

Preliminary Ecological Appraisal
August 2015 and August 2017

Land north of Water Lane
Angmering

Contents

1.0 INTRODUCTION.....	4
BACKGROUND.....	4
SITE CONTEXT AND STATUS.....	4
PLANNING POLICIES.....	6
2.0 METHODOLOGY.....	9
DESK TOP STUDY.....	9
PRELIMINARY ECOLOGICAL APPRAISAL.....	9
HEDGEROW ASSESSMENT.....	10
BADGER SURVEY.....	11
TREE ASSESSMENT FOR BATS	12
HABITAT SUITABILITY FOR REPTILES	13
HABITAT SUITABILITY FOR GREAT CRESTED NEWTS.....	13
LIMITATIONS.....	14
3.0 RESULTS.....	15
DESKTOP STUDY	15
HABITAT PHASE 1 SURVEY.....	19
HEDGEROW ASSESSMENT.....	24
TREE ASSESSMENT	28
HABITAT SUITABILITY FOR PROTECTED SPECIES	29
4.0 DISCUSSION.....	36
SITE	36
PROTECTED SPECIES.....	39
GENERAL SITE ENHANCEMENTS.....	47
5.0 CONCLUSIONS.....	49
6.0 REFERENCES.....	52
APPENDIX 1. PHASE 1 HABITAT MAP.....	53
APPENDIX 2: PHOTO DOCUMENT	54
APPENDIX 3: BIOLOGICAL RECORDS.....	55

LIABILITIES:

Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on a site at a later date.

The views and opinions contained within this document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to or during works.

1.0 Introduction

Background

- 1.1 The Ecology Partnership Ltd was commissioned by Rydon Homes and Gleeson Strategic Land Limited to undertake a preliminary ecological appraisal, at land north of Water Lane, Angmering, West Sussex.
- 1.2 This report presents the results of The Ecology Partnership's surveys in and around the site, which aims specifically to assess the site's potential to support protected species and protected habitats that may be affected by the proposed development. The majority of the site was surveyed in August 2015, however a small portion in the southwest corner was surveyed in August 2017.
- 1.3 Section 2 of this report sets out the methodologies of the surveys. In section 3 the results of the surveys are presented. Discussions and implications for development are found in section 4, including general site enhancements. Conclusions drawn from the report are presented in section 5.

Site Context and Status

- 1.4 The site is located to the north of Water Lane on the eastern edge of the town of Angmering in West Sussex. The site is adjacent to the border of the South Downs National Park and adjacent to the border of ancient woodland. The surroundings comprise of low-density residential housing, major A-roads and agricultural fields. There are no other designated sites within 5km of the site.
- 1.5 The approximate red line boundary of the site is shown below in Figure 1. This was also the approximate survey boundary.



Figure 1: Approximate location of the red line boundary

Description of Proposed Development

- 1.5 The site has received planning proposals for the construction of up to 525 residential dwellings with up to 3 hectares of employment land. Open space provision and SUDS will also be included within the illustrative master plan.

Planning Policies

1.6 National and local planning policies may have an effect on the proposed development. The following paragraphs identify relevant planning policies and discuss these in the context of the site.

1.7 Under the NERC Act (2006) *“Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”*. In order to comply with this ‘Biodiversity Duty’, planning decisions must ensure that they adequately consider the potential ecological impacts of a proposed development.

1.8 National policy guidance is provided by National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how they should be applied. Several sections are considered to be relevant;

‘In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value, where consistent with other policies in this Framework.’

And;

‘Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value. Local planning authorities may continue to consider the case for setting a locally appropriate target for the use of brownfield land.’

1.9 The site falls under the jurisdiction of the Arun District Council. A new Local Plan is currently being developed. In the meantime, the Arun Local Plan adopted in 2003 contains policies relating to nature conservation and relevant to the site including:

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, 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.”

- 1.10 This report addresses the site in relation to nature conservation and wildlife and indeed to the local planning requirements as well as national planning and nature conservation legislation. The report has been produced with reference to current guidelines for preliminary ecological appraisal (CIEEM, 2017) and in accordance with BS 42020:2013 Biodiversity – Code of Practice for Planning and Development.

2.0 Methodology

Desk Top Study

- 2.1 A desk top study search was completed using an internet-based mapping service (www.magic.gov.uk) for statutory designated sites and two internet-based aerial mapping services (www.multimap.com and maps.google.co.uk) were used to understand the habitats present in and around the survey area and habitat linkages and features (ponds, woodlands etc) within the wider landscape.
- 2.2 Biological records were purchased from Sussex Biodiversity Records Centre. A search of records in a 2km radius of the site was requested

Preliminary Ecological Appraisal

- 2.3 An extended preliminary ecological appraisal was undertaken on the 7th August 2015 of the majority of the site. A small separate portion off Dapper's Lane in the southwest corner was surveyed on the 9th August 2017. The surveyors identified the habitats present, following the standard 'Phase 1 habitat survey' auditing method developed by the Joint Nature Conservancy Council (JNCC). The site was surveyed on foot and the existing habitats and land uses were recorded on an appropriately scaled map (JNCC 2010). In addition, the dominant plant species in each habitat were recorded. The potential for the site to support protected species was also assessed.

Hedgerow Assessment

- 2.4 The hedgerows were assessed under the criteria of the Hedgerow Regulations 1997 (as amended 2002). Under the criteria, to be determined as **‘important’**, a hedgerow must be at least 30 years old and meet at least one of the additional criteria as summarised below:
- Marks a pre-1850 parish or township boundary
 - Incorporates an archaeological feature
 - Is part of, or associated with, an archaeological site
 - Marks the boundary of, or is associated with pre-1600 estate or manor.
 - Forms an integral part of a pre-Parliamentary enclosure field system.
 - Contains certain categories of species of birds, animals or plants listed in the Wildlife and Countryside Act or JNCC publications.
- 2.5 To be determined as ‘species-rich’, the hedgerow must include:
- a) at least 7 woody species, on average, in a 30 metre length;
 - b) at least 6 woody species, on average, in a 30 metre length and has at least 3 associated features;
 - c) at least 6 woody species, on average, in a 30 metre length, including a black poplar tree, or large-leaved lime, or small-leaved lime, or wild service-tree; or
 - d) at least 5 woody species, on average, in a 30 metre length and has at least 4 associated features.
- 2.6 The number of woody species is reduced by one in northern counties. The list of 56 woody species comprises mainly shrubs and trees. It generally excludes climbers (such as clematis, honeysuckle and bramble) but includes wild roses.
- 2.7 The hedgerow may also be considered as **‘important’** if the hedgerow runs alongside a bridleway, footpath, road used as a public path, or a byway open to all traffic and includes at least 4 woody species, on average, in a 30 metre length and has at least 2 of the associated features listed at (i) to (vii) below:
- i) a bank or wall supporting the hedgerow;
 - ii) less than 10% gaps;

- iii) on average, at least one tree per 50 metres;
- iv) at least 3 species from a list of 57 woodland plants;
- v) a ditch;
- vi) a number of connections with other hedgerows, ponds or woodland; and
- vii) a parallel hedge within 15 metres.

Badger Survey

2.8 A badger survey was undertaken at the site to assess if badgers were using the area and if any setts were located on the site and 30m away from the site that might constrain development. The evaluation of badger activity was based on methodology developed for the National Survey of Badgers (Creswell *et al.*, 1990) and includes searching for badger field signs such as setts, badger pathways, tracks (pawprints), dung piles with latrines, badger hairs and feeding signs such as snuffle holes.

2.9 During the survey, all habitats potentially suitable for badgers were systematically examined for evidence of badger activity including:

- Setts: several sett types may be present within a social group territory, ranging from a single hole to numerous interconnecting tunnels. Setts can be categorised into main, annexe, subsidiary and outlier (Wilson *et al.*, 1997).
- Latrine sites: badgers characteristically deposit dung in pits, which may be located along the boundaries and within the social group territory. These sites serve as means of inter- and intra-group communication.
- Paths and runs: well used routes between setts and/or foraging areas. Often used by generations of badgers.
- Snuffle holes: areas of disturbed vegetation often formed by badgers foraging for ground dwelling invertebrates such as earthworms and larvae and the underground storage organs of plants.
- Hair: often found among spoil and bedding outside entrances to setts or snagged on fences (such as barbwire) along well-used runs.
- Footprints: easily distinguishable from other large mammal species. Often found along paths and runs or in spoil outside sett entrances.

Tree Assessment for Bats

- 2.10 Roosts of bats in trees may be identified from the following field signs:
- Black stains beneath cracks, splits and other features where bat droppings have fallen;
 - Dark marks at entrance points where bats have rubbed against the wood and left natural body oils;
 - Feeding remains beneath roosts, such as insect wings;
 - Chattering of bats;
 - Bat droppings under access points;
 - Scratch marks around a feature (cavity or split) caused by bat claws;
 - Urine stains below the entrance or end of split;
 - Large roosts or regularly used sites may produce an odour;
 - Flies around the entrance, attracted by the smell of guano.
- 2.11 The trees on site were assessed for their potential to support roosting bats. The trees were assessed visually for evidence of bats as well as for features that increase the likelihood such as the following:
- Woodpecker holes, natural cracks and rot holes in trunks and branches;
 - Frost cracks;
 - Trunk and branch splits;
 - Hollow sections of trunk and branches;
 - Loose bark;
 - Cavities beneath old root buttresses and coppice stools;
 - Dense epicormic growth;
 - Dense ivy cover.
- 2.8 Trees scheduled for arboricultural work should also be assessed, and may be categorised (Table 1) to relate the value of their features to recommended actions. This approach allows trees to be graded according to their potential to support bat roosts. Trees may be assessed as having the potential to support bats (from an individual to a larger roost) even if no bats have been found.

Table 1: Protocol for visual inspection of trees due to be affected by arboricultural work, to assess the value of the trees to bats. Taken from Table 4.1 within the 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition) 2016'

Suitability	Description of roosting habitat
Negligible	Negligible habitat features on-site likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Habitat Suitability for Reptiles

2.9 Habitat surveys were carried out to assess the potential of the site to hold populations of reptile species. This involved looking for the presence of factors that would increase the suitability of the site for reptiles such as:

- Scrub and grassland (long sward) mosaic across the site;
- Features that can be potential hibernation sites for common reptiles such as log piles;
- Grass tussocks within the grassland that can act as shelter and burrowing sites;
- Water bodies or damp places on site (grass snakes);
- Compost heaps or decaying vegetation (slow worms);
- Features that can act as refugia on the ground such as disused roofing felt.

Habitat Suitability for Great Crested Newts

2.10 Habitat surveys were carried out to assess the potential of the site to hold great crested newts (*Triturus cristatus*). This involved looking at the wider landscape using Google

Maps and OS maps to assess types of habitat in the wider landscape. This also involved looking for the presence of factors that would increase the suitability of the site for great crested newts (GCNs) such as:

- The presence of suitable breeding places (water bodies) on site and within 500m of the site in the wider landscape;
- Habitat connectivity between ponds (if present) in the wider landscape and on site;
- The condition of the ponds and whether there were factors that would render them unsuitable for GCN such as fish;
- Land uses surrounding the site that may affect the potential of the site to hold GCN such as agriculture;
- Type of suitable habitat on site such as scrub/grassland mosaic;
- Patches of woodland in the wider landscape that can provide terrestrial habitat;
- Any barriers between known populations of GCN such as motorways and roads;
- Hibernation features on site for GCN such as log and rubble piles.

