POSTCOMBE AND LEWKNOR SOLAR FARM, OXFORDSHIRE

INSTALLATION OF SOLAR ARRAY

PRELIMINARY ECOLOGICAL APPRAISAL REPORT (DETAILED PHASE 1 HABITAT SURVEY, UKHAB ASSESSMENT AND PRELIMINARY BAT COMMUTING, FORAGING AND TREE ROOSTING APPRAISAL)

VERSION 2

EcoLine

CIEEM REGISTERED PRACTICE 2022-2023

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1. INTRODUCTION

Location

1.1 The site represents as collection of arable fields either side of the M40 motorway immediately north of Lewknor in Oxfordshire (**central site grid reference: SU 70800 98800**).

Brief site description

1.2 The site comprises series of large arable fields that lie either side of the M40, north of junction 6. Dense hedgerows, small copses and shelterbelts form the boundary of the site, apart from sections adjacent to human habitation. A public right of way passes through the area to the north-east of the motorway and might suggests that the area has been denuded of hedgerows. However, whilst hedgerows might have been removed along the pubic right of way, historic maps from the late 1800s show that the fields have not been subject to significant change (apart from the construction of the M40 – completed in 1974) for about 150 years.

1.3 The arable crop growing within these fields at the time of the survey was wheat with a grassland margin, which is quite wide in places and encircles much of the arable land. The shelterbelts date back to the 1800s and it is possible that these represent remnants of an ancient woodland that once occupied the site. A copse, planted around the turn of the last century, occurs in the eastern edge of the site and was partially destroyed as part of the motorway construction and a more recent extension to the shelterbelt immediately south of Postcombe (which now appears to be an extension to the farm's garden) was probably planted in the 1970s. A small cluster of Norway spruce (possibly part of a Christmas tree commercial venture) have been planted between the edge of the motorway and the shelterbelt to the south-west of Postcombe.

1.4 The surrounding landscape is mainly arable but old pasture occurs to the south of the site and around areas of human habitation such as Lewknor, Aston Rowant, Wheatfield and the land around Nethercote House. A large fish pond dating from at least the 1800s but is probably considerably older, was constructed through the creation of an upstream dam which formed an area of open water as well as a ribbon of wetland habitat along the path of the minor watercourse occurs south of the site at Nethercote. The pool appears to have been enlarged during the mid to late 1900s through the excavation of the wetland area.

1.5 Extensive parkland occurs around Aston Rowant and Wheatfield and tree lost within these areas have not been significant over the last 20 years. Some small ribbon woodlands occur within the local area along with some more recent block plantations of a modest size. However, there is an expanse of woodland and grassland mosaic habitat within the nearby Chilterns that occur on the far side of Lewknor, north-west of the site.

Scope of this report

1.6 It is proposed that the area be developed as a solar array and associated infra-structure. The production of a very detailed Preliminary Ecological Appraisal (PEA) was therefore required so that consideration of the potential impacts on the habitats and species present within and around the site can be fully assessed.

1.7 The PEA is based upon a detailed Phase 1 habitat and UKHAB survey of the area including a 100m buffer where access was permitted. The survey included an assessment of mature trees with potential for bat roosting and a bat commuting and foraging appraisal was carried out, the nearby pond to the south of the site (Appendix 6.1) was assessed remotely. Other notable and protected species were considered as part of the appraisal.

Legislation

Badgers
1.8 Badgers are protected under the *Badger Protection Act 1992*. This piece of legislation not only protects badgers from persecution it also protects the places they use for shelter (setts) from disturbance and damage and makes it an offence to obstruct badgers from sources of food and water.

Bats
1.9 In England, Scotland and Wales all bat species are fully protected under the Wildlife and Countryside Act 1981 (WCA) (as amended), through inclusion in Schedule 5. In England and Wales, this Act has been amended by the Countryside and Rights of Way Act 2000 (CRoW), which adds an extra offence, makes species offences arrestable and increases penalties.

1.10 The following account represents a simplified summary of the legislation. Taken together, the Act, Order and Regulations make it illegal to:

- intentionally or deliberately kill, injure or capture (or take) bats;
- deliberately disturb bats (whether in a roost or not);
- recklessly disturb roosting bats or obstruct access to their roosts;
- damage or destroy bat roosts;
- possess or transport a bat or any part of a bat;
- sell (or offer for sale) or exchange bats, or parts of bats.

1.11 The legislation states that ‘any structure or place which any wild animal uses for shelter or protection’ (WCA) or ‘breeding site or resting place’ (Habitats Regulations). Bats tend to re-use the same roost after periods of vacancy, and therefore the legal opinion is that the roost is protected whether or not the bats are present at the time.

1.12 All species of bat are protected under section 9(4) of the *Wildlife and Countryside Act, 1981 (as amended)* and all survey work likely to result in disturbance to bats or a place used for shelter needs to be conducted under licence from Natural England. Moreover, all bat species are protected with respect to development under international legislation as enacted in the *Conservation of Habitats and Species Regulations 2017*. This means that any development that might impact upon a bat roost requires special licensing before any development can take place.

Breeding birds
1.13 All birds, their nests and eggs are protected under the *Wildlife and Countryside Act 1981* from intentional harm and killing, regardless of how common the species is. In addition, some birds are afforded much higher protection,

especially with respect to disturbance of breeding sites, and in some cases, this protects their nesting site throughout the year. Birds listed on *Schedule 1* of the Act, such as kingfisher, barn owl and many of the raptor species are provided with this additional protection.

Dormice

1.14 Dormice are fully protected under the *Wildlife and Countryside Act 1981* (WCA) (as amended), through inclusion in Schedule 5. In England and Wales, this Act has been amended by the *Countryside and Rights of Way Act 2000* (CRoW), which adds an extra offence, makes species offences arrestable, increases the time limits for some prosecutions and increases penalties.

1.15 The following account represents a simplified summary of the legislation. Taken together, the Act, Order and Regulations make it illegal to:

- intentionally or deliberately kill, injure or capture (or take) animals;
- deliberately disturb animals;
- recklessly disturb animals or obstruct access to places of shelter;
- damage or destroy places of shelter;
- possess or transport animals or any part of animals;
- sell (or offer for sale) or exchange animals, or parts of animals.

