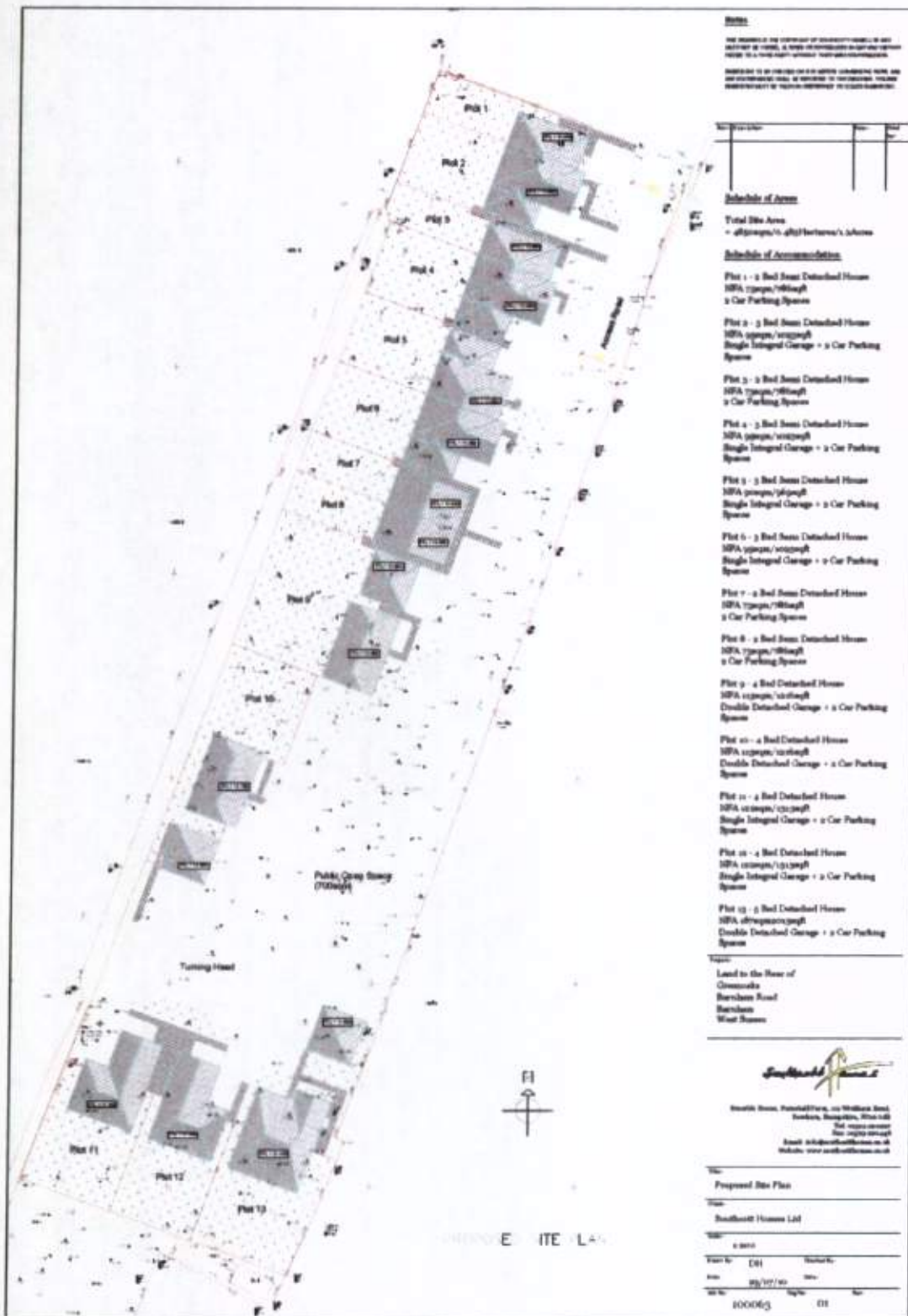


Figure 2: Proposed Site Layout

4.0 BASELINE CONDITIONS WITHIN THE ZONE OF INFLUENCE

4.1 Introduction

- 4.1.1 The ecological baseline describes the site in the context of the characteristic habitats of the area, and includes descriptions of designated sites and ecological features present within the potential zone of influence of the proposed development.

4.2 Designated Sites

Statutory Designated Sites

- 4.2.1 The nearest statutory Site of Special Scientific Interest (SSSI), Fairmile Bottom SSSI is over 2km from the site to the north east, at the northern end of Rewell Wood. It is designated for a range of features including chalk grassland and ancient woodland and associated species. The citation for the SSSI, is provided at **Technical Appendix 5**.

- 4.2.2 There are no European and Internationally designated wildlife sites within 5km of the site.

Non Statutory Sites

- 4.2.4 There are no Sites of Nature Conservation Importance (SINCs) present within 2km of the site (ADC, 2008). The nearest site is within the Rewell Wood complex.

4.3 Habitats and Vegetation

Introduction

- 4.3.1 The following description is based on survey visits during 16 Aug – 09 Sept 2010 by Gareth Knass and Tony Blunden. The site is made up of an extensive rear garden with lawns, extensive mature trees, and ruderal vegetation. A single detached dwelling is present to the south of the site (Greenoaks), but this is not included within the development site (and not shown on **Figure 2** above). To the east are further dwellings with large gardens bounding the site, and to the north a new housing development. To the west is a horse paddock. The broad habitats on site are shown in **Figure 3** below.

- 4.3.2 The habitats on site and adjoining the site are described below.

Site History

- 4.3.3 Historical Ordnance Survey (OS) mapping has been consulted to understand the development of the habitats on the site over the last c150 years. The earliest studied map was the first edition six inch to mile OS from 1875/76. This shows that the entirety of the site was within an open field, in an open landscape to the north and south of the Barnham road, with the closest settlements associated with Eastergate. The south coast railway line is present. By 1912 Downs View Road to the east had been constructed with dwellings present to the east of this road. To the south of the Barnham Road an extensive Nursery or 'Market Garden' industry had developed, centered around 'Warwick' and 'The Brooks' Nurseries. The site itself was, however, still part of an open field.

- 4.3.4 By the 1930's this Nursery industry had developed extensively to the north and east of Eastergate. The site had been enveloped into nurseries and it is between 1910-1930 when the majority of mature trees may have been planted on site. The dwellings to the east of the site (but west of Downs View Road) had been developed, and the boundaries of each plot are probably the same today. The dwelling house of Greenoaks was probably constructed following the decline of the Nursery industry on the north of the Barnham Road after the 1930s. The site today is a dwelling house with an extensive rear garden (c0.6 hectares) stretching north from the Barnham Road.

Grassland

- 4.3.5 The formally managed lawns on site are species poor improved grassland. Herb diversity appears to be low, but with frequent Creeping Buttercup *Rununculus repens*, White Clover *Trifolium repens*, as well as Selfheal *Prunella vulgaris* and Ragwort *Senecio jacobaea*. The lawns to the rear (north) of the site are damper with abundant Yorkshire Fog *Holcus lanatus* and some Marsh Thistle *Cirsium palustre*.

- 4.3.6 Typical examples of the grassland on site are shown at **Photos 1 & 2** below.