Limitations

- 2.11 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no single investigation could ensure the complete characterisation and prediction of the natural environment.
- 2.12 The protected species assessment provides a preliminary view of the likelihood of protected species occurring on site, based on the suitability of the habitat and any direct evidence on site. It should not be taken as providing a full and definitive survey of any protected species group. The assessment is only valid for the time when the survey was carried out. Additional surveys may be recommended if, on the basis of this assessment it is considered reasonably likely that protected species may be present.

3.0 Results

Desktop Study

- 3.1 The site is located to the north of Water Lane, along the eastern edge of Angmering in West Sussex. The site adjacent to the border of the South Downs National Park but it is not located within the site boundary. There were no other designated sites within a 5km radius. There are two SNCI (Site of Nature Conservation Importance) within the 2km radius, which are Highdown Hill & the Miller's Tomb (a chalk grassland) and Titnore & Goring Woods Complex (semi-natural woodland).
- 3.2 The A27 runs along the northern boundary of the site with ancient woodland, Groom's Copse, bordering the eastern side of the site, with nurseries and some low-density buildings on the west, alongside more woodland.
- 3.3 There is are significant quantities of ancient woodland to the north of the site, within the South Down National Park; a large local area of which is made up from Angmering Park and surrounding copses, Clapham Wood, Wepham Wood and the Dover. The boundary of Groom's Wood, an area of ancient and semi-natural woodland, is located adjacent to the eastern site boundary. OS maps reveal three waterbodies within a 300m radius of the site providing potential habitat for a range of species. There are a variety of habitats in the wider landscape as shown in Figure 2, however the majority of the wider landscape is dominated by agricultural fields, woodland blocks and low density housing.
- 3.4 The site itself is largely arable fields with significant connective hedgerows with excellent connectivity to further off-site woodland habitats. There are footpaths that run across areas of the site, and a road that runs up the centre of the site, leading to a motor racing circuit, which takes up approximately 6.5 ha of the site.



Figure 2: Habitats on and surrounding the site shown in red. Woodland is shown in green, with ancient woodland shown by orange hatching; pink indicates good quality semi-improved grassland.

- 3.5 The redevelopment is not thought to impact, directly or indirectly, any designated sites or areas of significant off site habitat. It is considered that the redevelopment of the site will impact only habitats within the redline boundary.
- 3.6 A 2km data search was requested from the Sussex Biodiversity Record Centre in August 2015. Records have been included from the last ten years, with the closest record and the most recent records included.

Table 2: Notable species records within 2km in the ten years.

	Species	Status	Closest record distance	Most recent record
Amphibians	Great Crested Newt (<i>Triturus cristatus</i>)	Bern Convention Appendix 2; European Protected Species; Habitats Directive Annex 2 - non-priority species; Habitats Directive Annex 4; Natural Environment and Rural Communities Act 2006 - Species of Principal Importance in England; Sussex BAP species; Sussex Protected Species Register; UK BAP priority species; Wildlife and Countryside Act 1981 Schedule 5	Approximately within 2km	2012
Mammals	Water Vole (<i>Arvicola amphibious</i>)	Natural Environment and Rural Communities Act 2006 - Species of Principal Importance in England; Sussex BAP species; Sussex Protected Species Register; Sussex Rare Species Inventory; UK BAP priority species; Wildlife and Countryside Act 1981 Schedule 5	780m west	2014
	Hazel Dormouse (<i>Muscardinus avellanarius</i>)	European Protected Species; Habitats Directive Annex 4; NERC Act 2006 - Species of Principal Importance in England; Sussex Biodiversity Action Plan; Sussex Protected Species Register; UK BAP priority species; Wildlife and Countryside Act 1981 Schedule 5	Approximately 2km northeast	2011
Reptiles	Slow Worm (<i>Anguis fragilis</i>)	Natural Environment and Rural Communities Act 2006 - Species of Principal Importance in England; Sussex BAP species; Sussex Protected Species Register; UK BAP priority species; Wildlife and Countryside Act 1981 Schedule 5 Section 9	Approximately 2km northeast	2013

Bats	Pipstrelle sp. (<i>Pipistrellus pipistrelles</i> / <i>Pipistrellus pygmaeus</i>)	UK BAP species, Annex IV of the Annex IV of the Habitats Directive, Priority Species listed under Section 41 of the Natural Environment and Rural Communities Act 2006, Wildlife and Countryside Act 1981 Schedule 5 Section 9; Schedule 2 of Conservation of Habitats and Species Regulations 2017 (European Protected Species animal)	380m west	2014
	Brown long-eared bat (<i>Plecotus auritus</i>)	See above	50m west feeding roost	2014
Birds	Red kite (<i>Milvus milvus</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended) IUCN Amber List	Approximately within 2km	2015
	Hobby (<i>Falco subbuteo</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended)	Approximately within 2km	2011
	Peregrine falcon (<i>Falco peregrinus</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended)	Approximately within 2km	2011
	Northern lapwing (<i>Vanellus vanellus</i>)	IUCN Red List UK BAP species	Approximately within 2km	2014
	Barn owl (<i>Tyto alba</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended) IUCN Amber List	Approximately within 2km	2013
	Kingfisher (<i>Alcedo atthis</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended) IUCN Amber List	Approximately within 2km	2012
	Firecrest (<i>Regulus ignicapilla</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended) IUCN Amber List	Approximately within 2km	2010
	Common crossbill (<i>Loxia curvirostra</i>)	Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended)	Approximately within 2km	2005
	Corn bunting (<i>Emberiza calandra</i>)	IUCN Red List UK BAP species	Approximately within 2km	2006

Habitat Phase 1 Survey

- 3.7 The site consists primarily of arable fields as shown in Figure 3, surrounded by significant hedgerows and trees line. There are hedgerows throughout the site, which provide connectivity to the adjacent ancient woodland. There are no ponds on site; however, there is an offsite pond that lies adjacent to Water Lane, as well as two ponds or waterbodies within 250m of the red line boundary that could be identified from OS Mapping.

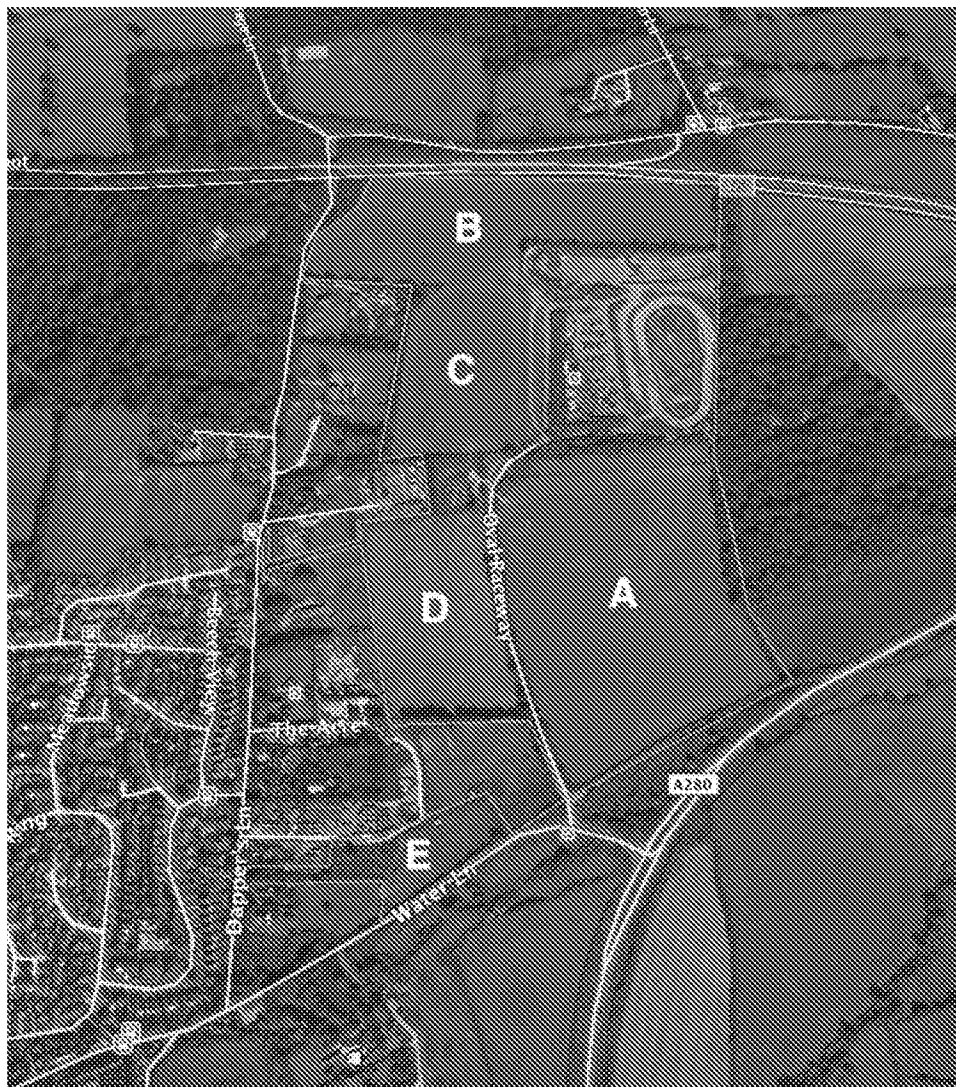


Figure 3: The fields have been numbered for ease of reference

Field A

- 3.8 Field A was sown with perennial rye grass that was of a short sward and slightly patchy, with some bare ground visible throughout. The field did not support any vegetative buffers along the margins and the only other species noted growing within the ryegrass was speedwell (*Veronica* sp.).
- 3.9 The hedgerows around this field were species-rich, with occasional mature trees within them. Ditches ran along the hedges, which were dry at the time of survey. The southern hedgerow was a dense hedge around 3m wide. The others were somewhat thinner, but all were between 2 and 4m tall. The northern hedgerow supported many stands of trees and was adjacent to a mound of scrub that was part of the raceway. Species found within these hedgerows were: elder (*Sambucus nigra*), dogwood (*Cornus sanguinea*), wild privet (*Ligustrum vulgare*), honeysuckle (*Lonicera periclymenum*), blackthorn (*Prunus spinosa*), English oak (*Quercus robur*), rose (*Rosa* sp.), hawthorn (*Crataegus monogyna*), elm (*Ulmus* sp.), bramble (*Rubus fruticosus* agg), ivy (*Hedera helix*), occasional gorse (*Ulex europaeus*), and in the eastern hedgerow only, there was field maple (*Acer campestre*). Understorey species that grew alongside the hedges and around the dry ditches included: male fern (*Dryopteris filix-mas*), common fleabane (*Pulicaria dysenterica*), scented mayweed (*Matricaria chamomilla*), bristly oxtongue (*Helminthotheca echioides*), Yorkshire-fog (*Holcus lanatus*), creeping thistle (*Cirsium arvense*), false oat-grass (*Arrhenatherum elatius*), cocksfoot (*Dactylis glomerata*), agrimony (*Agrimonia eupatoria*), common mallow (*Malva sylvestris*), willowherb (*Epilobium* sp.), curled dock (*Rumex crispus*), common hogweed (*Heracleum sphondylium*), nettle (*Urtica dioica*), false brome (*Brachypodium sylvaticum*), yarrow (*Achillea millefolium*), field bindweed (*Convolvulus arvensis*), common knapweed (*Centaurea nigra* agg.), teasel (*Dipsacus fullonum*), mugwort (*Artemisia vulgaris*) and common sowthistle (*Sonchus oleraceus*).
- 3.10 The top strip of this field comprised bare ground at the time of survey, and appeared ready for crop-sowing. There was some semi-improved garden in the eastern section of this strip. Separating this top strip from the main field was a small low-growing and

sparse scrub hedgerow with many gaps. Species here included: elder, bramble, hazel, willow, common fleabane and creeping thistle.