1.16 Dormice are protected under section 9(4) of the *Wildlife and Countryside Act, 1981 (as amended)* and all survey work likely to result in disturbance to this species or a place used for shelter needs to be conducted under licence from Natural England. Moreover, this species is protected with respect to development under international legislation as enacted in the *Conservation of Habitats and Species Regulations 2017*. This means that any development that might impact upon dormice requires special licensing before any development can take place.

Great crested newt

1.17 Great crested newts are fully protected under the *Wildlife and Countryside Act 1981* (WCA) (as amended), through inclusion in Schedule 5. In England and Wales, this Act has been amended by the *Countryside and Rights of Way Act 2000* (CRoW), which adds an extra offence, makes species offences arrestable, increases the time limits for some prosecutions and increases penalties.

1.18 The following account represents a simplified summary of the legislation. Taken together, the Act, Order and Regulations make it illegal to:

- intentionally or deliberately kill, injure or capture (or take) animals;
- deliberately disturb animals;
- recklessly disturb animals or obstruct access to places of shelter;
- damage or destroy places of shelter;
- possess or transport animals or any part of animals;
- sell (or offer for sale) or exchange animals, or parts of animals.

1.19 Great crested newts are protected under section 9(4) of the *Wildlife and Countryside Act, 1981 (as amended)* and all survey work likely to result in disturbance to this species or a place used for shelter needs to be conducted under licence from Natural England. Moreover, this species is protected with respect to development under international legislation as enacted in the *Conservation of Habitats and Species Regulations 2017*. This means that any development that might impact upon great crested newts requires special licensing before any development can take place.

Common reptiles
1.20 All common reptile species, such as slowworm, common lizard, adder and grass snake, are protected under Schedule 5 of the *Wildlife and Countryside Act 1981* and amendments. This act protects the species against intentional killing and injury. It is also protected under Appendix III of the *Berne Convention* (Convention on the Conservation of European Wildlife and Natural Habitats).

1.21 English Nature (2004) state that "where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring" and as such is in breach of the law.

Notable species
1.22 Many species within the British Isles are considered to be rare or even vulnerable to changing habitats, modifications to land management and even the effects of global warming. Most notable species, whether plant or animal, are not protected by specific pieces of legislation but are considered to be of biodiversity value in legislation such as the *Natural Environment and Rural Communities Act* 2006.

1.23 Species such as brown hare and European hedgehog have experienced severe declines within lowland England.

2. METHODOLOGY

2.1 A data search, via the Thames Valley Environmental Records Centre was made of the site and this information was supported by an inspection of historic maps and aerial photographs of the area as well as an investigation of data held on the government site 'Magic Maps'.

2.2 A daytime walkover survey was conducted on the 7th June 2022 and comprised the Phase 1 habitat survey where specific habitat areas were mapped within the redline boundary.

2.3 An assessment of the potential for the site and site margins to support bats and provide opportunities for commuting and foraging was undertaken based upon the potential suitability of proposed development sites for bats criteria that is described in the Bat Conservation Trust, (2016) *Bat Surveys – Good Practice Guidelines*, Bat Conservation Trust – see below:

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[a] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation[b]). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.[c]	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[a] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or 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[a] and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

[a] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[b] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.
[c] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

Table 2.1 extract from Bat Surveys – Good Practice Guidelines

2.4 Tree standards were identified within and around the edge of the site, which included those within hedgerows and woodland margins that had the potential in supporting roosting bats.

2.5 A full botanical list was prepared for the site and specific habitats were identified as part of the survey and these were described in some detail, which included the plant species composition of each individual area.

2.6 Ian Tanner of EcoLine hold personal bat licence class level 3 – 2015-14883-CLS-CLS and 4 - 2020-47856-CLS-CLS, and holds a personal class licence level 2 for great crested newts - 2016-22265-CLS-CLS) and undertook all the survey work.

2.7 A photographic record was made of the site some of which are included within the report and linked to the habitat descriptions given.

2.8 The site was mapped and the information gathered transferred on to a GIS.

3. SURVEY RESULTS

Data search

3.1 The data search of protected and notable species was extremely limited and whilst Botanical Society for Britain and Ireland (BSBI), Butterfly Conservation and the River Thame Trust (RTCT) had been active during the period 2017 to 2020 mainly recording plants, butterflies and birds respectively, only 38 records exist outside those species' groups (and 16 of those are for bats).

3.2 The only local bat records are for common pipistrelle and brown long-eared bats. These were recorded from Aston Rowant, Lewknor, Copcourt and Chalford. A single record for badgers exists from the Beacon Hill area, water vole have been recorded from a stream near Aston Rowant in 2018 and European hedgehogs were recorded from Lewknor and South Weston in 2020 (within 1km from the north of the site). No amphibian and reptiles have been recorded within 2km of the site and brown hare have also never been recorded from the area.

3.3 European Protected Species (EPS) mitigation licence have been issued within the local area but only one is within 2km of the site boundary. A bat licence was issued for brown long-eared and common pipistrelle bats in 2014 from a location 1.9km from the west of the site. In 2016 a licence was issued for common and soprano pipistrelle and brown long-eared bats from a location 3.2km to the south-west the edge of the site. A great crested newt licence was issued in 2014 from 4km east of the site.

3.4 The Aston Rowant National Nature Reserve (SSSI) lies 1.4km from the edge of the site in a south-easterly direction and Aston Rowant Wood SSSI lies 2.3km from the edge of the site within the same area. Knightsbridge Lane (SSSI) lies 2.8km from the site to the south-west. Elements of the woodland that partially surround the site have been identified as being of priority habitats within the context of the *Natural Environment and Rural Communities Act (*2006) Section 41 habitats of principal importance.

Phase 1 habitat survey

3.5 The eastern land parcel is about 44ha and the western area is approximately 38.5ha giving an estimated total of 82.5ha for the entire area (not including the motorway). The main land use is arable and this was exclusively planted with wheat at the time of the survey.

3.6 A total of 124 individual plant species were recorded as part of the survey, which reflect the diversity of habitat present within the site although much of this is of relatively poor quality. A large proportion of the plant species encountered reflect both the levels of disturbance as part of arable production and neglect in terms of the field margin management. A full species list is provided in appendix 6.4.