Photo 1 Managed Lawn (Red line indicates approximate southern site boundary)



Photo 2: Rougher Grassland/Nettle Scrub (at northern end of Site)

Trees and Shrubs

- 4.3.7 Mature Planting is present extensively in the rear of the garden. There is a high diversity of native and non native species planted within the garden, with a reasonably diverse structure. Native types include Hazel *Corylus avellana* (also including cultivars), Ash *Fraxinus excelsior*, Hornbeam *Carpinus betulus*, Field Maple *Acer campestre*, Elder *Sambucus nigra*. Non natives include an extensive row of Conifers on the western boundary, Cherry and Plum *Prunus sp.*, Sycamore *Acer cf pseudoplatanus*, Horse Chestnut *Aesculus hippocastanum*, Weeping Willow *Salix babylonica*, an ornamental Birch *Betula sp.* and Poplars *Populus sp.* **Photo 3-5** shows tree and shrub plantings on site.

- 4.3.8 None of the trees are considered ancient, although the Hornbeams at the north east boundary and to the south of the site are good examples of mature trees, probably around 80-90 years old (some pollarded).
- 4.3.9 A number of flower and shrub borders are present, mostly on the eastern boundary of the site. An old tennis court is present towards the rear of the site, and to the east of this young Hazel, Cherry/Plum and Sycamore has established. Where the ground is shaded by trees, the borders and ground flora is dominated by Ivy *Hedera helix agg.*, but with other species present such as Bluebell *Hyacinthoides cf. non-scripta*, Primrose *Primula cf vulgaris*, Violets *Viola cf odoratum* as well as Ground Ivy *Glechoma hederacea* and Ground Elder *Aegopodium podagraria*.



Photo 3: Eastern Boundary with Hazel, Field Maple, Sycamore and Conifers



Photo 4: Eastern Boundary with outgrown Hornbeam Hedge/boundary trees



Photo 5: Tall row of Conifers western boundary

Ruderal Vegetation

- 4.3.10 Towards the rear of the site, where the garden becomes less formal, the edges of the trees and shrub borders are dominated by Nettles *Urtica dioica* with some developing Bramble *Rubus fruticosus* agg. scrub. This is interspersed with maturing young Hazel, Cherry and other fruiting trees. Mature Elder bushes are also present here. To the very northern end of the site is an entirely ruderal area dominated by Nettle and Creeping Thistle *Cirsium arvense*, with a ground cover dominated by Ivy with some Male Fern *Dryopteris cf. filix-mas*. The tennis court area has been invaded by Nettle, where the Hazel and other trees are developing the understorey is dominated by Ivy (see **Photo 6**).

Buildings

- 4.3.11 No Buildings are present on site. Off site the closest dwelling is the detached dwelling Greenoaks, c40m to the south. A number of garden sheds are present off site, but on the sites eastern and southern boundaries (see **Photo 7**).

Flora

- 4.3.12 No notable or locally scarce species were noted. Specimens of Primrose and Bluebell (both ancient woodland indicators in a native setting) are considered likely to be garden introductions. **Figure 3** highlights a number of individual trees and groups of trees.

Evaluation of Vegetation and Habitats

- 4.3.13 The vegetation and habitats on site have a **negligible intrinsic nature conservation value**.



Photo 6: Ruderal Vegetation dominated by Nettles, North end of Site



Photo 7: Building 'Greenoaks'

4.4 Protected Species & Species of Conservation Concern

Breeding Birds

- 4.4.1 There is extensive habitat on site for nesting birds. The garden is likely to provide nesting and foraging opportunities for a number of common woodland edge and garden species. No scarce or rare species are likely to be present. The site is considered to be of **value within the Zone of Influence** for local bird populations

Bats

- 4.4.2 A survey to assess the site for bats and bat roosts was undertaken. The survey was carried out using the methodology described in **Technical Appendix 6**. This involved a survey internally and externally for any roosting bats or signs which could indicate use of the building by bats and for potential roost sites and roost access points. No buildings are present on the development site with potential for bat roosting. Off site to the south is the dwelling Greenoaks, which is the nearest potential building suitable for bat roosting. Access to this dwelling was granted and an external and internal inspection was made for potential for bat roosts on 20 August 2010. The building is shown on **Photo 7**. It has a brick and tile build, with hanging tiles on an extension. See **Photo 8-12** for illustration of internal and external features.



Photo 8: Hanging tiles are generally tightly fitting with few access opportunities



Photo 9: The roof spaces (two roof voids) were carefully inspected for bat droppings



Photo 10: The roof spaces (two roof voids) were carefully inspected for bat droppings



Photo 11: All surfaces internally and externally were inspected for signs of bats



Photo 12: A few (c5) Old small bat dropping were located in the roof void.

- 4.4.3 The build is relatively tight with few niches for bat access, restricted to around the chimney and soffits. The internal roof void inspections revealed very limited bat activity within the void with old droppings of possibly only a single bat, probably during exploration of the building rather than for roosting. The building will remain unaffected by the proposals.
- 4.4.4 A number of mature and maturing trees are present on site and on the boundary of the site. All trees were assessed for potential cavities and bat roosts using the methodology outlined in **Technical Appendix 6** during site visits. All trees on site are considered to be still relatively young and free from damage and potential access for bat roosts. No particular potential for roosting was noted.
- 4.4.5 A bat emergence and activity survey was undertaken within the rear garden (especially at the northern end) and around the Greenoaks dwelling on the 31 August 2010. This emergence survey was undertaken to methods outlined in **Technical Appendix 6**. The weather was warm and settled with no cloud cover or wind.
- 4.4.6 The survey recorded four species of bat, with regular foraging in the garden by Common and Soprano Pipistrelles *Pipistrellus Pipistrellus* & *P. pygmaeus*, as well as single passes through the site of Noctule *Nyctalus noctula* and Serotine *Eptesicus serotinus* Bats. Common Pipistrelles were evident in the northern end of the garden just after sunset, indicating a local roost. These bats appeared to be commuting onto the site from the east, and it is likely that a small Common Pipistrelle roost is present in one or more of the dwellings to the east of the site. Soprano Pipistrelle was present later on in the evening in smaller numbers, but is also likely to roost fairly locally. The single Noctule and Serotine bats were recorded after the first half hour after sunset and only briefly commuting through the site (both appeared to be heading north). Further detail on the survey is provided in **Figure 4**.

- 4.4.7 After the first 30-40 mins following sunset, the level of Pipistrelle activity dropped off considerably, with very little bat activity in the garden 45mins after sunset until the end of the survey.

Other Protected Mammals

- 4.4.8 The site was searched for signs of the potential presence of Badgers *Meles meles* using the methods outlined in **Technical Appendix 4**. No signs of Badgers were noted during the survey effort on site.
- 4.4.9 The potential for Dormouse *Muscardinus avellanarius* to be present was also considered. The site has a reasonable amount of woody vegetation, including mature and fruiting Hazel. The surrounding landscape is however much less suitable for the potential presence of the species and is a generally very open agricultural landscape, with the nearest sizable woodland 2km from the site. This combined with the relatively recent presence of woody habitat on site (see Section 4.3.3 - 4.3.4) means the likelihood of Dormouse being present is therefore considered low.
- 4.4.10 A Dormouse nut search of the fruiting Hazel was undertaken using the methodology provided in **Technical Appendix 7**, to provide further information. No evidence of Dormouse was found, with most nuts having been opened by Grey Squirrel *Sciurus carolinensis*) and a vole (probably Bank Vole *Myodes glareolus*). The Hazel nuts are large and many fruited, and the Hazel on site is considered probably a cultivar eg 'Cobnut'.

- 4.4.11 Given the habitats present no other protected mammal species are considered likely to use the site.

Fox

- 4.4.12 Extensive evidence of Fox *Vulpes vulpes* presence on site has been noted, with abundant scats through the rear of the garden, well defined mammal paths (no evidence of other mammals such as Badger or Deer were noted), and two Fox dens; the southern with a minimum of three holes just outside the eastern boundary of the site under an adjacent shed and compost pile, and the northern with two holes again on the site's eastern boundary. A young Fox was also noted on two visits, this combined with the extensive evidence indicates that the dens are likely to be a regular breeding site for the local Foxes. The location of these dens is shown on **Figure 4**.