- 3.11 Field A was bordered by ancient woodland on the eastern side, as well as a hedgerow where the woodland ended.

Field B

- 3.12 Field B was sown with perennial ryegrass (*Lolium perenne*) and was approximately 2ft in height with bar ground patches noted throughout. The field supported small vegetative borders with some scrub and the only other species noted growing within the ryegrass was annual meadow-grass (*Poa annua*) along the trodden pathways.

- 3.13 The western and eastern edges borders woodland edges with mature trees off-site and scrub habitat on site. The eastern and southern field margins include bramble, broad-leaved dock, ox-eye daisy, common fleabane, false oat-grass, spear thistle, ivy. The mature tree line off site include ash, oak, field maple, blackthorn, dogwood, elder, holly, hazel, elm.

- 3.14 There is one category 1 oak tree in the southwest corner with splits in the main trunk. The western edge comprises the edge of the woodland to the west and had a small road running through it. There are several mature and semi-mature trees in this woodland on the western and eastern sides of field B, but most are largely considered to be off-site, with the scrub borders within the fence line boundary. The northeast boundary also contains gorse and small ash trees as well as guelder rose, field maple, blackthorn, dogwood, elder, holly and hazel. The southern boundary contains several large pine trees over a dry ditch and scrub species surrounding them along the edge of the Motor Racing Circuit.

- 3.15 The majority of the northern boundary of this field has a narrow margin of tall grasses with a few ruderal species including herb Robert, cow parsley with sections of bramble

and a hedgerow fragment of dogwood, hawthorn, hazel, guelder rose, blackthorn and holly all on the northern side of the fenceline, bordering the A27.

Field C

- 3.16 This field was a mown perennial ryegrass field with a bramble and hogweed scrub edge with spear thistle, hawksbeard, hazel, nettles, herb Robert, elder field bindweed and tall Yorkshire fog. The western boundary has a mature treeline of Swedish whitebeam, ash, hawthorn, oak, dog rose, dogwood, field maple and blackthorn.
- 3.17 The eastern area, outside of the field boundary, between the field and the motor racing arena is an open rough grassland with bare patches of ground and a narrow hardstanding road. This area is used as a car park and therefore is highly disturbed. Species found here include creeping cinquefoil, creeping buttercup, red clover, white clover, ribwort plantain, bristly oxtongue, Yorkshire fog, perennial ryegrass, dandelion, creeping bent, curly dock, false oat-grass, cut leaved cranesbill, lesser trefoil and common fleabane.
- 3.18 The eastern hedgerow boundary with the racing circuit includes dogwood, elder, wild privet, honeysuckle, blackthorn, oak, elm, dogrose and hawthorn over a dry ditch.

Field D

- 3.19 Field D is separated from C by an area of bare ground and a manure pile with a scrub boundary dominated by bramble and nettles and a line of mature conifers along the western boundary.
- 3.20 The main arable field had been recently harvested at the time of the survey therefore the crop could not be determined. The eastern edge is bound by a dense hedgerow with occasional mature oak trees. The southern boundary was a planted line of conifers and the western boundary comprised tall ruderal species and bramble.

-
- 3.21 The hedgerow between field D and the central road running through the site included the following species: hawthorn, dogrose, dogwood, field maple, hazel, oak, blackthorn and elder with some conifer trees at the southern end of the road. The understorey plants include broad-leaved dock, cow parsley, common nettles, rosebay willowherb, bramble, dandelion, ivy, yarrow, Yorkshire fog, selfheal, field bindweed, spear thistle, ribwort plantain, false oat-grass, cocksfoot, mallow, traveller's joy, hogweed, hawksbeard, false brome, ragwort and horsetail.

Field E

- 3.22 This area was surveyed in August 2017. This field was largely a horse grazed paddock with species poor grassland and few scattered ruderal species. The western half of the field was densely scrubbed over and impenetrable to fully survey. The southern boundary along Water Lane was composed of a dense hedgerow with semi-mature trees.
- 3.23 Grassland species on site include perennial ryegrass, creeping bent and Yorkshire fog with stands of ragwort, common nettle and willowherb present. Also present in the grassland was ribwort plantain, creeping buttercup, spear thistle, dandelion, white clover and daisy.
- 3.24 Hedgerow species found include elder, elm, hawthorn and blackthorn with limited grazed understory. There are also additional scattered isolated trees within the edges of the grassland.
- 3.25 The dense scrub was dominated by common nettles, hogweed and bramble. There were significant quantities of abandoned rubbish and broken building parts within this scrub habitat. Full inspection of this area could not be undertaken at the time of the survey.
- 3.26 A small horse shelter is present within the paddock. This was wooden with a corrugated metal roof. The internal was open access. This building was not considered to have any potential for roosting bats and no bird's nests were found within the structure.

Semi-improved grassland

- 3.27 There were patches of semi-improved grassland throughout the site. These patches were mostly of around shin-high sward length and included the following species: perennial rye grass, cocksfoot, Yorkshire fog, meadow-grass (*Poa* sp.), common ragwort (*Jacobaea vulgaris*), teasel, bristly ox-tongue and common knapweed.
- 3.28 Various patches around the racetrack were of shorter sward and used as amenity grass. Species included: perennial ryegrass, birds-foot trefoil (*Lotus* sp), dandelion (*Taraxacum agg*), ribwort plantain (*Plantago lanceolata*), creeping thistle, wall barley (*Hordeum murinum*), bristly ox-tongue and creeping bent (*Agrostis stolonifera*).

Scrub Mounds

- 3.29 Around the raceway there were numerous man-made mounds, some reinforced with tyres. The vegetation on these mounds was mainly scrub and ruderal species such as: buddleia (*Buddleia davidii*), elm, hawthorn, elder, ragwort, willowherb, bristly ox-tongue, and a variety of grass species.

Treeline and woodland edge

- 3.30 There are a number of trees of varying maturity along scattered throughout the site, creating boundary features and connective habitat across the site, leading to woodland in both the east and western edges. Species found on site include oak, hawthorn, field maple, hazel, blackthorn, elder, conifers, Swedish whitebeam, ash and elm. These trees have been individually assessed for their potential to support bats and this is outlined below.

Hedgerow Assessment

- 3.31 There are a large number of hedgerows and tree lines surrounding each field within the site. These have been assessed for their importance in terms of species present, associated

features and potential for supporting protected species. The hedgerow characteristics and woody species, as listed in Schedule 1 of the Hedgerow Regulations, are displayed in table 3 below. For ease of reference, the qualifying features from subparagraph 4 in the Regulations have been listed here and just the numbers are referred to in the table:

- a. a bank or wall which supports the hedgerow along at least one half of its length;
- b. gaps which in aggregate do not exceed 10% of the length of the hedgerow;
- c. where the length of the hedgerow does not exceed 50 metres, at least one standard tree;
- d. where the length of the hedgerow exceeds 50 metres but does not exceed 100 metres, at least 2 standard trees;
- e. where the length of the hedgerow exceeds 100 metres, such number of standard trees (within any part of its length) as would when averaged over its total length amount to at least one for each 50 metres;
- f. at least 3 woodland species within one metre, in any direction, of the outermost edges of the hedgerow;
- g. a ditch along at least one half of the length of the hedgerow;
- h. connections scoring 4 points or more in accordance with sub-paragraph (5);
- i. a parallel hedge within 15 metres of the hedgerow.

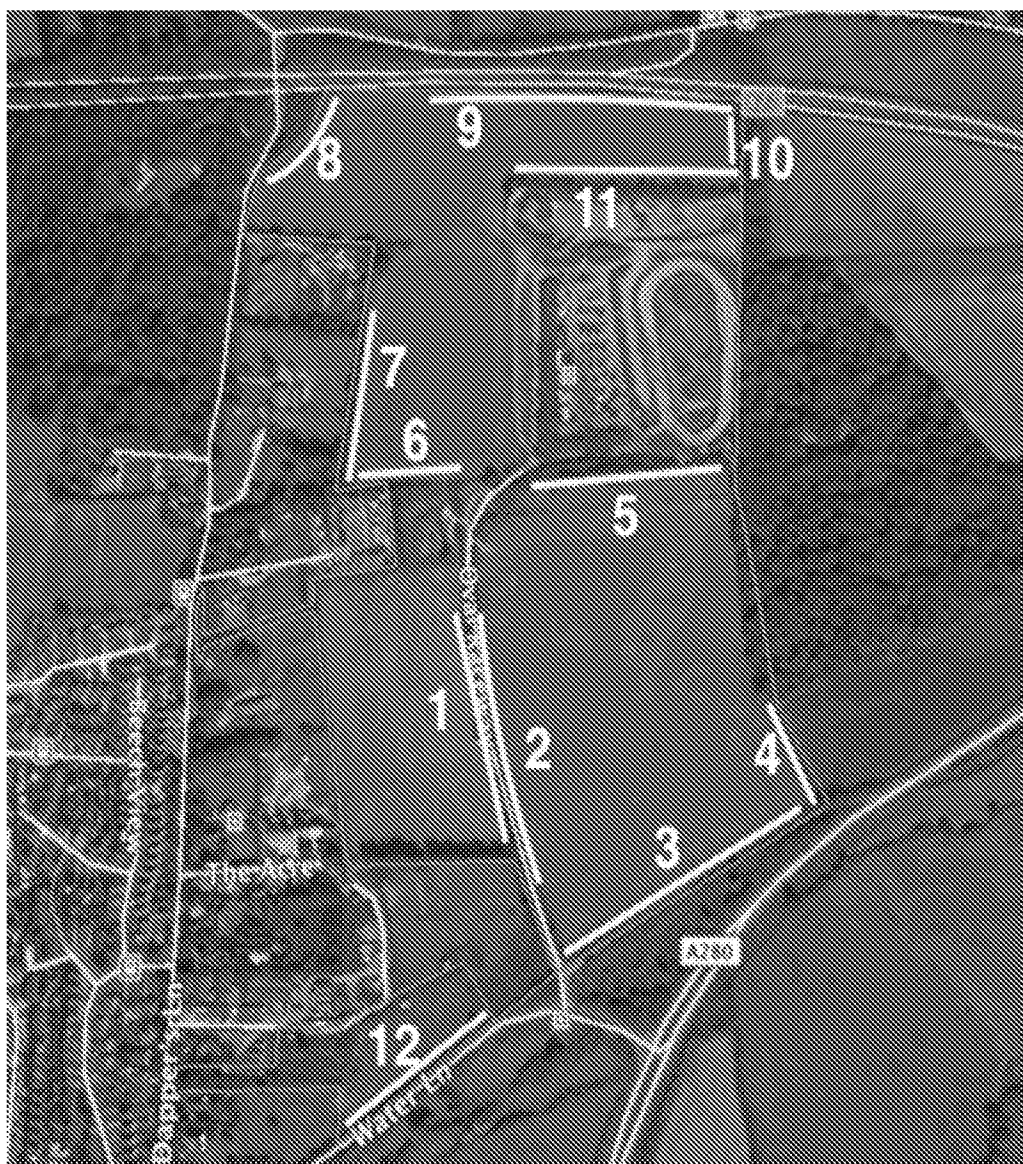


Figure 4: Numbered hedgerows assessed on site as per the Hedgerow Assessment Regulations