3.7 Within the area of the site and around the site margins are linear woodlands that are at least 150 years old. It is not fully understood the origins of these woodland strips, whether they were planted as shelterbelts or the remnants of a woodland cleared felled. Apart from some specific locations where a woodland ground flora occurs it is thought to be largely broad-leaf plantation. Small blocks of woodland also occur within and around the site and the woodlands within the site are clearly plantation.

3.8 The field margins are in places extremely wide and typically grassland, whilst the margins adjacent to urban areas and along the motorway are generally dominated by tall ruderal vegetation. Here the relative abundance of nectar plants attracts a wide array of invertebrates.

3.9 The findings of the survey are provided as a GIS generated habitat map and corresponding habitat descriptions and species compositions. Given the nature of work and for expedience's sake no attempt has been made to offer much in the way of relative densities of the species recorded. A copy of the map is provided in appendix 6.1 below with detailed habitat descriptions of the area provided in appendix 6.3.

3.10 The habitats recorded within the site included semi-natural woodland, plantation broad-leaf, coniferous woodland and mixed woodland, continuous scrub, semi-improved grassland, tall ruderal vegetation, arable land, continuous hedgerow and non-native shrubs.

Semi-natural woodland – (UKHAB w1f)
3.10.1 Woodlands within the area that represent linear areas of mature trees that appear largely unchanged from the late 1800s but might possibly be retained features from a more extensive area of woodland, which has been cleared for agriculture. This woodland habitat includes the presence of mature trees along with some ancient woodland indicator species. The canopy is quite variable contains ash, wild cherry, blackthorn, dog rose, wild privet, black bryony, elder, spindle, beech, hawthorn, pedunculate oak, sycamore, field maple and guelder rose with more recent planting of Norway maple and wayfaring tree. Ancient woodland indicators recorded as mainly scattered include spurge laurel, lords and ladies, dog's mercury, wood anemone and sweet woodruff.

Plantation broad-leaf woodland – (UKHAB w1h6)
3.10.2 Plantation woodland occurs as more recent linear stretches as well as older planting dating from before the late 1800s. These woodlands contain a mixture of native and non-native trees and lack ancient woodland indicators and includes the small block of woodland located in the north-eastern section of the M1.

Plantation mixed woodland – (UKHAB w1h6)
3.10.3 Within the north-west corner of the site woodland has been planted along the edge of the road. This appears to be a planted area of a former garden that was bounded by a hedge honeysuckle and includes garden plants such as hellebore. Tree species include Norway maple, beech, pine, horse chestnut and weeping ash

Plantation coniferous woodland – (UKHAB w2c)
3.10.4 Represents a small area of 'Christmas tree' planting of Norway spruce.

Continuous scrub – (UKHAB h3f)
3.10.5 Scrub establishment is largely restricted to the margins of the motorway and only occurs where scrub species have encroached into the area from the adjacent land.

Semi-improved grassland – (UKHAB g3c)
3.10.6 Permanent grassland fringe around former arable fields that in part contains abundant perennial rye-grass, false oat-grass, meadow-grass, cut-

leaved crane's bill, creeping buttercup, ox-eye daisy, hogweed, goat's beard, yarrow, field bindweed, rough mallow and bee orchid.

Tall ruderal vegetation – (UKHAB gc3 and g3)
3.10.7 The area dominated by stinging nettle with cleavers, false oat-grass, rough chervil, hogweed and encroaching bramble.

Arable land – (UKHAB c1c7)
3.10.8 Area of wheat with some margins of arable weeds.

Non-native shrub
3.10.9 Small areas of non-native hedgerow planting of snowberry, hedge honeysuckle, buddleja, laurel, cypress and other garden shrubs occurs close to the housing estate in the north-west of the site.

Continuous hedgerow
3.10.10 Lengths of continuous hedgerow occurs along with the areas of linear woodland. The hedgerows occur along the edge of London Road as well as truncated section within the central part of the site north of the motorway. However, the margins of the motorway are defined by a post and rail fence and even where encroaching scrub has been cut back, these areas cannot be described as hedgerow. Species include mainly blackthorn and hawthorn with bramble, dog rose and mature sycamore.

Preliminary bat commuting and foraging assessment

3.11 The woodland habitats present across the site provides foraging and commuting opportunities for several widespread bat species, including common pipistrelle and brown long-eared bats as well as the possibility of some *Myotis* species. It is presumed that bat activity levels are likely to be higher along the eastern and western boundary of the site within the area of Nethercote Lane and Salt Lane.

3.12 The quality of habitats within the eastern and western boundaries of the site, despite the woodland habitat being largely linear, offers particularly opportunities for foraging bats. Within the area along Salt Lane and the section of Nethercote Lane north-east of the motorway there is **Moderate** suitability for foraging and commuting bats. The section of Nethercote Lane to the south-east of the motorway includes blocks of mature broad-leaf woodland as well as a minor watercourse network with a **Moderate/High** suitability for foraging and commuting bats.

3.13 Much of the habitat within the site offers rather less potential for foraging and commuting bats. Linear woodland and robust hedgerows occur within and around this area but is otherwise dominated by arable land. Consequently, there is **Low** suitability for foraging and commuting bats. However, along the south-western edge of the site a watercourse that flows down to Manor Farm occurs and the relatively young ash plantation provides a strong habitat link between the watercourse and Salt Lane. Consequently, there is **Low/Moderate** suitability for foraging and commuting bats within this area.

Preliminary bat roost assessment

3.14 The presence of bats within an area is largely dependent upon the presence of a network of bat roosting locations. Such roosting area are generally located within structures as well as trees the absence of suitable roosting features influences the amount of bat activity present within an area as much as a lack of habitat.

3.15 In this instance, there are no structures present within the site, but structures considered to offer potential suitability do occur around the margins of the site. Even relatively modern buildings, such as those that occur within Postcombe offer good potential for species such as common pipistrelle and brown long-eared bats and the cluster of buildings around South Weston offer older structures that could provide roosting habitat for a wide array of bat species. Nethercote House occurs close to the old fishing pond and therefore species such as Daubenton's bat are likely to be present, foraging from the surface of the pool.