- 4.4.13 The site is considered to be of **local value** for mammal populations

Reptiles

- 4.4.14 There is habitat on site that would be suitable for reptiles. A dedicated reptile survey was undertaken between the 16 August and the 09 September over seven visits using the methods outlined in **Technical Appendix 8**. This involved the careful placing of artificial refugia (felt and Tin) in potentially suitable reptile areas across the site. The dates of the visits are provided in **Table 1** below. Approximately 40 refugia were used on site from the very western boundary (west of the conifers) to the eastern boundary surveying habitat that may potentially be suitable for reptiles, including borders in the formal garden.

Table 1: Reptile Survey Visits Greenoaks

Date	Time	Conditions*	Results
16/08/10	pm	Warm dry, but overcast	Refugia placed/visual inspection
20/08/10	pm	Warm and sunny	0
31/08/10	pm	Warm and sunny no cloud	0
02/08/10	am	Warm, Sunny, no cloud	0
03/08/10	am	More cloud but sunny	0
08/09/10	am	Sunny spells late morning	0
09/09/10	pm	Sunny spells	0
10/09/10	am	Sunny spells	0

*visits were judged when the conditions were ideal for the refugia to be warmer than surrounds (eg warming up during the mornings or cooling down during the afternoons). On cloudy days the visits were made more during the midday period

- 4.4.15 No reptiles were recorded during the survey effort. Presence of reptiles on site is considered unlikely.

Amphibians

- 4.4.16 No waterbodies were noted within the immediate vicinity of the site. The habitats present on site are considered to be of reasonable suitability for presence of amphibians. The presence of the legally protected Great Crested Newt *Triturus cristatus* on site is considered unlikely.

Invertebrates

- 4.4.17 The legally protected Stag Beetle *Lucanus cervus* is present in West Sussex. The habitats on the site are however of lower quality for the species, but there are a few scattered logs from previously cut mature trees. The site is considered to be of **negligible value** for local invertebrate habitat

Other Protected Species

- 4.4.18 No other protected species are considered present within the zone of influence which would be impacted by the development proposals.



5.0 ASSESSMENT OF LIKELY IMPACTS WITHOUT MITIGATION

5.1 Introduction

- 5.1.1 In view of the predicted activities and the resultant biophysical changes associated with the proposal, as described in Section 3, this section identifies the main potential ecological impacts within the predicted zone of influence, those considered likely to arise in the absence of mitigation. This exercise provides focus for recommendations for further scheme design and mitigation.

5.2 Protected Sites

Potential Impacts on Designated Sites

- 5.2.1 The designated sites are considered to be of sufficient distance for the development not to have significant adverse effects.

5.3 Habitats & Species on Site

Potential Impacts on Habitats and Vegetation

- 5.3.1 The majority of the grasslands will be re-profiled and developed as part of the housing scheme. This habitat has low intrinsic nature conservation value with no notable species recorded and its loss in vegetation terms is not considered significant. A number of the trees on the eastern boundary of the site are to be retained within the proposals.

Potential Impacts on Birds

- 5.3.3 If vegetation is removed during the breeding season there is potential to destroy bird nests, which would be contrary to Section 1 of the Wildlife and Countryside Act 1981 (as amended), see **Technical Appendix 2**.

Potential Impacts on Bats

- 5.3.4 On the basis of the survey undertaken and presence of bat roosts, with bats listed on Schedule 2 of the Habitats Regulations, (see **Technical Appendix 1**) a European Protected Species licence under Regulation 44 will not be required for works on site. The retention of the eastern boundary features will ensure that commuting and foraging routes here are retained. No significant potential for roosting was noted on site. The loss of early evening sheltered foraging in the garden will have a minor negative effect on local populations of bats, but sufficient foraging habitat is still retained in the local area, in adjacent large wooded gardens to the east, and in the wider open countryside.

Potential Impact on Foxes

- 5.3.5 Without any mitigation the road construction has the potential for disturbance to the Fox dens. This could potentially provide a significant effect if the Foxes had dependant young in a den.

Potential Impacts on Reptiles

- 5.3.5 The reptile survey has not recorded any reptiles and it is unlikely that they are present on site.

6.0 OPPORTUNITIES ECOLOGICAL ENHANCEMENT AND MITIGATION

6.1 Introduction

- 6.1.1 The location of the site and the scheme design provides for potential to provide enhancements to the local ecology. Suggestions and recommendations are outlined below, including broad scheme design recommendations.
- 6.1.2 The potential for impacts on an unmitigated scheme was considered in Section 5, and mitigation recommendations are provided to ensure that protected species are also considered in construction and operation of the site.

6.2 Potential for Ecological Enhancement

- 6.2.1 The retention of boundary trees will provide a long term benefit to the ecology of the site providing a commuting corridor for bats in particular, as well as other wildlife
- 6.2.2 Further ecological benefits could be provided by provision of native species in landscaped open areas of the site and back gardens, and linking any planting with the boundary features. The landscape strategy (Landscape Perspective, 2010) provides for native species to be used in the open space on the eastern boundary. A ground cover of mainly formal non native species is also proposed. It is recommended that this mix is used in borders around the more formal lawn elements of the scheme, and further native species are considered along the eastern boundary (eg native Bluebells, Primroses, Cowslips, Violets and other native woodland type ground flora).
- 6.2.3 **Figure 3** above shows on the eastern boundary (around the southern Fox den) a couple of maturing Hazel and Field Maple, it is recommended that these are retained to provide native maturing tree specimens within the scheme.
- 6.2.4 The mature Hornbeams shown in **Figure 3** should also be retained where possible. Where overhanging limbs is an issue these could be cut back, a number of the trees have been pollarded in this way in the past. The landscape strategy provides for a no dig solution to the road at the northern end of the site where a row of Hornbeam is present.
- 6.2.5 There is potential to provide benefits to the local bat and bird communities by providing new roosting and nesting opportunities in the buildings to be created, through the provision of bat bricks and tiles and in-built opportunities for bats (eg **Technical Appendix 9**), and provision of bird boxes. Provision of boxes in retained trees should also be considered.
- 6.2.6 A number of logs from mature cut trees are lying along the eastern boundary around the old tennis court area. It is recommended that these are gathered and placed in a pile in a discreet place on the eastern boundary to provide wood piles for invertebrates in the scheme.

6.3 Mitigation for Protected Species and Species of Concern

Vegetation

- 6.3.1 Retained trees should be protected during construction by fencing to ensure that construction material isn't stored around the root systems and they are not compacted by machinery.

Birds

- 6.3.2 All bird species are protected at the nest. Any development that could affect nesting birds should take place outside the bird nesting season, usually considered March-August. Potential habitat should be removed outside the bird nesting season.

Fox

- 6.3.3 Two Fox dens are present on the eastern boundary of the site (see **Figure 4**). The northern den will be very close to the road construction area and will be affected by this. The southern den, is mostly off the site, and a number of metres from the road construction (it bends away south west before the den area). The northern den will need to be closed down prior to construction works commencing within 20m. This should only take place between mid June – January, outside the time of year that young Foxes are heavily dependant on their dens. This work should be undertaken and supervised by an experienced ecologist.
- 6.3.4 The southern den can be retained within the scheme, but care should be taken to ensure that works closest to this den do not go any closer than the construction area for the road. Fencing during construction should be placed on the eastern boundary of the road to highlight the presence of the den and ensure that materials aren't stored in this area and that machinery does not track closer than the construction area. A number of boundary trees are present here, these will be retained. It is recommended that the mature Hazel and Field Maple in this location just off the boundary are also retained. As much vegetation around the den as possible should be maintained to provide cover for the den. Landscape planting of a small amount of native thorn shrubs (eg Hawthorn *Crataegus monogyna*) here would also provide more security for the den in the long term.
- 6.3.5 The removal of other vegetation over the site should be undertaken prior to January where possible to ensure that no other Fox dens are present in areas of thick Nettle and Bramble scrub.