Table 3: Hedgerow Assessment

Hedgerow	Woody species	Average number of species per 30m	Features listed under subparagraph 4 or additional qualifying criteria	Features / Notes	Important Hedgerow? Y/N
H1	Hawthorn Dogwood Rose Field Maple Hazel Oak Blackthorn	5	(b) (e) (g) (i)	360m long dry ditch runs along road edge	Yes: 5 woody species and supports 4 features listed under subparagraph 4

	Elder				
H2	Dogwood Elder Wild privet Blackthorn Hawthorn Oak Elm Rose Gorse	7	(b) (e) (g) (i)	340m long	Yes: 7 woody species
H3	Hawthorn Blackthorn Wild privet Rose Oak Elder Willow	4.5	(a) (b)	250m long	Yes: Adjacent to a bridleway or footpath; contains over 4 woody species and supports 2 of the features listed under subparagraph 4
H4	Oak Elm Elder Field maple Wild privet Blackthorn Rose	7	(b) (d) (g)	85m long	Yes: 7 woody species
H5	Dogwood Hawthorn Hazel Rose Blackthorn Gorse	6	(b) (e) (g)	225m long	Yes: 6 woody species and supports 3 of the features listed under subpara. 4
H6	Hazel Elder Hawthorn Rose	3	(d) (g)	~50m Dry ditch	No
H7	Oak Ash Field maple Rose Hawthorn Blackthorn Dogwood	7	(b) (e) (f)	210m long	Yes: 7 woody species

H8	Blackthorn Dogwood Elder Hazel Ash Rose Field Maple Elm Gorse	6	(e) (f)	150m; Defunct	No
H9	Dogwood Hawthorn Hazel Rose Blackthorn	3	N/A	450m long; Large gaps; Bramble along most of the boundary	No
H10	Dogwood Hawthorn Ash Oak Blackthorn Elm	5	(b) (d) (f)	80m long; woodland edge habitat	No
H11	Ash Beech Yew	2	(a) (e) (g)	245m long large gaps	No
H12	Elder Hawthorn Blackthorn Elm	4	(g)	150m gappy	No

Tree Assessment

3.32 Along hedgerow H1 there were a number of oak trees that supported some superficial cracks and crevices, and these were considered to have moderate roosting potential. The most southern oak in H1, however, supported a number of woodpecker and/or rot holes that appeared to have some depth to them. This tree is considered to have high bat roost potential.

3.33 In the northwest corner of field C, is a large mature oak with several cracks in the main upper branches of the tree. This tree is considered to have high roosting potential. There is a further mature oak, considered to be potentially just off-site in the southwest corner of field B with similar features and is also considered to have high roost potential.

- 3.34 There are a number of trees along the boundaries of the site, forming woodland and boundaries between fields and plots, of differing maturity and species. It is recommended that as many of these trees are retained as possible as they all hold intrinsic value for a variety of species including dormice, bats and birds. Those trees with particular potential for supporting bat roosts are indicated on the habitat map in appendix 1.

Habitat Suitability for Protected Species

Badgers

- 3.35 An active main badger sett was located within a wooded area to the south of the central driving circuit. The location is marked on the habitat map (appendix 1). Approximately eight holes were located with well-worn mammal pathways leading to and from the holes. No latrines were noted on site nor any snuffle holes, however these may have been present within the arable fields, but not located by the surveyors.
- 3.36 One further mammal hole was located within the southern half of the Grooms Copse along with two mammal pathways. This is suspected to be from a badger, however no other holes in this area were found.

Dormice

- 3.37 There is a significant amount of potential habitat present off site, suitable for dormice, in the form of Groom's Copse to the east of the site. The site provides a variety of suitable tree species associated with the species such as oak, hazel, ash and large amount of bramble, providing a variety of food sources and excellent connectivity across the site to further woodland. The layered habitat of woodland and scrub creates the density and diversity of understorey necessary to support the species. There are historical records for dormice within 2km of the site, however these records are all to the north of the A27 which is considered to be a major barrier to the dispersal of dormice.

- 3.38 It was considered necessary for further surveys to be conducted and dormouse tubes were erected at the same time as the preliminary ecological appraisal in 2015. A full survey was undertaken in 2015 and additional and replacement tubes were put up as shown below in Fig.5. The separate 2017 Dormouse Report gives further details and results of these surveys.

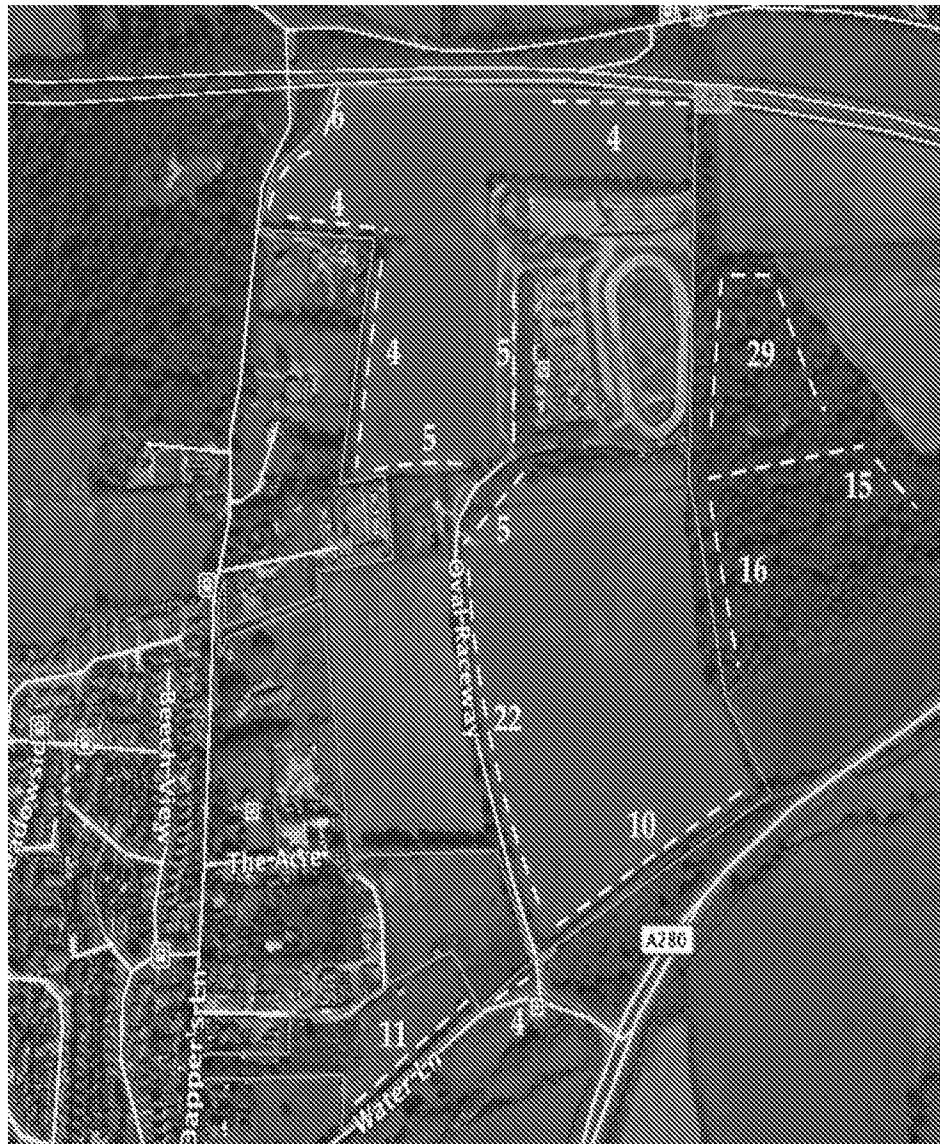


Figure 5: Location of dormouse tubes across the site in 2017 with numbers shown to indicate the number of tubes associated with each dotted line



Figure 6: Dormouse tube located within Groom's Copse

Great Crested Newts

3.39 A pond is present just outside the boundary of the site as shown below in Figure 7. This is located to the south of field A. A network of ditches and the stream are thought to provide the waterbody with water. At the time of the 2015 survey, the pond could not be assessed using the HSI method. This is due to the heavy scrub growth around the pond and the amount of common reed (*Phragmites australis*) that was present. The survey was carried out in mid-August, which is a suboptimal time of year for assessing ponds in terms of newts. It is considered that the waterbody may be suitable for GCN during their aquatic phase (approximately February – June) and the possibility of the site supporting GCN cannot be ruled out at this stage.

3.40 Since this survey, eDNA sampling has been undertaken on waterbody 1 in early 2016. GCN were found to be absent from this waterbody. Further details can be found in the June 2016 report.