3.16 As for tree roosting sites, the site contains a multitude of trees but few tree standards are present within the area and none of these were identified as having potential for roosting bats. Indeed, of the trees encountered throughout the survey, including those within woodland immediately adjacent to the site, only one had potential as a bat roost. This specimen was a dead tree (possibly a horse chestnut) that included rotted fallen limbs and was located adjacent to a minor watercourse.

Great crested newt assessment

3.17 No records for great crested newts occur within 2km of the site and the nearest record for this species occurs 3.3km to the east and 3.3km in the north-west of the site.

3.18 Open waterbodies do occur within 500m of the site but these are all 'in-line' features as part of a watercourse and therefore not suitable for great crested newts. Other ponds with potential for great crested newts occur at Adwell, South Weston, Lewknor, Aston Rowant and Postcombe but are all too far away to be considered a likely source of great crested newts. A couple of ponds are just within 500m of the site but these have restricted movement towards the site due to barriers. These barriers are either in the form of a watercourse or a major road such as the A40.

Dormouse assessment

3.19 No records for dormice occurs within the area and no connectivity occurs between areas of mature woodland within the nearby Chilterns, known to support strong dormice populations, and the site. However, woodland habitat within the site includes habitat that has provided a contiguous high forest habitat (albeit only a relatively small area of habitat) since before the mid-1800s and may include elements of ancient woodland.

3.20 Relatively little is understood regarding the food requirements of this species where high fat and high protein foods such as hazel and sweet chestnut are not readily available. It is known that dormice eat ash keys and blackberries and do not consume acorns, but little is known about other common woodland species such as field maple, hawthorn, spindle, blackthorn and rose hips.

3.21 The Peoples Trust for Endangered Species (PTES) has recently launched a survey technique to assess hedgerows for possible dormice occupation. Typically, this is in areas where dormice are already known but provides a basis from which existing hedgerow and woodland habitats can be assessed. The survey relies on dormice footprints (these are very distinctive) to gauge presence rather than more invasive techniques that require licensing.

Badger assessment

3.22 The only record for badgers was from the base of the Chilterns, approximately 1.5km to the south-east of the site.

3.23 Despite this dearth of records, evidence of badger presence was recorded in various locations either side of the motorway. The evidence was typically in the form of badger paths, dung-pits, which sometimes formed latrines, and areas of scarification containing snuffle holes. No setts or any major levels of badger activity was recorded within the site.

Reptile assessment

3.24 No records for reptiles exist within the area, although common lizard and slowworm have been recorded in the Chiltern area.

3.25 There is some potential for reptiles to occur along the route of the M40 but in general the manner by which the site is managed is unlikely to support reptiles.

Bird assessment

3.26 No specific bird assessment has been performed as part of the survey as it is presumed that an abundance of bird species occur in association with the woodland habitats within the area. It should however be noted that skylark were recorded across the arable area. It was presumed that nesting activity was taking place at several locations on the edge of the tramlines across the area but no attempt was made to locate nests.

Other species assessment

3.27 European hedgehogs have been recorded from the Lewknor area in recent times although no evidence of European hedgehog was encountered within the site. However, it is unlikely that this species would be present within the site but might occur in association with the woodland margins of the area.

3.28 Roe deer were encountered within the area as well as brown hare and droppings of the same were discovered in various locations throughout the area.

4. CONCLUSIONS

Data search

4.1 No records provided an immediate concern regarding the site presence of protected species within the site. No great crested newt records obtained from the local record centre occurred within 2km of the site. The nearest great crested newt licence was issued 4km away. Only common pipistrelle and brown long-eared bat species have been recorded within 2km of the site and all records are at least 1km away.

4.2 One badger record from the Chilterns has been recorded and two European hedgehogs have been sighted at a distance from the site. No dormice records occur, although it is known that dormice occur within woodlands within the Chilterns. Only two species of bat were identified within 2km of the site and no records occur within the site.

4.3 Three SSSIs occur within the area but the nearest is 1.4km from the site – although this is a National Nature Reserve. It is unlikely that the proposal will have any impact upon these areas. Solar array developments do not require consultation with Natural England as these developments are not listed within this SSSI Impact Risk Zone.

Habitat appraisal

4.4 The arable habitat directly impacted by the proposed development within the main site has limited ecological value. However, the margins of the site do contain areas of moderate ecological value.

4.5 The woodlands have structural value and some of the ground flora is reasonably diverse including species such as spindle, spurge laurel, wood anemone, sweet woodruff, dog's mercury, lords and ladies, sweet violet and wood avens. A proportion of the woodlands are listed as being priority habitat, although a review of this might be required. The marginal grasslands contain species such as common agrimony and a bee orchid was encountered but generally the grasslands are poorly managed with limited species diversity. Areas of tall ruderal vegetation and marginal ephemeral habitats also occur and contain a degree of diversity.

Great crested newt appraisal

4.6 No great crested newt records occur within 2km of the site and no ponds that are potentially suitable to support great crested newts occur within 400m. Where potential ponds occur within 500m a barrier exists that would prevent great crested newts from accessing the site.

4.7 A series of pools occur south of the site that are within 500m of the site. However, these pools are in-line features where water flows into the pool at one end and exits at the other. Such ponds (described on maps as fish ponds) are not suitable for great crested newts.

Bat foraging, commuting and roosting appraisals

4.8 The habitats present within the site are not conducive to bat foraging and the assessment of the site indicated that this **Low/Moderate** suitability for commuting and foraging bats. Some habitats were more favourable to bats around the margins of the site but the only area where bats are likely to be found in good numbers is along the section of Nethercote Lane the south of the motorway. However, the linear areas of woodland is likely to attract bat species that generally forage along woodland margins.

4.9 No potential bat roosting sites were identified as part of the survey. However, the numbers of trees present within and around the area made it impossible to check every tree in order to rule out the possibility of potential bat roosting.

Badger appraisal

4.10 No badger setts were recorded within the area and no existing records of badger in the area occur. However, the evidence of badger presence was recorded within both parts of the site.

Dormice appraisal

4.11 No existing dormice records occur within 2km of the site, although dormice occur in the woodlands within the nearby Chilterns. The woodland habitats within the area have some moderate potential for dormice but currently there are no plans to have any impact upon these marginal woodlands.

Reptile appraisal

4.12 No records of reptiles within 2km of the site occur. It is not thought that reptiles are likely to occur within the area, although it remains possible that reptiles could occur along the motorway margins.