Other Protected Species

- 6.3.3 No other protected species have been recorded on site.

7.0 CONCLUSIONS

7.1 Compliance with legislation

- 7.1.1 If the mitigation measures outlined above are taken into account pre-development and during site clearance and construction, then protected species and habitats should not be directly affected and the provisions of the law and local policy outlined in **Technical Appendix 1, 2 and 3** will be adhered to.

7.2 Opportunities for Ecological Gain

- 7.2.1 A number of options are put forward for providing ecological gain to the development proposals. The implementation of these or other ecological gains as part of the development will ensure that the provisions of PPS 9 and the saved policies in the Arun District Local Plan 2011 (See **Technical Appendix 3**) are fully complied with.

8.0 REFERENCES

Arun District Council (2000) Biodiversity Action Plan for Arun District

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HMSO. 1981. The Wildlife and Countryside Act 1981.

HMSO. 2000. The Countryside and Rights of Way Act 2000 (CRoW Act).

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

Landscape Perspective (2010) Landscape Proposals L90-200 Rev C

ODPM. 2005. Planning Policy Statement 9: Biodiversity and Geological Conservation.

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The Regulations go on to state exemptions and defences that apply to acts that may contravene the Regulation. Such exemptions include those listed in Regulation 40

The granting of a licence under Regulation 44.

In order to carry out a lawful operation (e.g. development work which has full planning permission) that may result in any of the offences above, it is necessary to obtain a licence from Natural England to allow the operation to proceed.

However, in accordance with the requirements of the Habitats Regulations 1994, a licence can only be issued after the following conditions have been satisfied:

- *Regulation 44(3)(a) - that there is no satisfactory alternative, and*
- *Regulation 44(3)(b) - that the action authorized will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.*
- *and Regulation 44(2)(e) – that the action is required in preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment;*

Full planning permission is required to apply for a Natural England licence (where such a consent is necessary for the work to be carried out). In addition, a method statement which details the survey results, methodology of work to be undertaken, mitigation and compensation measures, must be submitted to Natural England with the licence application.

**Wildlife & Countryside Act 1981 &
Countryside & Rights of Way Act 2000 (CRoW)**

Wildlife & Countryside Act

The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principle legislation in Britain for the protection and conservation of our wildlife and its habitats of national importance. The legislation adopts a habitat and species based approach to nature conservation. Habitats and some species are protected in designated Sites of Special Scientific Interest (SSSI). Other species are afforded some protection from harm or disturbance by way of inclusion in either Article 1 (birds), Schedule 1 (specially protected birds), Schedule 5 (specially protected animals) or Schedule 8 (specially protected plants).

(ii) Protection Afforded to SSSIs

The presence of an SSSI on or near to a development is a material consideration, and this is discussed further in policy (see PPS9)

(iii) Law Relating to Protected Species

The WCA provides protection to such species via Section 1 (birds) and Section 9 (animals). These sections provide protection from intentionally:

- killing, injuring or taking any wild bird or taking, damaging or destroying the nest or eggs of a wild bird
- disturbing any wild bird in Schedule 1 whilst building, on or near a nest, or disturbing dependant young of such birds
- damaging, destroying or obstructing access to any structure or place of shelter or protection of a schedule 5 animal, or disturbs any such animal whilst it is occupying a structure or place it uses for that purpose
- killing, injuring or taking any animal listed in Schedule 5
- Having in possession or control any live or dead wild bird or egg, or any wild animal in Schedule 5, or trading in any animal under Schedule 5.

As with European Protected species, there are exemptions from this legislation, and licences for development can be obtained in certain circumstances. Protected species are also a material consideration in planning applications.

Countryside & Rights of Way Act 2000 (CRoW) and Wildlife and Countryside Act 1981

(i) Protected Species & SSSIs

The Countryside and Rights of Way Act 2000 (CRoW Act 2000) adds to protected species legislation in the WCA. The lesser test of 'Recklessness' is added to the protection from disturbance in three circumstances. These are:

- disturbance to Schedule 1 birds and their nests, eggs and dependant young,
- disturbance to Schedule 5 animals in their place of shelter/protection, and
- disturbance to the places of shelter/protection of Schedule 5 animals.

This addition means that any person who deliberately takes an unacceptable risk or fails to notice an obvious risk is falls under the Section irrespective of intention.

The CRoW Act also provides greater protection to SSSIs from operations (and non operations) of owners, occupiers and third party users of an SSSI.

POLICY GEN25 Water Resources

Development will only be permitted where the Local Planning Authority is satisfied that adequate water resources are available or will be provided in time to serve the development, and that provision is not considered detrimental to existing abstractions, river flows, water quality, fisheries, amenity or nature conservation.

POLICY GEN26 Water Quality

Development will only be permitted where the Local Planning Authority is satisfied that it would not lead to a deterioration in the quality or potential yield of surface and ground water resources.

POLICY GEN28 Trees and Woodlands

Development will not be permitted if it would damage or destroy one or more trees protected by a tree preservation order, identified as ancient woodland or in a conservation area unless:

- the removal of one or more trees would be in the interests of good arboricultural practice; or
- the benefits of the proposed development outweigh the amenity value of the protected trees.

Conditions may be used to ensure that, for any trees which are removed as part of a development, an equivalent number are planted on the site.

POLICY GEN29 Nature Conservation Across the District

Development will only be permitted on sites which contain semi-natural habitats, features of nature conservation interest, or within wildlife corridors, where these can be largely retained and sympathetically incorporated into the scheme. Legal agreements may be used to offset the loss of, or impact on, any nature conservation resource present on the site prior to development.

POLICY AREA13 Sites of International Importance for Nature Conservation

Proposals for development in, or likely to affect (directly or indirectly) a site of international importance for nature conservation will be subject to the most rigorous examination. Development not directly connected with or necessary to the management of the site which is likely to have an adverse effect on the site, will not be permitted unless: there is no alternative solution, there are reasons of public health or public safety, or there are benefits of primary importance to the environment.

Where such sites do not host a priority habitat or species, development will not be permitted unless there are imperative reasons of overriding public interest.

Where development is permitted, the use of conditions or planning obligations will be considered in order to avoid and minimise harm to the site, to enhance the site's nature conservation interest, and to secure any compensatory or mitigation measures and appropriate management that may be required.

POLICY AREA14 Sites of National Importance for Nature Conservation

Proposals for development in, or likely to affect (directly or indirectly) Sites of Special Scientific Interest will be subject to special scrutiny. Where such development is likely to have an adverse effect, it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Where the site concerned is a National Nature Reserve, a site identified by the Nature Conservation Review or Geological Conservation Review, particular regard will be paid to the national importance of that site.

Where development is permitted, harm to the nature conservation interest must be minimised. The use of conditions or planning agreements will be considered to ensure the protection and enhancement of the nature conservation interest, and to provide appropriate compensatory or mitigation measures and site management.