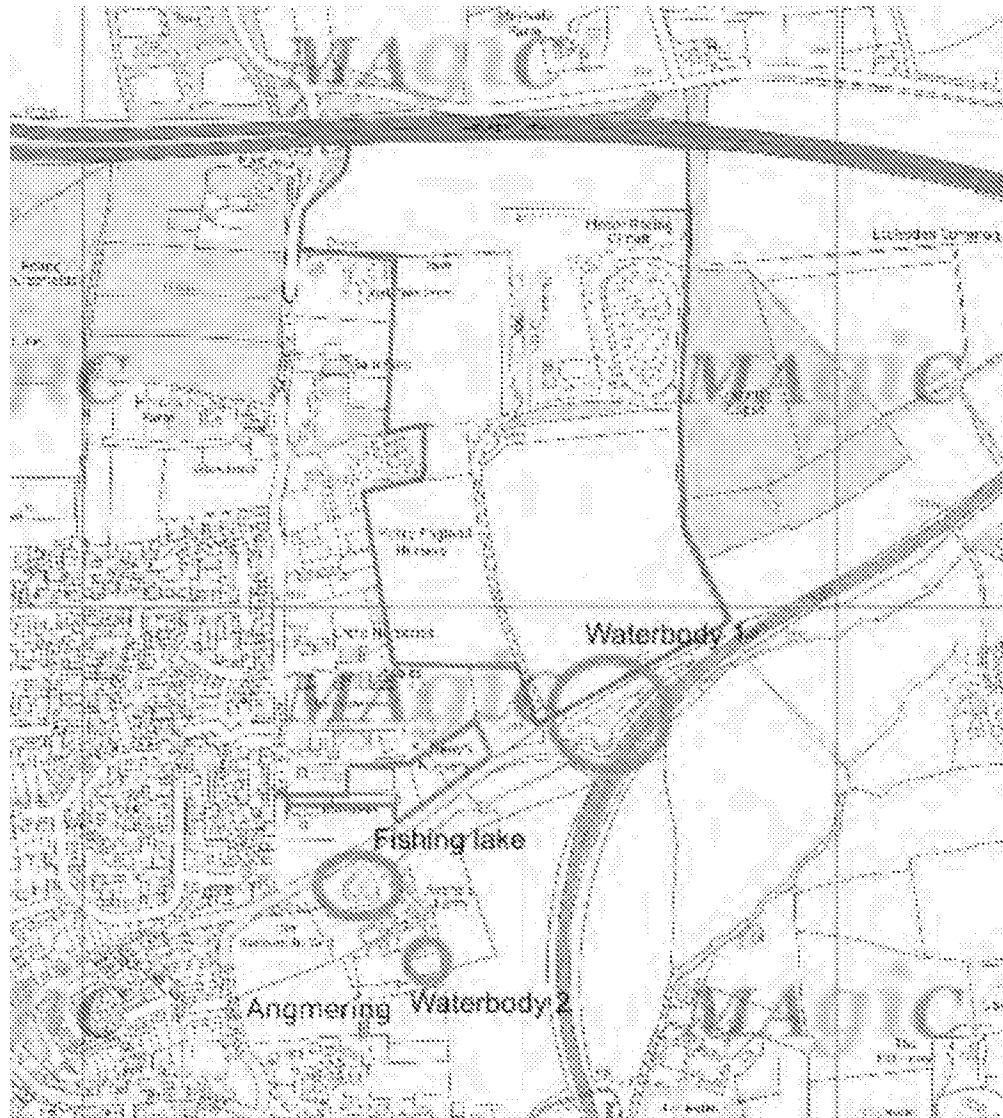


Figure 7: Ponds located in the wider landscape

- 3.41 The development site is separated from the surveyed pond (waterbody 1) by a small footpath to the north and by a dual carriage way to the south. There is a small shallow ditch that connects the pond to further habitats to the south. The waterbody to the west, the fishing pond, is ornamental and contains a good population of carp and ducks. GCN are not commonly found alongside these species due to the general lack of vegetation associated with them and due to predation from the fish. A further pond was located to the south of the fishing pond, within the back garden of one of the houses. This was assessed using the HSI survey method.

- 3.42 Finally, a further waterbody, waterbody 2 on the map above, was assessed using the HSI method. The suitability index is calculated for each of the 10 categories. These are then analysed using the equation below to obtain the geometric mean or HSI score of the ten suitability indices.

$$HSI = (SI_1 \times SI_2 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/10}$$

The calculated score should be between 0 and 1 and will fall within one of several bands, which correspond to a given category for the pond.

Table 4: HSI Scores and Pond Suitability

HSI	Pond Suitability
< 0.5	Poor
0.5 - 0.59	Below Average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

Table 5. HSI score for the pond behind the residential house

Suitability Indices No.	Feature	Pond Score
1.	Location	1
2.	Area	0.3
3.	Permanence	0.9
4.	Water quality	0.33
5.	Shading	0.5
6.	Presence of waterfowl	0.01
7.	Presence of fish	0.67
8.	Pond density	0.5
9.	Suitable newt habitat within 500m	0.67
10.	Macrophyte content	0.3
10 th root		0.35
Pond Suitability		Poor

-
- 3.43 The pond was considered to have 'poor' suitability for GCNs. This was largely due to the presence of geese and the impact that these species have on the water quality and lack of vegetation.

Reptiles

- 3.44 The semi-improved grassland and ruderal species around the scrub areas vary in sward height, however the overall habitat does provide significant areas of optimal habitat for common reptile species such as slow worm and common lizard and potentially for adder. There is excellent connectivity across the site and to suitable woodland habitats. There is a large amount of refugia and dead wood present providing hibernacula and shelter for reptiles. There are recent records of common reptile species found within 2km as detailed in table 2.
- 3.45 Further presence/likely absence reptile surveys were considered to be necessary and were set up on the same day as the preliminary ecological appraisal. Reptile mats were laid along the edges of the fields, in strategic areas in the longer grassland and adjacent to the hedgerows as shown in blue overleaf in Figure 8. Please see 2015 Reptile Survey report for further details and results.

Breeding Birds

- 3.46 All mature trees and shrubs within the site boundary have potential to support nesting birds. Several common species were seen and heard at the time of the survey including green woodpecker, wren, pheasant, swallow and buzzards. Barn Owl are also known to use the site.
- 3.47 The fields were not considered to provide suitable coverage for ground nesting birds. The fields are on crop rotation. From 2015 to 2017, at one point in time the fields have been left bare, sheep grazed, been growing tall perennial ryegrass and sweetcorn. The features most likely used by breeding birds are the boundary hedgerows, trees and woodlands.



Figure 8: Locations of the reptile mats for the 2015 survey (indicative only)

Other species

- 3.48 During the 2016 eDNA sampling on waterbody 1, signs of water vole presence was found to be present on the banks.
- 3.49 Rabbits are likely to be present on site and grazing the boundary grassland.

4.0 Discussion

Site

- 4.1 The site does not fall within any statutory designations. However, the border of the South Downs National Park is approximately 150m east of the extension site and adjacent to the original site. Given the scale of the development and its distance from the National Park, it is considered that the development will not result in any direct impacts as there is no land loss, isolation or fragmentation of the protected habitats. In terms of indirect impacts such as alterations in lighting, drainage and pollution resulting from construction, it is considered these would not be significant.
- 4.2 In terms of non-statutory designations, the Highdown Hill & Miller's Tomb SINC is 1.35km southeast of site and the Titnore & Goring Woods SINC is approximately 1.6km northeast. Again, given the scale of the development and the distances between the sites, it is considered that the development would not impact upon the ecological functionality of these protected sites.

The proposed development is not located on or directly adjacent to any designated sites, and it is considered to be sufficiently isolated from designated sites within the landscape that there would be no significant direct or indirect impacts on these sites. Therefore, it is considered that the development would be completed in accordance with **Policies AREA13 Sites of International Importance for Nature Conservation, AREA14 Sites of National Importance for Nature Conservation and AREA15 Sites of Local Importance for Nature Conservation.**

Habitats

- 4.3 The habitats on site are common and widespread throughout the local area and the UK as a whole. The most ecologically valuable habitats on site are considered to be the hedgerows and trees. The semi-improved grassland throughout the site was very short, particularly in the horse paddocks and therefore of reduced ecological value. The tall ruderal vegetation can be found throughout the site particularly along the site

boundaries and has the potential to be used by a range of species, including invertebrates. The areas of hardstanding and the buildings are considered to be of low ecological interest.

- 4.4 Hedgerows are a habitat of principal importance for the conservation of biodiversity under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. This means that developments need to take into account impacts on this habitat to prevent its degradation. Whilst the hedgerows on the extension site are not considered to be important or species-rich, it is recommended that all hedgerows be retained on site where possible as they provide habitat connectivity and green corridors allowing movement of species throughout the wider landscape. This is especially important since the presence of dormice on the original site has been confirmed and bats have been recorded using the central hedgerow. Any hedgerows removed should be replaced elsewhere on site. It is also recommended that where possible enhancements to hedgerows and green corridors is considered within the masterplan.
- 4.5 In terms of off-site habitat, there are approximately 20 units of priority deciduous woodland within 2km of the site, the closest of which is Polling Furze fields 280m north of the extension site and adjacent to the northwest edge of the original site. This is also a habitat of principal importance for the conservation of biodiversity under section 41 of the NERC Act 2006. Whilst it is considered that no direct impacts such as habitat loss or fragmentation are applicable in this case, indirect impacts such as lighting and drainage will need to be considered when looking at the site as a whole.
- 4.6 There are also approximately 11 units of semi-natural woodland, the closest of which is Groom's Copse 280m north-east of the extension site and immediately adjacent to the eastern boundary of the original site. Natural England (2017) identify the following significant effects from adjacent land that may have an effect on ancient woodland. These must be considered within the scheme:

“Direct impacts of development on ancient woodland or veteran trees include:

- damaging or destroying all or part of them (including their soils, ground flora, and fungi*
- damaging roots and understorey (all the vegetation under the taller trees)*

-
- *damaging or compacting soil around the tree roots*
 - *polluting the ground around them*
 - *changing the water table or drainage of woodland or individual trees*
 - *damaging archaeological features or heritage assets*

Nearby development can also have an indirect impact on ancient woodland or veteran trees and the species they support. These can include:

- *breaking up or destroying connections between woodlands and veteran trees*
- *reducing the amount of semi-natural habitats next to ancient woodland*
- *increasing the amount of pollution, including dust*
- *increasing disturbance to wildlife from additional traffic and visitors*
- *increasing light pollution*
- *increasing damaging activities like fly-tipping and the impact of domestic pets*
- *changing the landscape character of the area."*

4.7 Natural England's standing advice for development close to ancient woodland (November, 2017) recommends that a buffer of at least 15m be established between the woodland and any forms of development. This can extend up to 50m depending on level of pollution or trampling to be expected on site. No roads or cycle ways should be included in this buffer zone to avoid trampling and changes in drainage. The ancient woodland is off-site and will be protected from recreation pressure through the erection of fencing. However, to protect it from pollution such as dust during development, it is recommended that screening barriers should also be installed in this buffer zone during the construction phase.

4.8 It is recommended that the ancient woodland is sensitively considered as part of any master plan and that habitat connectivity between this block of woodland and the priority deciduous woodland to the west be retained. Linkages across the whole of the site, including the hedgerows, should be maintained and enhanced where possible. These would help to ensure that the proposals are completed in compliance with **Policy GEN28 Trees and Woodlands**.

-
- 4.9 Whilst the loss of habitats such as arable land and disturbed land, including the race track, is not considered to be significant in terms of ecological value, site linkages and any potential issues with habitat fragmentation across the landscape must be considered as part of the master plan.
- 4.10 The use of the habitats within the red line has been assessed for their potential to support a number of protected species. These are discussed individually below.