4.13 Consequently, should arable management be suspended in advance of the construction of the solar array then it is advised that a reptile survey be conducted along a strip adjacent to the motorway corridor.

Brown hare appraisal

4.14 The presence of brown hare within the site needs to be considered and it is recommended that a population assessment be made after harvest to determine numbers of animals present within the area.

4.15 It is typically the case that brown hare populations respond favourably to the construction of solar arrays. However, measures are required to ensure that the local population of this species is maintained during the construction phase of the solar array.

Bird appraisal

4.16 Skylark activity within the site indicates that these birds already nest within the arable land. It is therefore predicted that once arable production is suspended the resulting non-ruderal vegetation that arises (usually containing expanses of scentless and scented mayweed with a diversity of annual weed species) will attract considerable numbers of nesting skylark.

4.17 It is therefore recommended that a strategy be agreed that includes a full assessment of skylark nesting activities within the site as well as providing the specific timings of vegetation clearance across the site to avoid periods when skylark might be nesting.

4.18 No autumn or winter assessment has been made in terms of late season bird assessments and arable areas such as this. It is anticipated that late season and winter bird presence would be relatively high, especially in an area where nearby woodlands and tall grassland offer additional roosting cover and foraging opportunities. It is therefore recommended that a winter bird survey be conducted.

5. RECOMMENDATIONS

Further surveys

5.1 A number of additional surveys are recommended. These surveys are needed to determine the ecological value of the area as well as providing further evidence as to whether the development of the site requires specific mitigation and compensation for impacts that the proposed development might require. It may also be of value to determine the nature by which ecological enhancements as part of the proposed works might be considered.

Bats

5.1.1 It is recommended that an assessment be made to determine the presence of bats across the site. This should include assessments of particular areas of the site where woodland features occur nearby as well as assessments during different times throughout the bat season (when bats are active). In areas where bat activity is highest might be locations where tree roosts might occur. It is suggested that an initial static bat detector assessment be made at ten separate locations across a period of two-weeks in May to determine the relative levels of bat activity associated with linear woodland and hedgerows across the site.

5.1.2 If any impacts upon hedgerows and trees within the site are required, it will be necessary to undertake bat emergence and activity surveys to provide greater understanding as to how bats are using the area and whether roosting is likely to take place.

Badger

5.1.3 It is recommended that badger surveys are conducted in areas where development proposals are likely to impact areas of woodland margins within the site. If well-defined badger routes are encountered within the site then considerations in terms of possible obstructions as a result of security fencing around the site might be an issue. Ideally, surveys should be conducted at a time when vegetation is less dense than in the summer but at a time when badgers are likely to remain active (i.e. avoiding the depths of winter). An evening survey of the area deploying a thermal imager or similar should be deployed to provide an assessment of badger movement within the area.

Nesting Birds

5.1.4 It is recognised that the site offers an abundance of nesting and winter foraging habitat for species that occur in trees, scrub and within open arable land and winter stubble (including skylark, which were recorded from all parts of the site during survey work). No further assessments are required at this stage and proposed mitigation strategies are to be devised to minimise impacts upon these species.

Dormice

5.1.5 It is recommended that a simple dormice footprint survey be conducted within areas considered to be the most suitable habitat for dormice. It is suggested that 30 footprint tubes be positioned within the hedgerows and woodland margins in May and that these be checked and maintained every fortnight for approximately two months such surveys can be conducted without the need for licensing and is the preferred techniques for determining dormice presence by PTES.

5.1.6 Alternative techniques can be used and this includes the use of nesting tubes. However, reliability in dormice establishing nests within these features is quite low

and therefore require about 70 tubes positioned throughout a season. Tubes need to be positioned in dense scrub vegetation to reduce predation.

Brown hare
5.1.7 It has been reported that where solar arrays are positioned within areas where brown hares occur, the protection from predation and persecution offered by the installation results in an increase in brown hare populations. It is therefore considered unnecessary to conduct further assessments of brown hare unless it is necessary to conduct population studies of such species before and after the construction of the solar array.

Hedgehog
5.1.8 It is not presumed that European hedgehogs occur within the site but as the habitat present generally occur along the road network. Therefore, no surveys for this species are required at this stage.

Preliminary recommendations for mitigation

5.2 It is not possible to provide a full account for mitigation other than to say that the proposals for developing an area of arable land offers considerable opportunities for ecological enhancements. Indeed, the calibrations for net-gain within a propose solar array is only complicated in terms of the total amount of land that can support grassland habitat and the nutrient levels (in particular the phosphate levels within the soil). It is not just essential that phosphate levels are at reasonably low levels to promote a higher diversity of grassland species but it also makes the management of the land considerably easier.

Badger
5.2.1 Access across the site may be provided through the incorporation of gaps in fencing large enough for badgers to squeeze through.

Bats
5.2.2 Although no assessment of bats has been undertaken, it is suspected that solar arrays have a negative impact upon bat foraging and may discourage bats from commuting across or adjacent to solar arrays. It is therefore recommended that buffers are imposed in areas where bats occur, which is most likely to be along woodland margins and high hedgerows.

Nesting birds
5.2.3 The clearance of vegetation and the commencement of works should take place outside the main bird nesting season (March to August inclusive). If works need to start within this period, then a thorough assessment is required to determine whether bird nesting occurs. It should be noted that the suspension of arable production in advance of proposed development work is likely to promote an dramatic increase in skylark nesting in the spring as well as autumnal bird foraging on left grain as well as seed from arable weeds.

Brown hare
5.2.4 It has already been noted that brown hare benefit from solar array developments. Therefore, as long as access to brown hare is permitted, the population should increase without further encouragement.

European hedgehogs
5.2.5 All hedgerows and areas of dense continuous scrub should be checked for hedgehog presence prior to commencement of works. If present then works should not occur during periods when females are rearing young or over the winter months.

Mitigation and compensation measures should be included within the scheme and include the provision of nesting and hibernation habitat away from areas impacted by proposed works. Post construction provision for this species should be included within the design of the scheme and include access routes for foraging within and around the proposed development area.