POLICY AREA15 Sites of Local Importance for Nature Conservation

Proposals for development in, or likely to have an adverse effect (directly or indirectly) on a Local Nature Reserve, Site of Nature Conservation Importance (including ancient woodlands or wildlife corridors) or Regionally Important Geological/Geomorphological Site will not be permitted unless it can be demonstrated that reasons for the proposal outweigh the need to safeguard the nature conservation value of the site/feature. Where development is permitted which would damage the nature conservation value of the site/feature, such damage should be kept to a minimum.

Conditions or planning obligations will be used to secure necessary compensatory or mitigation measures, enhancement and site management.

Where appropriate, the Authority will consider the use of legal agreements to provide appropriate compensatory measures, enhancement and site management.

Retained Ecology Policies of the West Sussex Structure Plan 2001-2016

Nature conservation

Policy ERA2

(a) Development should not be permitted unless the wide range of habitats, species and geological features of the County will be protected, conserved and, where possible, enhanced particularly through long-term management mechanisms and habitat creation schemes. A particularly high level of protection should be afforded to sites and features of national and international importance. Proposals for the extension or creation of new habitats should be permitted provided that they are consistent with wider environmental objectives.

(b) Local plans will include policies to:

- (1) ensure that site evaluation is undertaken to establish the nature conservation importance of proposed development sites;
- (2) protect sites or features of nature conservation importance, including those protected under legislation and prevent development unless there are no alternative solutions and there are overriding reasons which outweigh the need to safeguard the value of sites or features;
- (3) ensure that where development would result in the loss of an important nature conservation resource, a new resource is provided which is of at least equivalent value, where possible;
- (4) where appropriate, secure the restoration, creation and management of habitats through development proposals; and
- (5) where necessary, ensure the investigation and recording of sites and features of nature conservation importance, and, where appropriate, the preservation of any finds.

Ecological Appraisal Method

Introduction

The methodology for this appraisal is based on the Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom published by the Institute of Ecology and Environmental Management (IEEM June 2006). Regardless of whether a statutory Environmental Impact Assessment is required, these guidelines provide a robust framework for ecological assessment at any scale.

Desk Study

The first stage of the appraisal is a desk study of the proposed development site and associated Zone of Influence. This provides background information on the site and local environment so as to more effectively target field survey and further desk research.

The Multi Agency Geographical Information for the Countryside (MAGIC) database and Natural England's 'Nature on the Map' are interrogated for information regarding nationally or internationally designated sites within 1km or 5km of the site respectively. The National Biodiversity Network (NBN) data base is interrogated primarily for any relevant local protected species records within the area. The NBN provides access to a substantial volume of biodiversity data for the UK. Although rarely site specific, it does provide valuable information on the local occurrence of protected species.

Where appropriate, the local environmental Record Centre is approached to provide information regarding locally identified sites and records of protected and/or notable species within and around 1km of the site and European Protected species within 5km of the site.

Site Survey Methodology

The aims of the survey are to record land-use and broad vegetation types present on the site and in the surrounding areas, and to evaluate the habitats and vegetation communities ecological value along with the potential to support protected species, species of principal importance, and any other notable species.

Where relevant, habitat immediately adjacent to the site is also assessed as this can have a bearing on the possible presence of protected species on the site and the ecology of adjacent areas can be affected by development nearby.

Habitats and Vegetation

Habitats and vegetation communities are recorded on a broad scale by visually noting contrasting land uses, vegetation zones and landscape features, such as hedgerows and trees. Dominant plant species are recorded in each of the areas identified, as are any notable plant species, such as protected species and habitats or notifiable weeds.

Protected Species

Many plant and animal species are legally protected in the UK. Some, such as bats, badger, water vole and great crested-newt are commonly encountered on development sites. Protected species law is a

serious consideration for developers and land owners, as failure to confirm their presence during initial project conception can later lead to serious programming delays and their associated costs and to prevent any infringement of the law.

Case law has established (Regina vs. The Cornwall County Council ex parte Hardy 2001) that "It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted.

For the most regularly encountered protected species, a brief summary of methods follows:

Bats

Bats use buildings and trees for roosting and breeding, and so the potential for any of these features on site to support bats was considered, as was the sites potential for providing bat foraging habitat.

External inspections of the trees and buildings on site were undertaken. The survey looked for the presence of bats as well as signs of their presence such as:

Bat droppings, e.g. within cavities and buildings;

Staining at potential roost access points;

Lack of bat evidence cannot be taken to mean the lack of use by bats and an assessment of potential roost sites was therefore also undertaken:

Signs of bats can be easily washed off by wind or rain;

Droppings are hard to see where rubble and other floor debris may obscure them;

Low numbers of droppings can easily be missed especially where they may become damp and deteriorate;

Evidence of bats may not be apparent where bats roost out of view, such as in tree cavities etc.

Badgers

The site and its boundaries were systematically searched for the presence of Badgers *Meles meles*, in particular badger setts, on or near (30-40m) of the site. The area was also assessed for the presence of badger foraging activity and territorial behaviour. Such signs include foraging trails, foraging scrapes in short grass, which are commonly known as 'snuffle holes' (shallow scrapes in soft ground or even turf rolling created by foraging for ground-dwelling invertebrates such as worms and grubs), footprints, hairs caught under fences, sett entrances, and latrine sites.

Dormice

The presence of Dormouse on or near the site was considered during the survey, principally through habitat suitability, combined with data on occurrence within the area. Where suitable habitat occurs, further survey for feeding signs on hazel nuts and honeysuckle where it occurs along with searches for arboreal nests. If it a site is considered suitable, further survey is usually required.

Other Mammals

Consideration is also given to the potential for habitats to support other legally protected mammals and those of nature conservation importance. Where any water bodies occur on or near to the site

species including Water Vole *Arvicola terrestris* and Otter *Lutra lutra* are considered. Depending upon the geographic location consideration is also given to species such as Red Squirrel.

Breeding Birds

Any notable bird species seen during the survey are recorded. The type and quality of breeding, foraging and roosting habitats available for birds is also considered and interpreted with particular reference to protected or more notable bird species.

Consideration is given to any features which could support nesting birds, (Buildings and other structures, and areas of vegetation) that will be cleared or disturbed as a result of the development.

Reptiles

Any areas of habitat considered suitable for supporting reptiles were noted (for example, areas of rough grassland and scrub, banks, burrows, and rubble piles, compost heaps).

Great Crested Newt

Due to declines in numbers predominantly due to habitat loss and restricted European range, Great Crested Newts *Triturus cristatus* are protected under Section 9 of the Wildlife and Countryside Act, 1981 (as amended) and Regulation 39 of the Conservation (Natural Habitats &c) Regulations 1994, which protects Great Crested Newts from harm, injury and deliberate capture, killing, disturbance, damage and destruction of eggs, breeding site or resting place. This includes deliberate or reckless damage or disturbance.

Survey was by habitat suitability (the occurrence of suitable ponds and terrestrial habitat) combined with knowledge on their distribution from biological records for the area. If a site is considered suitable, further survey is usually required if an impact is considered likely.

Invertebrates

A very small proportion of invertebrates are afforded legal protection under the Wildlife and Countryside Act 1981 (as amended), although a relatively high number of invertebrates are included within the UK and local BAPs, and many more species are identified as being Nationally Scarce. Most invertebrates require specialist knowledge in order to identify them, although some groups, including butterflies and dragonflies, can be readily identified by generalists. Therefore, apart from recording any species of these readily identifiable groups, the survey concentrated on recording the presence of any key habitats of nature conservation importance considered suitable for supporting more scarce and restricted invertebrates, for example bare ground, dead wood and botanically rich habitats.