Protected Species

Bats

- 4.11 The trees on site vary in maturity and the majority are too immature and thin to support potential features associated with bat roosts. Along hedgerow H1 there were a number of oak trees that supported some superficial cracks and crevices, and these were considered to have high roosting potential. The most southern oak in H1, however, supported a number of woodpecker and/or rot holes that appeared to have some depth to them. This tree is considered to have high roosting potential. In the northwest corner of field C, is a large mature oak with several cracks in the main upper branches of the tree. This tree is considered to have high roosting potential. There is a further mature oak, considered to be potentially just off-site in the southwest corner of field B with similar features and is also considered to have high roosting potential. These trees have been identified on the habitat map as Target Note 1.
- 4.12 If the trees which have been identified as showing potential to support bats need to be removed it is recommended that surveys are undertaken prior to their removal. These should be surveyed either by endoscopic survey or dusk emergence / dawn return to roost surveys. This will show whether bats are using these trees and whether a licence for felling would be required by Natural England. Enhancements for bats have also been considered as part of this report.
- 4.13 All the mature trees and semi-mature trees on site, including the trees growing along the tree lines and the hedgerows provide good opportunities for foraging bats. Hedgerows

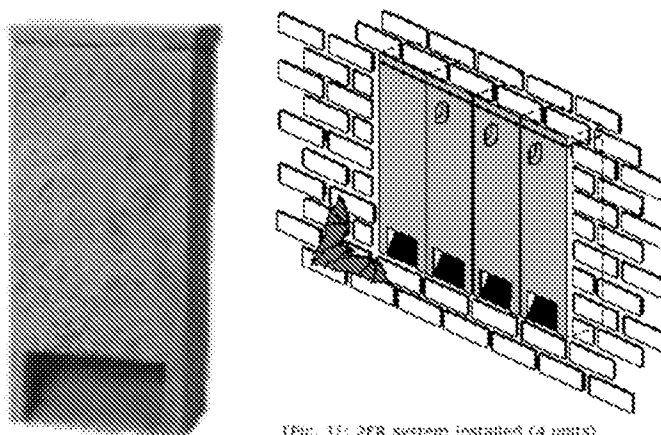
-
- and tree lines also help connect the site to the wider landscape ensuring that bats can move with ease across the area using these linear features for shelter and protection and opportunistic foraging. Tree lines and hedgerows should therefore be maintained or enhanced where possible.
- 4.14 The site is considered likely to be used by foraging bats. It is considered that a bat transect survey is carried out to establish the most important areas of the site, that are used by bats for commuting. It must be demonstrated that significant commuting routes for bats between roost sites and foraging grounds are considered within the design of the scheme.
- 4.15 Using the Bat Conservation Trust's document Bat Surveys Good Practice Guidelines 2nd Edition, Table 7.2 'Minimum recommended visit frequency and timing for activity surveys' the recommended survey effort is as follows. The site was considered to be classed as a 'large sized site'. The habitat quality for bats on site and adjacent to site was considered to be 'low - medium' therefore it is recommended that transect surveys are carried out which will require one visit per transect each month (April – September or April to October). At least one of the surveys should comprise dusk and pre-dawn surveys (or a dusk to dawn survey within one 24-hour period). It is also recommended that automated surveys are carried out. This will require 1 location per transect. Data should be collected on 3 consecutive nights each month (April-September or April-October).
- 4.16 Please see the 2017 Bat Activity Report for further details and results from these surveys.

Mitigation measures for bats

- 4.17 Any proposed lighting scheme as part of the development will have to take into account bats in the surrounding area as well as site. All bat species are nocturnal, resting in dark conditions in the day and emerging at night to feed. Bats are known to be affected by light levels which can affect both their roosting behaviour as well as their foraging behaviour. This needs to be taken into account, with a sympathetic lighting scheme for the development. Recommendations include:

-
- Lighting should only be installed if there is a significant need;
 - Light levels should be kept low, the use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its UV filtration characteristics;
 - Baffled lights should be used, where light is directed towards the ground;
 - Lighting should be avoided near treelines or hedgerows, with light angled away from these areas, bats use linear features such as treelines to commute across the landscape to forage; and
 - Lights should have focussed luminance on their target area, preventing light spill and pollution into other areas of the site and local area.
- 4.18 To enhance the local bat population and provide roosting opportunities, it is recommended that boxes should be hung on retained mature trees and have clear flight paths. Recommended boxes include:
- Schwegler 2F Bat Box – these boxes are attractive to small bats and can be hung on trees around the building. One should be used on the mature trees along the site boundary.
 - Schwegler 2FN Bat Box - It slightly larger than the 2F and provide opportunities for the larger bats. One should be used on the mature trees along the site boundary.
- 4.19 Incorporating specially designed bat boxes onto mature trees on site can enhance the habitat on site for bats. Bat boxes will be erected on the trees prior to works starting on site. Suitable bat boxes include a variety of wooden bat boxes such as; improved cavity box, double chamber bat box and other wood based varieties. Schwegler boxes have been recommended as these are long lasting and require no maintenance.
- 4.20 It is recommended that as many trees as possible be retained within the site, particularly on the site boundaries. Furthermore, it is recommended that buffer zones, tree planting and the sue of green corridors are incorporated into the design of the master plan.
- 4.21 Bat boxes/tubes can also be incorporated into the structure of new buildings. These provide good opportunities for crevice-dwelling species such as pipistrelles. The opening

of the bat box/tube will be the only section of the bat box/tube that would be visible. Several of these tubes can be established in a row together providing a good-sized roost space. The bat tubes should be inserted as high up as possible in the brickwork (Figure 6).



{FIG. 1}: BFR system installed (4 units)

Figure 9: Bat tubes incorporated into the wall of a building to provide roosting space

- 4.22 Further enhancements for bats in the local area can be achieved through the use of native tree planting and landscaping within the development. According to local planning policy (Gen28 – Trees and Woodlands), any trees removed need to be replaced with an equivalent number on site.

Badgers

- 4.23 A main sett was located on site, within a treeline and woodland edge area in between arable field A and the driving track to the north (see location in appendix 1). The sett consisted of at least eight holes and is considered to be active with several well worn mammal pathways running throughout the woodland edge, leading to and from the holes.
- 4.24 It is always recommended that development should avoid closing a main badger sett. Main badger setts are significant in terms of badger ecology, with setts being used for many years and badgers remaining loyal to main setts. Other setts, including annexe, outlier and subsidiary setts can change in activity over the year, with some of these setts

-
- being inactive for long periods of time. Whilst these are less significant in terms of badger ecology, they do play an important role within family life and therefore if a sett is to be closed compensation and mitigation must be considered within the master plan.
- 4.25 The underground excavations of badger setts can extend up to 20metres from sett entrances, and this will need to be taken into account during the design of the site and throughout the construction stage. It is advised that a 20metre buffer zone be enforced around the excavations. The exclusion zone must be fenced off with Heras fencing, which allows badgers to move freely, but protected the sett from any accidental incursions in to the sett area. Furthermore, the 20m buffer no use of heavy machinery, fires and the use of chemicals is allowed. If disturbance to either significant disturbance to either sett is considered likely then a Natural England licence should be applied for.
- 4.26 It is advised that the area surrounding retained setts on site, should be shielded by planting a screen of vegetation, to stop potential human interference from development of the surrounding land. Species such as hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), dog rose (*Rosa canina*), holly (*Ilex aquifolium*) and bramble (*Rubus fruticosus*), should be planted, the thorny and spikey form of these plant species, will help to prevent potential disturbance of the sett.
- 4.27 Enhancements for badgers should be considered as part of the development. This would include the provision of alternative foraging habitats to replace the lost area of agricultural land. The provision of fruiting trees would allow badgers opportunities to forage for fallen fruits. Furthermore, green corridors around the site and through the site should be created, which will facilitate the movement of badgers from the sett to alternative foraging habitat.
- 4.28 Badgers receive protection under The Protection of Badgers Act 1992, which consolidates the previous Badger Acts of 1973 and 1991. The Act makes it an offence to:
- Wilfully kill, injure, take, or attempt to kill, injure or take a badger;
 - Cruelly ill-treat a badger, including use of tongs and digging;
 - Possess or control a dead badger or any part thereof;

-
- Intentionally or recklessly damage, destroy or obstruct access to a badger sett¹ or any part thereof;
 - Intentionally or recklessly disturb a badger when it is occupying a badger sett;
 - Intentionally or recklessly cause a dog to enter a badger sett;
 - Sell or offer for sale, possess or have under his control, a live badger.

4.29 It must be noted that badger foraging habitat and corridors are not legally protected, although should be considered within any development. A Development Licence would be required from Natural England for any development works that are likely to affect an active badger sett, or disturb badgers whilst in a sett. However, Natural England states that “badgers are relatively tolerant to moderate levels of noise and activity around their setts and that low to moderate levels of apparent disturbance at or near to badger setts do not necessarily disturb the badgers occupying those setts” and therefore such disturbance around setts does not always require a licence (Natural England, 2009).

4.30 If a badger sett is to be closed to make way for development, then an application to Natural England will be required to do so. It is advised that monitoring of the holes are carried out to establish levels of activity and establish that badgers are using the holes not other mammal species such as fox, which can sometimes inhabit vacant badger setts. This can be conducted at the same time at the dormouse checks in the woodland. Survey data for the usage of any sett to be closed, will also be needed to inform a licence application. If activity at a sett is significant then it is likely that a replacement sett will need to be built within the redline boundary as mitigation, for a licence application to be successful

Great Crested Newts

4.31 The waterbody located on Water Lane, could not be assessed for its suitability for supporting GCN at the time of the 2015 survey due to heavy scrub growth. The

¹ A badger sett is defined in the legislation as “any structure or place which displays signs indicating current use by a badger”. This includes seasonally used setts. Latest guidance from Natural England a sett is defined as such (and thus is protected) as long as signs indicate “current use”. Additionally, Natural England state that “the maximum lapse of time between last occupation by badgers and the inspection of a sett for it to be considered in “current use” is how long it takes the signs to disappear, or more precisely, to appear so old as to not indicate “current use”” (Natural England, June 2009).

development site is separated from the waterbody by a small footpath to the north and by a dual carriage way to the south. There is a small shallow ditch that connects the pond to further habitats to the south. The waterbody to the west, the fishing pond, is ornamental and contains a good population of carp and ducks. The final waterbody, waterbody 2, was considered to have low potential to support GCNs. This was due to the presence of geese, lack of vegetation and poor water quality. No further surveys of either this waterbody or the fishing lake is considered a requirement. There are however biological records of GCN within 1km.

- 4.32 eDNA sampling was undertaken on waterbody 1 in mid 2016. Please see the 2016 report for further details and results.