Preliminary recommendations for compensation

5.3 Where mitigation is not sufficient to eliminate impacts upon ecology, it will be necessary to implement compensatory measures so that habitats and species can development in new locations. Most compensatory measures are instigated during or after impacts have occurred but, in some circumstances where the status of the species or the habitat qualifies as priority, it is necessary that compensation has become well-established prior to destruction of habitats and features have taken place.

Habitat

5.3.1 Under the current NPPF habitat loss needs to be fully compensated for. Indeed, with the introduction of the 10% BNG policy, land that is not being included within the development but is contained within the redline boundary is expected to demonstrate at least a 10% biodiversity enhancement.

5.3.2 It is usually anticipated that the development of a solar array on arable land provides an opportunity for ecological enhancements to meet the BNG 10% level. However, investigations of soil chemistry and measures to reduce nutrient levels is an important component in the establishment of high-quality grassland habitat.

5.3.3 Any losses or damage to priority woodland habitat cannot be compensated for and instead such impacts would have to be avoided.

Hedgehog

5.3.4 Where hedgehogs are identified as being present the use of artificial nesting sites should be considered along with the creation of brash piles that hedgehogs could use for nesting and hibernation that is away from areas of disturbance.

Bats

5.3.5 The provision of additional roosting habitat at a distance from the site is likely to provide additional opportunities for bats. Bat boxes can be positioned on trees with a southerly aspect at approximately 4metres in height. The best results are had where low branches are removed along with cluttered overhanging twigs that might obscure the warmth of the sun reaching the bat boxes or form an obstruction to bats.

Ground nesting birds

5.3.6 Considerable opportunities exist in providing additional habitat for skylarks and other ground nesting bird species. Studies indicate that skylark require uncluttered habitat with clear sightlines to avoid predation. Consequently, skylark are unlikely to nest within or around a solar array but larger areas within a site managed as a low nutrient hay meadow might be suitable if sufficiently large. As sward needs to remain reasonable short throughout the spring and early summer it will be necessary to remove enriched topsoil prior to sowing a wildflower seed mix.

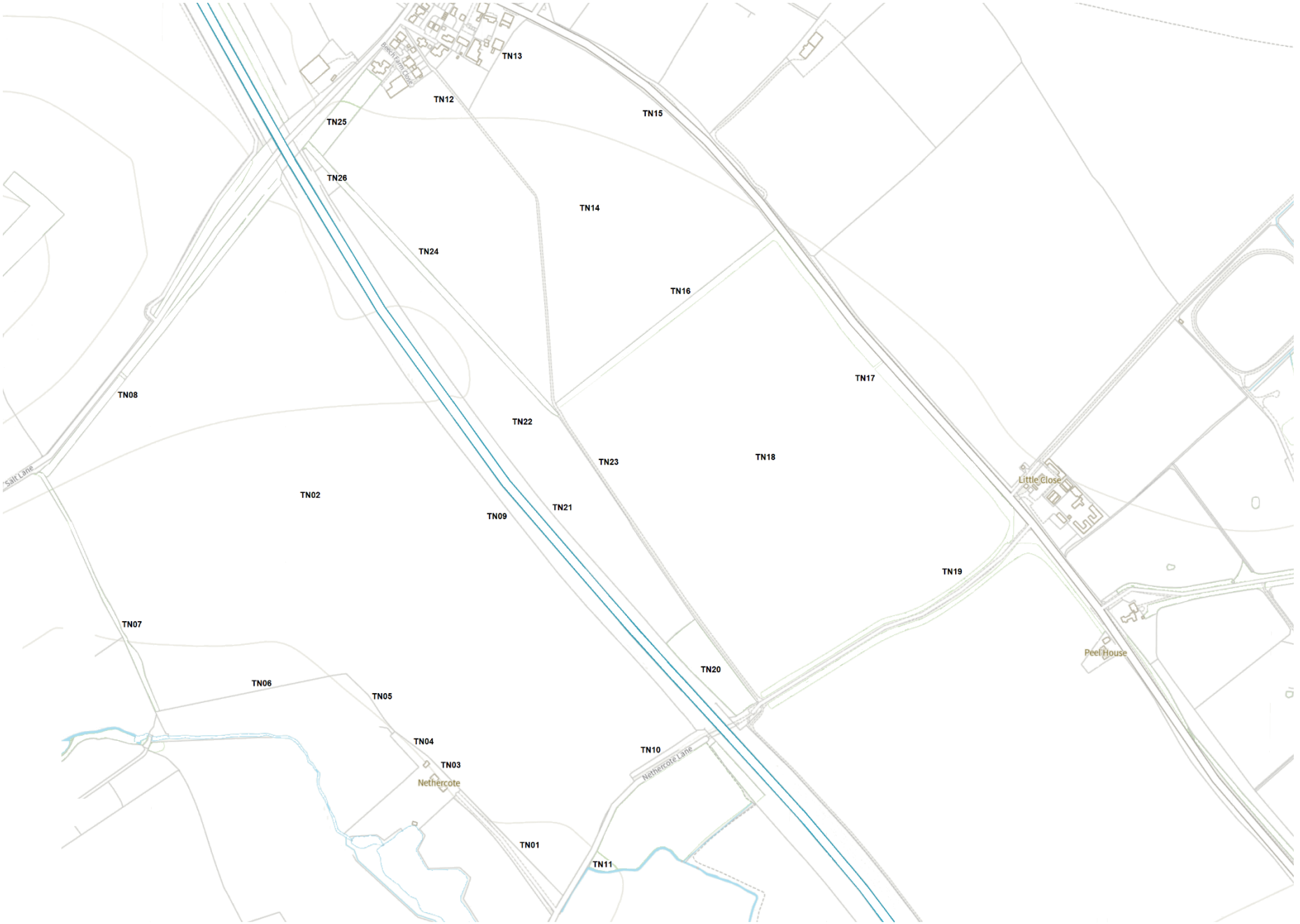
5.3.7 Alternative approaches in more enriched soils is to plough areas in late winter to allow arable weed species to develop in time for the nesting season. The abundance of seed produced in the autumn also provides good foraging habitat for skylark, linnet, twite, brambling and other small song birds that are often found feeding in flocks.