Survey Constraints and Limitations

Walkover surveys are carried out during a brief window of time. And therefore, the survey will provide only a snapshot of the range of plants and animals that might be present. However, professional judgement is used to interpret the habitat features recorded, and their likely value for supporting protected and notable species, including species of principal importance. Where timing is likely to significantly affect the results of a survey, further survey work is recommended. Survey can also be restricted through land access, especially land adjacent to the site. During the current survey the (melting) snow cover did not affect the assessment of the grasslands on site.

Fairmile Bottom SSSI Citation

COUNTY: WEST SUSSEX	SITE NAME: FAIRMILE BOTTOM
DISTRICT: ARUN	
Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.	
Local Planning Authority: ARUN DISTRICT COUNCIL	
National Grid Reference: SU 990094	Area: 68.0 (ha.) 168.0 (ac.)
Ordnance Survey Sheet 1:50,000: 197	1:10,000: SU 90 NE, SU 91 SE, TQ 01 SW
Date Notified (Under 1949 Act): -	Date of Last Revision: -
Date Notified (Under 1981 Act): 1987	Date of Last Revision: -
Other Information: This new site lies within the South Downs area of Outstanding Natural Beauty.	
Reasons for Notification: Fairmile Bottom lies on a north-west facing scarp slope of the South Downs where the Upper Chalk is covered by a thin layer of clay-with-flints. The site contains yew <i>Taxus baccata</i> woodland and scrub as well as unimproved chalk grassland, which are all nationally rare communities.	
Mature woodland occurs over much of the site and in areas where yew dominates, the dense canopy presents little opportunity for the development of shrub and ground floras. In other parts of Fairmile Bottom there is a higher proportion of beech <i>Fagus sylvatica</i> within the canopy and as high-cut beech coppice 'stubs'. Where yew is at a minimum there is a sparse field layer of false-brome grass <i>Brachypodium sylvaticum</i> and bramble <i>Rubus fruticosus</i> . Yew scrub is invading the open downland.	
Areas of woodland containing oak <i>Quercus robur</i> , ash <i>Fraxinus excelsior</i> and beech with coppice hazel <i>Corylus avellana</i> are found at Fairmile Bottom. The field layer is varied in its diversity consisting of scattered false-brome and ivy <i>Hedera helix</i> on the lower slopes, and wood spurge <i>Euphorbia amygdaloides</i> , bracken <i>Pteridium aquilinum</i> and bluebell <i>Hyacinthoides non-scriptus</i> where the soil is deeper towards the top of the slope.	
Small patches of species-rich chalk grassland are scattered throughout the site. The sward is dominated by sheep's fescue <i>Festuca ovina</i> and upright brome grasses <i>Bromus erectus</i> , amongst which grow the herbs salad burnet <i>Sanguisorba minor</i> , yellow-rattle <i>Rhinanthus minor</i> and common milkwort <i>Polygala vulgaris</i> . To the south, the main area of grassland is composed of coarser grasses including tor-grass <i>Brachypodium pinnatum</i> and cock's foot <i>Dactylis glomerata</i> . This area is subject to considerable trampling from visitors but islands of finer rabbit-grazed turf still remain where wild thyme <i>Thymus praecox</i> , eyebright <i>Euphrasia nemorosa</i> and mouse-ear hawkweed <i>Hieracium pilosella</i> are present. Orchid species at Fairmile Bottom include the bee <i>Ophrys apifera</i> , frog <i>Coeloglossum viride</i> and fragrant <i>Gymnadenia conopsea</i> orchids.	
The invertebrate fauna is rich and typical of the habitats present. The site supports an outstanding diversity of beetles (Coleoptera) including one species endangered with extinction which inhabits beech logs. The uncommon silver-washed fritillary <i>Argynnis paphia</i> and the white admiral <i>Ladona camilla</i> are amongst the many butterflies present.	

Technical Appendix 6

Bat Survey Methodology: Trees

Safe Tree Felling Methodology

Bat Survey Methodology: Buildings

Bat Activity Survey Methods

Trees Survey Method

Introduction

All bat species and their roosts are fully protected in Britain under the Wildlife and Countryside Act 1981(as amended) and the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).

Initial Survey

Tree survey methodology involves looking for any suitable holes, cracks or crevices which could be used by bats for roosting. In addition, large or apparently unhealthy trees which have a dense covering of Ivy possibly covering holes or crevices, also have the potential to support bats.

A survey for signs of residence by bat species consists of a slow methodical search of all aspect of the tree for actual roosting bats and their signs. Droppings around holes, on the tree trunk or on the ground beneath can be used to identify species. Scratch marks and staining at roost entry and exit holes. The presence of spider webs at a potential roost can often indicate their absence at that time although does not mean that the hole is not used at all. Careful attention is given to any sounds indicating the presence of a breeding bat roost (i.e. audible social calls). The survey is completed using binoculars from ground level and high powered torch and endoscope to inspect cavities with ladder where safe access permits.

Tree Survey Evaluation

Trees are assessed for their potential to support bat roosts either in the summer (nursery) or winter (hibernation) based on previous experience of bat occupancy at other sites, and upon the presence of suitable roost sites and access points. In particular, the presence of potential roost sites which are hidden from view was noted.

The potential for trees to support roosting or breeding bats is evaluated under the following categories:

Tree category and description	Stage 1 Survey requirements prior to determination	Stage 2 Further measures to inform mitigation	Stage 3 Likely mitigation
Category 1 Confirmed bat roost tree with field evidence of the presence of bats, e.g. droppings, scratch marks, grease marks or urine staining.	Tree identified on a map and on the ground. Further assessment to provide a best expert judgement on the likely use of the roost, numbers and species of bat, by analysis of droppings or other field evidence. Ecologist involvement <u>will</u> be required.	Avoid disturbance to trees where possible. Further dusk and dawn surveys to establish more accurately the presence, species, numbers and type of roost present, and to inform the requirements for mitigation if felling is required.	Felled under Habitats Regulations licence ² following the installation of equivalent habitats as a replacement. Felling would be undertaken taking reasonable avoidance measures ³ such as 'soft felling' to minimise the risk of harm to individual bats.
Category 2a Trees that have a high potential to support bat roosts	Tree identified on a map and on the ground. Further assessed to provide a best expert judgement on the potential use of suitable cavities, based on the habitat preferences of bats. Ecologist involvement <u>may</u> be required.	Avoid disturbance to trees where possible. More detailed, off-the-ground visual assessment. Further dusk and dawn surveys to establish the presence of bats and, if present, the species, numbers and type of roost to inform the requirements for mitigation if felling is required.	Trees with confirmed roosts following further survey would be upgraded to Category 1 and felled under licence as above. Trees with no confirmed roosts would be downgraded to Category 2b and felled taking reasonable avoidance measures ³ .
Category 2b Trees with a moderate/low potential to support bat roosts	None. Ecologist involvement is <u>unlikely</u> to be required.	Avoid disturbance to trees where possible. No further surveys.	Trees would be felled taking reasonable avoidance measures ³ .
Category 3 Trees with negligible potential to support bat roosts	None. Ecologist involvement will <u>not</u> be required unless new evidence is found.	None.	No mitigation for bats required.

Notes

1 A general principle for those involved in advising on and undertaking tree works should be, wherever possible, to avoid disturbance and retain all features which offer some value to bats. For safety-related tree work, a balance should be sought between tree safety standards and the impact on wildlife.

2 Where a Habitats Regulations licence to undertake work on a tree roost is required, the licence will need to demonstrate that alternative approaches have been previously considered to try to avoid works to the tree. These may

be options such as diverting paths away from hazardous trees and removing unsafe limbs, instead of felling an entire tree.