Dormice

- 4.33 The ancient woodland off site offers a layered habitat with trees of varying levels of maturity and scrub habitat at the edges. The connective hedgerows could allow the species to persist on site. There are biological records of dormice within 2km, however these are all north of the A27 which would create a significant barrier to present dispersal, however there may have been a population south of the road prior to its development. The woodland environment is considered to create optimal habitat for dormice and therefore further surveys are therefore recommended to establish presence/absence of the species.
- 4.34 Dormouse surveys involve erecting dormice tubes within potential suitable habitat on site and within adjacent off site habitats to detect whether they are present or establish likely absence. Dormice surveys should be carried out over a number of months. Each month of the year is given a score of suitability. A survey effort adding up to a score of 20 will need to be achieved throughout the course of a year for suitable survey effort to be achieved. A hazel nut search will also need to be carried out where fruiting hazel is present on site, to identify whether any nuts have been opened by dormice, which can be detected by their distinctive method of opening this food source.

-
- 4.35 Surveys were carried out in 2015 and 2017. Please see the 2017 Dormouse Report for further details, results and the proposed mitigation and enhancement scheme.

Reptiles

- 4.36 The semi-improved grassland and ruderal species around the scrub areas vary in sward height, however the overall habitat does provide significant areas of optimal habitat for common reptile species such as slow worm and common lizard and potentially for adder. Further presence/absence surveys are recommended across all suitable habitat on the site and the results of these surveys will influence any further mitigation measures. The locations of the reptile mats has been shown in Figure 8. The mats are attractive to reptiles because they get very warm and reptiles can often be found warming up under such mats. These mats will be checked on seven different visits under suitable conditions.
- 4.37 Please see the 2015 reptile report for further details and results from these surveys.
- 4.38 Creation of log piles and brash piles within suitable areas of vegetation may be created for use by common reptile species as refugia, in place of the manure pile. Log piles should be located in a variety of locations, such as damp places, with some situated in more sunny locations. These should be stacked, and perhaps some amounts of leaf litter added. Planting around log piles with such species as honeysuckle or clematis (*Clematis sp.*) can also add value.

Breeding Birds

- 4.39 The UK breeding season for most bird species takes place between March and September. It is recommended that any works affecting trees or hedges on site be carried out outside of this period. Should this not be possible, it is further recommended that all vegetation suitable for breeding birds be checked for active nests no more than 48 hours prior to vegetation clearance. If active nests are identified, works in the vicinity of the nest must cease until the birds have fledged the nest.

- 4.40 The high levels of disturbance and regular change in land use of the fields on site create suboptimal conditions for ground nesting birds. The tall corn crop and grazed semi-improved grassland are not considered to create suitable ground conditions for species such as skylark. Breeding birds are likely to utilise the boundary features including trees and adjacent woodland. These features are to be retained, along with enhancements and buffer zones. No further surveys are considered to be necessary.

Other species

- 4.41 Rabbit droppings, scrapings and holes were observed during the site visit. The Wild Mammals Protection Act 1996 states that it is an offence to crush or cause asphyxiation to mammals. Therefore, if any rabbit warrens are found which are to be disturbed or excavated, this should be done by hand rather than mechanical equipment.
- 4.42 Water vole droppings were found along the banks of waterbody 1 in May 2016. This is within 40m of the extension site's red line boundary across a small road. Records from Sussex Biodiversity Records Centre also reveal water voles had been recorded here in 2014. According to Natural England guidelines, a buffer zone of 10m should be maintained between the bank of the water body and any development works to protect water voles from any direct impacts and to minimise disturbance. It is considered that this water body will not be impacted by the development given its distance from the site and that the road will act as a significant buffer from any direct or indirect impacts. The whole of the site to the north of Water Lane is therefore not considered to be constrained by water voles.

General Site Enhancements

- 4.43 A number of enhancements can be incorporated into the final development to help reduce the number of potential ecological impacts. This would also allow the proposals to achieve a net gain in biodiversity post-development by enhancing existing habitats and creating of new habitats to allow the site to support a greater number of species. The suggested enhancements are outlined below.

-
- 4.44 The mature trees and edge of the woodland should be maintained where possible to maintain connectivity and foraging habitat for a range of species. Following further assessment, the trees identified as having bat roost potential should be surveyed prior to removal by an ecologist. Before any development plan is finalised it is recommended that The Ecology Partnership be consulted if it is planned that the trees are to be removed.
- 4.45 Any trees that are removed should be replaced elsewhere on the site or with native species such as: oak, ash, hazel, beech and cherry, this will mitigate against the loss of habitat that could be considered important under planning local policies.
- 4.46 The habitats on site have potential to support common reptiles and small mammals. To allow such species to successfully forage and move through the site, it is recommended that the boundary features of the separate plots are constructed from hedging as opposed to timber fencing. This will also enhance the biodiversity of the site, in particular if fruiting and flowering native species are used. If timber fencing nevertheless is to be used, it is recommended that either some panels are lifted from the ground, or that a number of holes are created at ground level.
- 4.47 It is always recommended that where possible, enhancements are made to incorporate features which are suitable for a range of species. Therefore, planting shrubby species such as hazel and dogwoods on the edges of the site and within the gardens, would provide a good-layered habitat, which will attract a range of local wildlife. Maintaining the edges of the site will ensure that connectivity is retained with off site habitats. The use of wildflower mixes to increase the biodiversity of existing species poor grassland, will enhance the ecological value of the site for a range of important invertebrates.
- 4.48 Bird boxes may be hung on retained mature trees to increase the number of breeding opportunities throughout the site. Recommended boxes include:
- Schwegler 1N Deep Nest Box – give added nest protection from predators
 - Schwegler 1B Bird Box – general purpose bird box, suitable for many species
 - Schwegler Bird House – This is suitable for all common garden birds and may be attached to a building or wall so is suitable for siting behind climbing plant.

- 4.49 The site is to be developed into a residential development and fruit trees could be included within the garden areas. Species that could be planted include apples, pears, plums, gages and damsons. The site margins should be planted with additional species such as blackberry and hawthorn. Spring bulbs and wild flower seeds can also be sown into the borders. Log piles too can be incorporated in this area. Orchards are BAP habitats and are important for invertebrates and bird, lichens and fungi species alike. Fallen fruit provides good opportunities for badgers, hedgehogs (BAP species) and bats forage in areas of high insect diversity.

5.0 Conclusions

- 5.1 The site does not fall within any designated sites, however there are sites to consider within a 2km radius including ancient woodland bordering the site. The immediate surroundings of the site are largely pasture and agricultural fields to the south with significant areas of woodland to the east and low density housing immediately to the west.
- 5.2 The areas of scrub and grassland are considered to be of site value only. The mature trees and woodland habitats are considered to be of some value. Mature trees are of intrinsic value and should be maintained where possible.
- 5.3 A badger sett was located in the centre of the site, in a woodland edge area, south of the driving circuit track. This is considered to be a main active sett with well worn pathways running across the area and is likely to be in use all year round and used for breeding. It is recommended that the badger sett is retained on site, with enhancements made, such as planting of fruit trees and potentially the creation of a water source. Setts on site should be protected from potentially human disturbance post development, by planting protected screens around the excavations with species such as hawthorn, blackthorn, holly, bramble and dog rose. Monitoring of the holes to gauge levels of activity and to confirm the use of the holes by badgers, as opposed to other species such as foxes, is recommended and can be conducted at the same time as the dormice checks. Data

collected from monitoring can also be used to inform a licence application to close a badger sett to make way for development.

- 5.4 The site is likely to provide suitable habitat for foraging bats. Largely these will be restricted along the hedgerows and woodland edges as grazed fields provide limited resources for bats. Transect surveys and the use of anabat surveys are recommended to provide insight into how bats are using the site. Please see the 2017 report for further details.
- 5.5 The waterbody on Water Lane, between the two sections of the site is recommended for eDNA sampling to test for the presence of GCN DNA between April and June. The result of this may require further surveys. Please see the 2016 report for further details.
- 5.6 The areas of tussocky grassland and scrub connectivity across the site create optimal habitat for a number of common reptile species. Further presence/absence surveys are currently being undertaken prior to any development works to establish if a population is present and if so, the size of the population. These surveys will influence further mitigation plans. Please see the 2017 report for further details.
- 5.7 The woodland to the east creates optimal habitat for dormice. There are a number of tree species associated with dormice such as oak, hazel and ash as well as bramble present on site providing a number of food sources. Further surveys are recommended and currently taking place across the site and in the woodland to establish if the species is present. These surveys will influence further mitigations work. Please see the 2017 report for further details.
- 5.8 The site is considered to have potential for breeding birds and as such, should vegetation require removal as part of the scheme, it is recommended that this is undertaken outside of the bird nesting season, as detailed in this report. Should this not be possible, it is further recommended that the buildings and vegetation be checked for active nests prior to clearance.
- 5.9 It is recommended that as many of the mature trees as possible within the site boundary be retained as part of the proposals. In particular, the oak trees along the central

hedgerows will require further surveys. These trees support numerous cavities which may provide some opportunities for bats and as such they are classed as category 1 trees.

- 5.10 Recommendations for enhancements have been made within this report, aimed at improving the ecological value of the site post development to provide overall net gains in biodiversity.

6.0 References

Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.

Bat Conservation Trust (2007). *Bat Surveys – Good Practice Guidelines*. Bat Conservation Trust, London.

Bat Conservation Trust (2012). *Bat Surveys – Good Practice Guidelines*. Bat Conservation Trust, London.

Great Crested Newt Mitigation Guidelines. English Nature 2001.
<http://www.naturalengland.org.uk>

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

Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001) *Great Crested Newt Conservation Handbook*. Froglife, Halesworth.

Natural England (2011) *Badgers and Development: A guide to best practice and licensing*. Natural England, Bristol