6. APPENDICIES

- 6.1 Phase 1 habitat map
- 6.2 Site descriptions map
- 6.3 Site descriptions
- 6.4 Species list
- 6.5 Photographic record of site

6.1 Phase 1 habitat map

6.2 Site descriptions map



6.3 Site descriptions

1. Cypress hedgerow (approximately 6m in height) along the margins to Nethercote House. Incorporates a grassland verge and access track containing abundant rough meadow-grass, perennial rye, barren brome, couch, black grass, wall barley and cock's-foot with cut-leaved crane's bill, creeping buttercup, stinging nettle, creeping thistle, cow parsley, cleavers, ground ivy, white deadnettle, broad-leaf dock, ivy, dandelion, great plantain, spear thistle, rough chervil, garlic mustard, field forget-me-not, greater burdock, shepherd's purse, hawthorn sapling and prickly sowthistle. Large badger dung-pit noted.
2. Wheat field with several calling skylark defending nesting territory.
3. Close board fencing enclosing a section of tall cypress hedgerow alongside field access track. Area contains locally abundant stinging nettle and cock's-foot. The track contains abundant cock's-foot, false oat-grass, barren brome and rough meadow-grass with hogweed, cow parsley, stinging nettle, creeping buttercup, goat's beard and greater burdock.
4. Open and wide access track along a post and wire fence containing locally abundant stinging nettle, false oat-grass and red fescue with cock's-foot, rough meadow-grass, barren brome, tufted hair-grass, perennial rye, cow parsley, broad-leaf dock, hogweed, green field-speedwell, hogweed, cut-leaved crane's bill, yarrow, rough mallow, field bindweed, field forget-me-not. Pheasant recorded.
5. Post and wire fence with semi-mature ash and adjacent grassland verge of tall ruderal vegetation. Contains locally abundant stinging nettle, cow parsley, greater burdock, creeping thistle, frequent false oat-grass, barren brome, spear thistle, field forget-me-not, hedge mustard, red deadnettle, cleavers and green field-speedwell.
6. Narrow grassland strip along a post and wire fence with stinging nettle, red deadnettle, hedge mustard, cleavers, cow parsley, white deadnettle, soft brome, false oat-grass, barren brome, field forget-me-not, red fescue, field bindweed, creeping thistle, bristly ox-tongue, rough meadow-grass and sun spurge. Brown hare encountered.
7. Young linear woodland of mainly ash with frequent wild cherry, sycamore and hawthorn with blackthorn, dog rose, Norway maple and black bryony. The ground flora includes false oat-grass, cow parsley, cock's-foot, red fescue, barren brome, bearded couch and some cultivated oat. Also contains garlic mustard, wood dock, cleavers, white deadnettle, field bindweed, ivy, wood avens, hogweed, rough chervil and dog's mercury. Large badger latrine noted and roe deer encountered.
8. Woodland strip along Salt Lane containing areas of priority habitat. Contains ash, wild cherry, blackthorn, dog rose, wild privet, black bryony, elder, spindle, beech, hawthorn, sycamore, field maple, guelder rose, Norway maple, wayfaring tree and pedunculate oak. The ground flora includes spurge laurel, rough chervil, bearded couch, dog's mercury, cleavers, wood avens, spear thistle, false oat-grass, ivy, stinging nettle, barren brome, cock's-foot, garlic mustard, white deadnettle, bramble, rough meadow-grass, red fescue, field bindweed, greater burdock, nipplewort and lords and ladies.

9. Post and rail fence along the line of the M40 motorway with field maple, hawthorn, blackthorn, bramble and dog rose. Ground flora includes stinging nettle, false oat-grass, red fescue, cleavers, bearded couch, barren brome, herb Robert, common mallow, ground ivy, rough chervil, hedge crane's bill, cut-leaved crane's bill, cock's-foot, mugwort, spear thistle, dog's mercury, hedge woundwort, black bryony, creeping thistle, white bryony, ox-eye daisy, hogweed, goat's beard, yarrow, field bindweed, welted thistle, field forget-me-not, bristly ox-tongue, meadow fescue, dove's foot crane's bill, groundsel, prickly sow-thistle, field pansy, nipplewort, black medic and teasel. Butterflies were encountered in reasonable numbers including common blue, speckled wood, red admiral and small tortoiseshell. Grey squirrel also encountered.

10. Woodland margin along the edge of Nethercote Lane containing areas of priority habitat and include horse chestnut, field maple, elm, ivy, elder and sycamore. The ground flora contains ivy, dog's mercury, barren brome, creeping buttercup, welted thistle, cleavers, white deadnettle, hedge woundwort, rough chervil, greater burdock, field forget-me-not, bramble, garlic mustard, false oat-grass, bearded couch and herb Robert. Willow warbler noted.

11. Minor watercourse on the far side of Nethercote Lane containing fool's watercress and yellow flag.

12. Boundary with adjacent garden along a public right of way dominated in part by hedge honeysuckle with buddleja, laurel, hazel and cypress. The path follows a mown strip of grassland great plantain, dove's foot crane's bill, perennial rye, smooth meadow-grass, field bindweed, creeping buttercup, pineapple weed, shepherd's purse, annual meadow-grass and scented mayweed. The margins of the path contain false oat-grass, black-grass, meadow brome, Yorkshire fog, cock's-foot, rough meadow-grass, stinging nettle, cut-leaved crane's bill, fathen, hogweed, prickly sow-thistle, cow parsley and foxglove.

13. Boundary along the back of the Postcombe housing estate containing laurel, dogwood, cypress, elder and various low growing shrubs. The internal margin of the field is mainly tall ruderal vegetation and contains common mallow, white bryony, nipplewort, stinging nettle, ground elder, cow parsley, scented mayweed, garlic mustard, hedge bindweed, hedge mustard, wood spurge, field poppy, fathen, white deadnettle, woody nightshade, smooth sow-thistle, false oat-grass, greater periwinkle, meadow brome, field forget-me-not, groundsel, dove's foot crane's bill, black-grass, creeping thistle, cleavers and hogweed.

14. Wheat field containing nesting skylark and roe deer.

15. Hedgerow along London Road (the A40) of mainly blackthorn and hawthorn with a section of snowberry close to the housing estate. Contains dog rose and mature sycamore trees with a field margin containing meadow brome, cultivated oats, hogweed, cow parsley, stinging nettle, fathen, spear thistle, creeping thistle, greater burdock, cleavers, barren brome, scarlet pimpernel, scented mayweed, hedge mustard, pineapple weed, field horsetail, broad-leaf dock, white deadnettle, bramble, broad-leaf willowherb and green field-speedwell. Brown hare droppings noted.