3 Reasonable avoidance measures are considered to be good practice. 'Soft felling' is a generic term used to describe more cautious felling approaches, using limbing and bucking techniques to reduce the impact of felling limbs which may still have bats within cavities. Where proportionate to the impact, best practice approaches to felling may include methods such as additional dusk emergence or dawn re-entry surveys immediately prior to felling (during the active bat seasons) or the use of non-return valves to ensure that bats can leave but not return to a roost cavity before works begin.

Detailed survey

Where the value of an individual tree or woodland area is found to be high during a preliminary survey, a more comprehensive survey in order to fully assess the likely value of the potential bat feature is undertaken. The scope of additional work will vary depending on a range of environmental factors.

Survey techniques are likely to include:

- Emergence survey during early evening (i.e. prior to emergence and at emergence), with the aid of a bat detector for ultrasonic calls.
- Climb-and-inspect assessment of selected trees to check for cavities and inspection with an endoscope or mirrors if appropriate.
- Foraging and transect walks through habitat surrounding potential tree roosts to understand local bat use of the site.

Survey work is tailored to each individual case, and the degree of evening emergence and foraging work undertaken is based on the following factors:

- size of the site;
- number of trees to be affected;
- habitats on site (eg water features/woodland);
- habitats and protected sites in the wider countryside;
- knowledge of bat use in local area;
- geographical range of rare species;
- proximity to known or suspected roosts.

Limitations of Tree Survey

Bats may move regularly between different tree roosts, and if used infrequently, signs to indicate the use of such trees by bats are unlikely to be evident. In addition, any signs which are left on trees by bats as a result of their use of a roost site (e.g. droppings below a roost exit) may be washed off as a result of wind and rain. Consequently, it is often difficult to confirm the presence of a bat tree roost. Surveys are best described as a sampling tool to assess presence of different bat species using the site at that time and place and general use of the area by bats.

Best practice methods for Tree Work

Works to trees used by bats (even if the bats are not present at the time) may result in an offence being committed under this law. If bats or bat roosts are found to be present in a tree, a European Protected Species (EPS) license from Natural England is likely to be required to legally undertake works on that tree. Where a satisfactory survey has resulted in no evidence of bats being found, and bats are then incidentally discovered during work, it is a legal requirement that the activities are halted immediately and Natural England consulted.

To reduce the chance of disturbing a bat roost it is important to avoid the summer (breeding season) and winter (hibernation) months. Works to trees with potential for bats is best done in September when young bats are mobile and on the wing, female bats are unlikely to be pregnant and the hibernation season has not yet begun. March is also a suitable time, (although careful survey is required for nesting birds as these are legally protected during this period).

Bats may move regularly between different tree roosts, and if used infrequently, signs to indicate the use of such trees by bats are unlikely to be evident. In addition, any signs which are left on trees by bats as a result of their use of a roost site (e.g. droppings below a roost exit) may be washed off as a result of wind and rain.

Consequently, it is often difficult to confirm the presence of a bat tree roost, and as a result an assessment of the trees to identify those with potential to support a bat roost is usually undertaken with trees with bat potential categorised into three categories.

There are a number of procedures that can be used by tree surgeons to ensure that best practice is maintained when undertaking tree felling/pruning operations. These are detailed below. The application of these principals apply to both Category 1 and Category 2 listed trees (see BCT, 2007). These methods should be used on these trees during the suitable tree felling periods (September and March).

- Keep tree work to a minimum retaining all potential roosts where possible.
- A precautionary inspection of the tree(s) by the tree surgeon looking for signs of bats should be carried out before starting work. This should include an inspection of all holes and niches using a torch and preferably an endoscope. If bats or signs of bats are found no work should start and Natural England should be contacted for further advice.
- Where possible avoid cross cutting in proximity to cavities or hollows.
- Limbs with internal fissures should be pruned carefully to maintain integrity of features as potential roost sites.
- Any sections felled containing cavities should be lowered carefully and left on the ground (preferably for 24 hours) with the openings clear, allowing anything inside an opportunity to escape.
- Split limbs that are under tension may need to be wedged open to prevent their closure when pressure is released, potentially trapping bats.
- Where ivy covers areas of a tree's trunk or branches, there may be hidden roosting potential behind it. Dealing with ivy covered trees depends on the amount of ivy. If there is a thick mass of ivy growth it may be practical to consider felling the tree on the basis that the thickness of the foliage will soften the fall and reduce the shock. This tree can then be inspected on the ground and if possible left for 24hours, before section cutting. If the tree is only partially covered, pruning or sectioning may be more appropriate. If the works are not urgent cutting the ivy at its base and completing the work when the ivy is dead, thus reducing the bat roosting potential should be considered. However where stems of ivy create a dense mass against the trunk there will always be roosting potential.

If bats or evidence of bats are found at anytime, all works must stop immediately and Natural England contacted for further advice.

Bats in Buildings Survey Method

Introduction

Bats use buildings and trees for roosting and breeding, and so the potential for any of these features on site to support bats needs to be considered in an ecological assessment of a development site. Building survey methodology is provided below.

Methods

The survey for signs of residence by bat species consists of undertaking a slow methodical search both internally and externally for actual roosting bats and their signs which could indicate the presence of a bat roost including:

- Bat droppings – e.g. on floors, stored articles, walls, beams, tiles, windowsills entry / exit points etc. These can be used to aid species identification.
- Dark staining at well-used roost sites (e.g. ridge boards & timber joints, etc) or entry / exit points.
- Wear marks at bat roost sites and entry / exit points. (This can be a polishing and smoothing of rough wood surfaces and masonry or slight scuffing of very smooth wooden surfaces)
- Urine spots or streaking in the vicinity of bat roosts and entry / exit points.
- Similarly the presence of spider webs at a potential roost can often indicate their absence at that time, but requires careful interpretation combined with other evidence

All internal spaces of the buildings are searched, including gaps at the roof timber frame joints. External surfaces of the building are also examined for evidence of use of any potential bat access points. The surveyor uses a strong torch in dark internal areas and shaded outdoor areas, endoscope for inaccessible spaces, binoculars and, where appropriate, a ladder to examine the buildings externally.

The potential to support bat roosts either in the summer (nursery) or winter (hibernation) based previous experience of bat occupancy at other sites and upon the presence of suitable roost sites and access points is also considered. In particular, the potential for roost sites which are hidden from view is noted.

Survey Constraints and Limitations

Lack of bat evidence cannot always be taken to mean the lack of use by bats as signs of bats can be easily washed off by wind or rain. Droppings are hard to see where rubble and other floor debris may obscure them. Low numbers of droppings can easily be missed especially where they may become damp and deteriorate. Evidence of bats may not be apparent where bats roost out of view, such as in wall cavities etc.

Surveys are carried out during a brief window of time, and therefore, provide only a snapshot of the site use. As bats regularly move between different roost sites, particularly to satisfy their varying requirements at different times of the year, a bat survey often concentrates upon searching for signs to indicate the presence of roosting bats at any time of the year. Due to these survey limitations an assessment using professional judgement is also used to interpret the findings and the potential for

supporting bats and is used to guide any recommendations for precautionary approaches to carrying out the proposed work.

Bat Activity Survey

Introduction

The value of a site to bats can be arrived at using activity surveys to understand how many bats use the site, the degree of use and what species are involved.

Timing

An activity survey is undertaken in conditions when bats are likely to be active. Evening surveys commenced from sunset, often beginning with monitoring certain potential bat roost trees or woodland areas where such trees exist, for any emerging bats.

Dawn survey work may also be undertaken, usually recording activity up to two hours before, and sometimes up to an hour after sunrise.