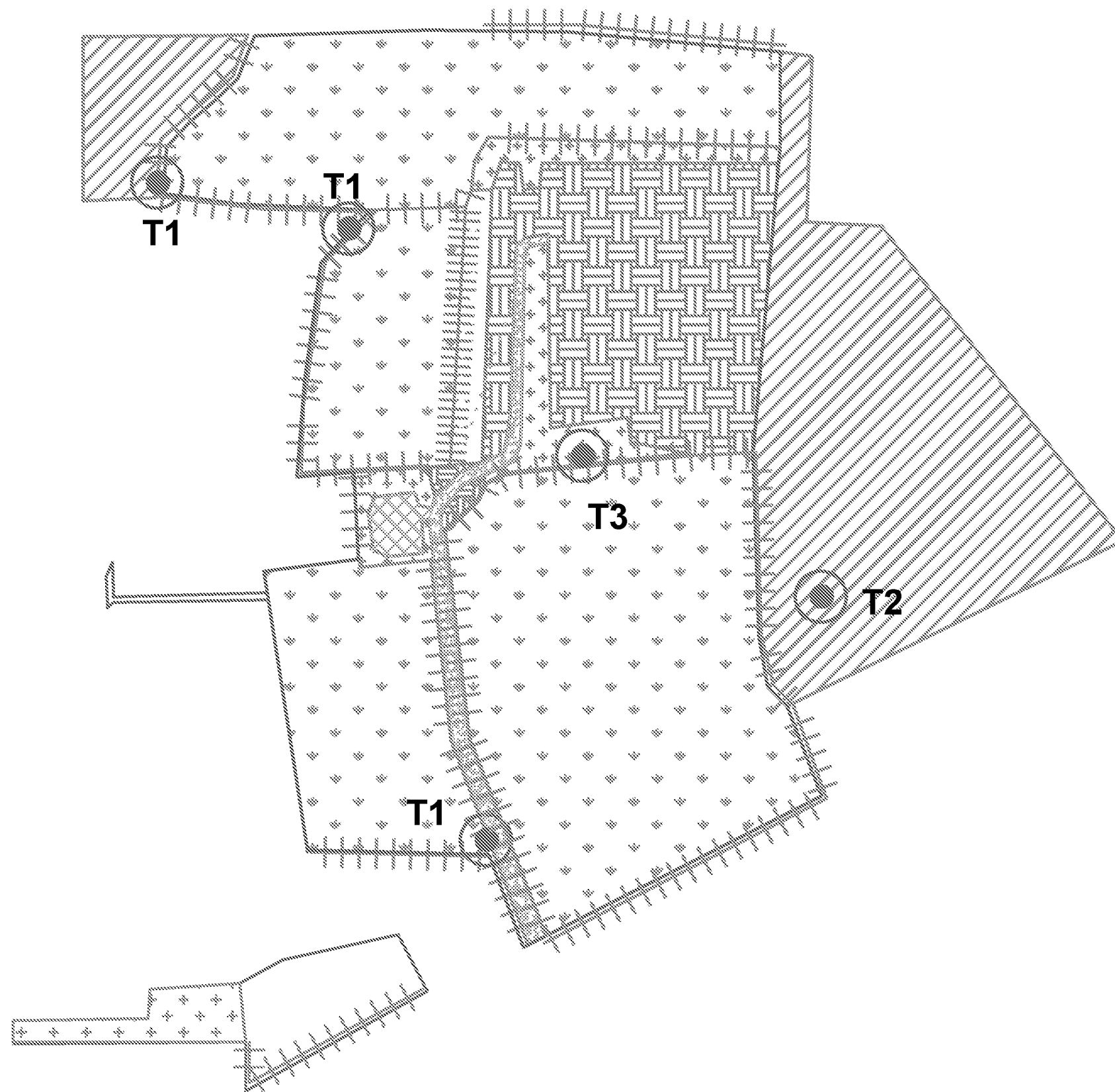
Neal, E. and Cheeseman, C. (1996) *Badgers*. T & A D Poyser Ltd. London.

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155

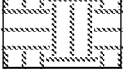
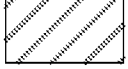
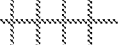
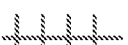
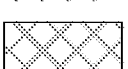
Magic Interactive Map: www.magic.gov.uk

Natural England Guidance on Ancient Woodland (November 2017):
<https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences>

Appendix 1. Phase 1 Habitat Map



Key

-  Arable fields
-  Rough grassland
-  Horse grazed paddock
-  Scrub
-  Bare earth
-  Hardstanding
-  Woodland
-  Hedgerow
-  Fenceline
-  Manure pile
-  T1 Category 1 tree
-  T2 Mammal hole
-  T3 Badger Sett
-  Survey boundary

Site: Land on Water Lane, Angmering

Client: Rydon Homes & Gleeson Developments

Surveyor: EB & BMB

Drawing Date: 26th August 2015.
(Updated 28th November)

Drawing Title: Phase 1 Habitat Map

the
ecology
partnership

The Ecology Partnership
Thorncroft Manor, Thorncroft Drive, Leatherhead,
Surrey, KT22 8JB
T 01372 364 133 W www.ecologypartnership.com

Appendix 2: Photo Document

Photograph 1: Field A grazed grass, short sward	 A black and white photograph showing a wide, flat field of short, dense grass. The horizon is low, with a line of trees visible in the distance under a sky with scattered clouds.
Photograph 2: Field B tall perennial rye-grass	 A black and white photograph of a field with tall, dense grass. The grass is standing upright and appears to be a mix of different types. The horizon is visible with some trees in the background.
Photograph 3: Field C managed grassland, short sward	 A black and white photograph of a field with short, dense grass. The field is flat, and the horizon is low, with a line of trees visible in the distance under a sky with scattered clouds.
Photograph 4: Field D harvested crops, short sward	 A black and white photograph of a field with short, dense grass. The field is flat, and the horizon is low, with a line of trees visible in the distance under a sky with scattered clouds.

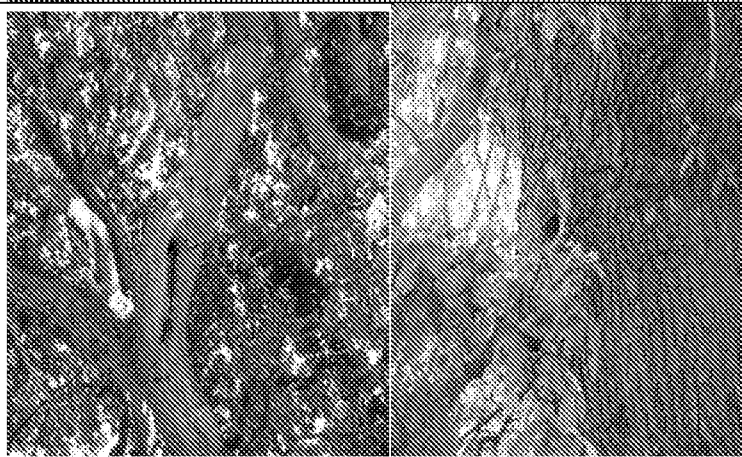
Photograph 5:
Top of Field D rough
grazed grassland and
scrub



Photograph 6:
Hedgerow 1 and 2 and
central road



Photograph 7:
High roost potential
tree oak along H1



Photograph 8:
Northern boundary
along A27



Photograph 9:
Eastern woodland
edge boundary



Photograph 10:
Manure/hay pile with
conifer tree boundary



Photograph 11: Top of field C, footpath and tall grasses/ruderal sp.	
Photograph 12: Grooms Copse, ancient woodland	
Photograph 13: Mammal hole in woodland	

Photograph 14:
Rough grassland used
as a car park by the
motor circuit



Photograph 15:
Scrub mounds around
circuit



Photograph 16:
Oval Raceway Motor
Circuit



Photograph 17:
Scrub and overgrown
vegetation around
waterbody in between
sites



Photograph 18:
Stream in field E



Photograph 19:
Scrub habitat in field
E



Photographs 20 and 21: Main badger sett located within the redline boundary, south of the track circuit

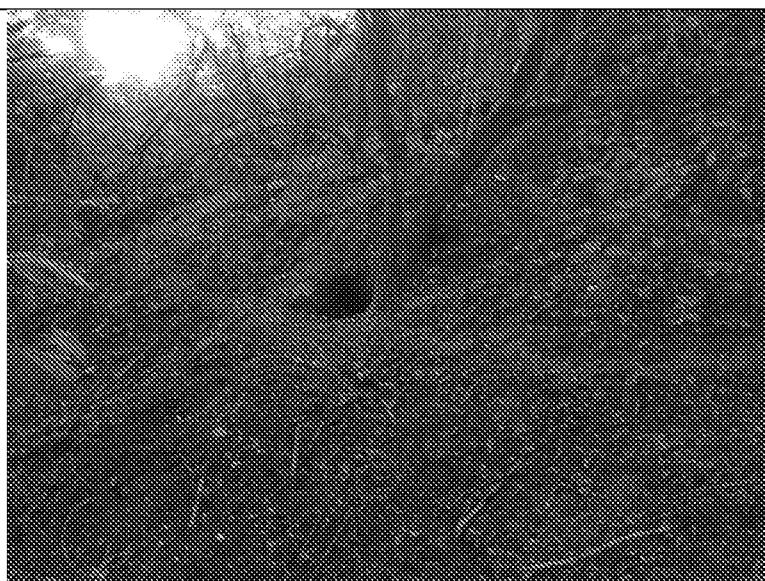
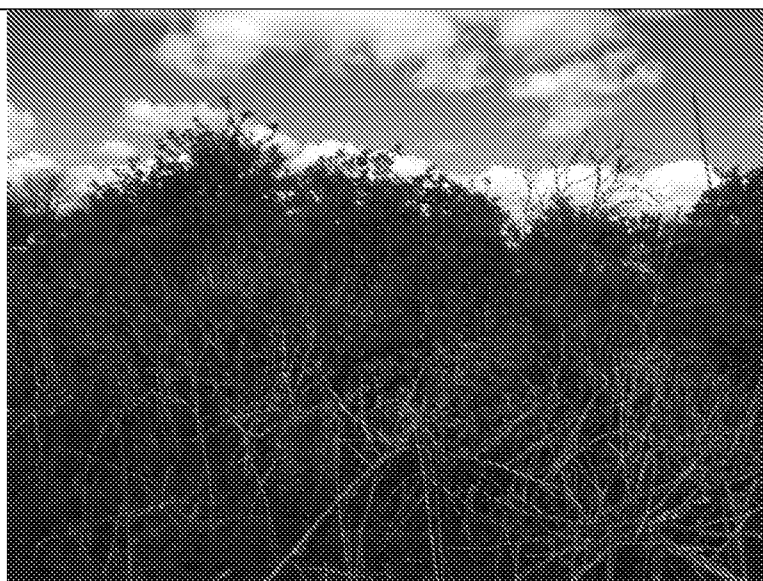


Photo 22:
Field E in 2017



Photo 23:
Field E dense scrub in
2017



Appendix 3: Biological Records

SUMMARY REPORT

Land at Water Lane, Angmering + 2km radius

14 August 2015 ESD/15/549 Search Area: TQ0503 to TQ0906
Emma Bagguley (PJC Ecology)

Protected Species Register (not including bats, badgers, otters or birds)

Number of species recorded	7
----------------------------	---

European Protected Species

Number of species recorded	10
----------------------------	----

Bats

Number of species recorded	8
----------------------------	---

Birds

Number of species recorded	146
----------------------------	-----

Number of BoCC Red list species recorded	27
--	----

Number of BoCC Amber list species recorded	52
--	----

Number of W&CA Schedule 1 species recorded	25
--	----

Number of significant breeding bird records	53
---	----

BAP species (not including bats or birds)

Number of species recorded	35
----------------------------	----

Rare Species (not including bats, birds or otters)

Number of species recorded	43
----------------------------	----

Invasive Alien Species

Number of species recorded	13
----------------------------	----

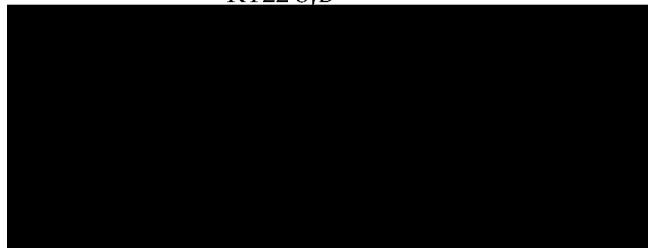
The Ecology Partnership

Thorncroft Manor

Thorncroft Drive

Surrey

KT22 8JB



Approved: Alexia Tamblyn MA (Oxon) MSc CEnv MCIEEM FRGS

Date: 23/10/2015

Re-issued: 31/01/2018