Activity surveys are undertaken during the period when bats are not hibernating, this is usually between the end of April to October.

Methods

During the survey a site is walked slowly, mainly following woodland edges, tree lines, hedgerows, paths or rides through woodland, and incorporating all features of the landscape that may be of value to bats. A transect is often followed, worked out prior to the survey commences.

Bat detectors (Bat box III, Petterson D240x & Anabat SD1) are used as an aid to detecting bats on the site, and also in determining the species which were present. Each survey visit generally continued for 2 hours or more, after sunset.

Since different species of bats echolocate using different frequencies, there is a risk that certain species will be missed if the bat detector is not tuned to the frequency used by that species at the time. Therefore, during the majority of the survey period, a surveyor scans through different frequency ranges to ensure as many bats were recorded as possible. The main frequency ranges used were as follows:

- 32-55khz to detect the smaller species of bats, such as Pipistrelle spp, Myotis spp, etc.
- Around 22-30 khz to detect the larger bat species, including Noctule and Serotine bats.

Assessment of Landscape for Potentially Good Bat Foraging sites or Flight Lines

The habitats across the site are surveyed and assessed on their likely use by bats for foraging and for use in commuting across the landscape. This assessment is based upon the following main factors:

- Sheltered areas where insects are likely to gather;

- Presence of rough grassland or other habitats likely to result in higher insect numbers;
- Provision of linear links across otherwise open habitat to allow bats to follow features within shadows (i.e. hidden from predators), while also providing foraging potential.

Data Collected

Time, flight direction and species of bat are recorded for each bat heard or seen and these were mapped on individual site maps. Time of sunset/sunrise and weather conditions are also recorded for each survey.

The following data is gathered for every bat pass recorded:

- Location of observation (data highlighted on a map);
- Whether the bat was foraging or commuting (if commuting, in which direction was it travelling and whether the bat was following any landscape features);
- Species of bat observed (where possible).

References

Bat Conservation Trust (2007). "Bat Surveys Good Practice Guidelines." Bat Conservation Trust, London. ISBN 978-1-872745-99-2

Mitchell-Jones ed. (2006) "Bat Conservation Handbook" Third Edition, English Nature

Dormouse Nut Search Methods

Introduction

Dormice *Muscardinus avellanarius* are protected under UK and European law. They are a mostly arboreal mammal, living in hedgerows, scrub and woodland where there is usually a diversity of plant species for them to feed on and nest within.

Quality of habitat

An assessment of the quality of the habitat for Dormice involves examining all woody habitat present on a site and connected to the site. Features looked for include:

- Presence of a high diversity of native woody plant species at a suitable nectaring and fruiting stage of their life cycle or lower diversity habitat with good food resources (nectar, insects, or fruit);
- Presence of good connectivity of wooded habitat in an area on a linear and vertical level;
- Presence of key plant species preferred by Dormice (such as Hazel coppice);
- Well structured habitat that provides niches for nesting and hibernating;
- Proximity to ancient woodland, large hedgerows, ancient scrub and any other ancient woody habitat;
- Habitat that has had consistent management over a period of time.

Nut Searches: identification of Dormouse feeding signs on Hazel Nuts

Nut searches are best carried out from mid September until late December, when the Hazel is in mast. Hazel nuts degrade over time but can persist on the woodland floor for over a year. Stands of fruiting Hazel are targeted, and nuts are searched for in quadrats beneath each suitable tree for approximately 20 minutes. Any Hazel nuts thought to have been opened by Dormice are collected.

Reptile Survey Methodology

Introduction

All of the common reptile species (Grass Snake, Adder, Common Lizard and Slow-worm) native to Britain are protected by the 1981 Wildlife & Countryside Act 1981 (as amended) under Sections 9(1) and 9(5). This legislation makes it illegal to intentionally kill or injure a common reptile and also, to sell, barter, exchange or transport for sale these animals or parts of them. However, their habitat is not directly protected.

Survey Methods

Survey work involves the placing of cut up roofing felt or other flat materials such as corrugated iron sheeting, wood or plastic that reptiles hide under. The reptiles use these artificial refugia as they warm faster than the surrounding environment and are attractive to shelter beneath. In order to be effective, refugia need to be placed in the most suitable habitat and in the best locations within those habitats for reptiles. Survey refugia are placed at a minimum of 10/ha.

Reptiles can be surveyed using this technique between early spring and late autumn. The times of the year that provide optimum survey are April to late June, and late August to the end of September. Survey work is undertaken during suitable weather conditions (i.e. between 9 and 18°C with little or no wind and no rain). High temperatures in late June to late August mean that suitable weather conditions occur the morning / late afternoon, after and even during rain in warm weather, and on overcast days. Refugia survey is always complemented by visual searching for reptiles which are not utilising refugia.

Population Size Assessment

In order to assess the importance of a population the population size needs to be assessed. This uses standard numbers from the Herpetofauna Groups of the British Isles (HGBI, 1999) advisory notes for Amphibian and Reptile Groups (ARGs) **Table T1** below.

Table T1: Assessing Reptile Populations

Species	Population size (adult density)		
	High	Medium	Low
Slow-worm	(> 100 / ha)	(> 50 / ha)	(< 50 / ha)
Common lizard	(> 80 / ha)	(> 40 / ha)	(< 20 / ha)
Adder	(> 4 / ha)	(2 - 4 / ha)	(< 2 / ha)
Grass snake	(> 4 / ha)	(2 - 4 / ha)	(< 2 / ha)

References

Herpetofauna Groups of the British Isles (HGBI) Guidelines (1998) "Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards." HGBI Advisory notes for Amphibian and Reptile Groups (ARGs). HGBI, c/o Froglife, Halesworth, personal collection.

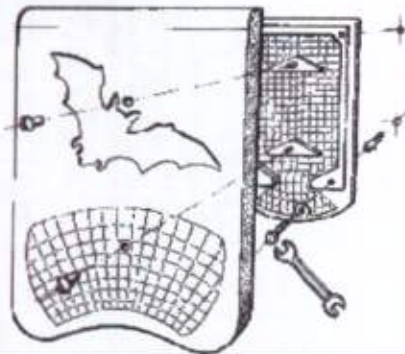
Froglife, 1999. Froglife Advice Sheet 10. Reptile Survey. An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife, Halesworth, Suffolk.

Bat Boxes on Buildings, Examples

Suitable Bat Mitigation for buildings

**Schwegler 1WQ Roost Unit
– all season**

This roost unit is designed for the safe hibernation of bats in winter as well as for roosting, forming of colonies and raising their young during summer. The integrated insulation in combination with light-concrete material is ideal for the needs of building-inhabiting bat species all year round. The patented "double wall system" is already tested and proven for decades as used in many professional and scientific projects over Europe



Schwegler Bat Roost Unit IFR This Tube system meets the characteristic behavioural requirements of the types of bats that inhabit buildings. Made with Schwegler wood-concrete, the design maintains excellent climatic conditions inside the roost unit allowing the animals to either hang onto the wooden rear or onto the wood-concrete front. The box, once installed is maintenance free and self cleaning.	
Ibstock B Roost Unit This roost unit has been designed to meets the characteristic habitat requirements of the types of bats that inhabit buildings. The roost unit can be installed within any external brick walls and can be matched with the brick type or supplied with decorative motif.	
 B	 C
Enclosed Bat Box B Designed specifically for the pipistrelle bat Available in all brick types Several roosting zones are created inside the box Bats are contained within the bat box itself Maintenance free with entrance at the base Ideal for new build & conservation work	Cut to show function of the roost unit Size 215x 290mm