16. Linear woodland of ash, beech, hawthorn, dog rose, field maple, bramble, dogwood and sycamore. A wide field margin contains bearded couch, red fescue,

cock's-foot, rough meadow-grass, false oat-grass, barren brome, cow parsley, ash seedlings, ragwort, spear thistle, cleavers, curled dock, field forget-me-not, creeping thistle, garlic mustard, cut-leaved crane's bill, rough chervil, creeping buttercup, Yorkshire fog, wood avens, greater burdock, common mouse-ear, dandelion and common agrimony. Badger scarification noted.

17. Linear woodland cutting along London Road (the A40) containing areas of priority habitat with ash, sycamore, blackthorn, hawthorn, Norway maple, dog rose, buckthorn, beech, field maple, wild privet, black bryony and traveller's joy. The field margin includes soft brome, bearded couch, creeping buttercup, ribwort plantain, field bindweed, white campion, rough meadow-grass, field forget-me-not, spear thistle, daisy, red fescue, common wintercress, sweet violet, common mouse-ear, curled dock, barren brome, nipplewort, ragwort, prickly sow-thistle, common agrimony, germander speedwell, thyme-leaved speedwell, lords and ladies, field pansy and ivy. Evidence of roe deer.

18. Arable field of wheat. Nesting skylark and roe deer recorded.

19. Woodland strip containing areas of priority habitat with ash, beech, field maple, sycamore, blackthorn, Norway maple, wild cherry, hawthorn, apple, spindle and ivy. The ground flora includes false oat-grass, bramble, creeping thistle, curled dock, ash seedlings, cow parsley, common agrimony, wood avens, dog rose, stinging nettle, meadow brome, cleavers and spear thistle. On the woodland margins species such as bearded couch, ribwort plantain, field forget-me-not, garlic mustard, groundsel, cut-leaved crane's bill and greater burdock also occur.

20. Small woodland block adjacent to the motorway containing areas of priority habitat with ash and sycamore with elm, hawthorn, blackthorn, spindle, hazel and elder. The ground flora is dominated by stinging nettle with barren brome, curled dock, cock's-foot, ivy, rough meadow-grass, cleavers, creeping thistle, white deadnettle, cow parsley and garlic mustard. The track adjacent to the woodland rough meadow-grass, perennial rye, cock's-foot, cow parsley, greater plantain, creeping buttercup, ribwort plantain, hogweed, broad-leaf dock and dandelion.

21. Margins along the post and rail fence of the M40 motorway with ash, sycamore, dog rose, hawthorn, blackthorn and bramble. The narrow margins along the fence include false oat-grass, bearded couch, cock's-foot, cut-leaved crane's bill, cleavers, groundsel, garlic mustard and greater burdock.

22. Arable field of wheat. Roe deer encountered.

23. Poorly connected section of hedgerow along the public right of way containing locally abundant blackthorn with bramble, elder and dog rose. The margins include cleavers, stinging nettle, cow parsley, perennial rye, rough meadow-grass, dandelion, greater plantain, ribwort plantain, field bindweed, hogweed, meadow brome, charlock, field forget-me-not and cut-leaved crane's bill.

24. Linear woodland of ash, Norway maple, sycamore, blackthorn, dog rose, wild cherry, dogwood, field maple beech and black bryony. The ground flora includes wood meadow-grass, cock's-foot, greater burdock, field forget-me-not, cow parsley, meadow brome, false oat-grass, wood avens, herb Robert, wood anemone, sweet woodruff, ivy and lords and ladies. Badger dung-pit recorded.

25. Semi-improved grassland that has been planted with Norway spruce with locally abundant ground ivy and contains yarrow, ragwort, cow parsley, daisy, common vetch, lesser trefoil, common agrimony, hogweed and bee orchid.

26. Woodland block of Norway maple, beech, pine, horse chestnut and weeping ash, which is bounded by hedge honeysuckle, wayfaring tree and guelder rose. The ground flora is mainly cow parsley with lords and ladies and includes a number of garden plants such as hellebore.

6.4 Species list

Agrimony, common
Anemone, wood
Ash, weeping
Ash
Avens, wood
Barley, wall
Beech
Bindweed, field
Bindweed, hedge
Black-grass
Black medic
Blackthorn
Bramble
Brome, barren
Brome, meadow
Brome, soft
Buddleja
Bryony, black
Bryony, white
Burdock, greater
Buttercup, creeping
Campion, white
Charlock
Cherry, wild
Chervil, rough
Chestnut, horse
Cleavers
Cock's foot
Couch
Couch, bearded
Crane's bill, cut-leaved
Crane's bill, dove's foot
Crane's bill, hedge
Cypress sp.
Daisy
Daisy, ox-eye
Dandelion
Deadnettle, red
Deadnettle, white
Dock, broad-leaf
Dock, curled
Dock, wood
Dogwood
Elder
Fathen
Fescue, meadow
Fescue, red
Field-speedwell, green
Flag, yellow
Forget-me-not, field
Foxglove
Goat's beard
Ground elder
Ground ivy
Groundsel
Hawthorn
Hellebore sp.
Herb robert
Hogweed
Honeysuckle, hedge
Horsetail, field
Ivy
Ivy, ground
Laurel
Laurel, spurge
Lords and ladies
Mallow, common
Mallow, rough
Maple, field
Maple, Norway
Mayweed, scented
Meadow-grass, annual
Meadow-grass, rough
Meadow-grass, smooth
Mercury, dog's
Mouse-ear, common
Mugwort
Mustard, garlic
Nettle, stinging
Nightshade, woody
Nipplewort
Oak, pedunculate
Oat-grass, false
Orchid, bee
Ox-tongue, bristly
Pansy, field
Parsley, cow
Periwinkle, greater
Pine sp.
Pineapple weed
Pimpernel, scarlet
Plantain, great
Plantain, ribwort
Poppy, field
Privet, wild
Ragwort
Rose, dog
Rose, guelder
Rye, perennial
Shepherd's purse
Snowberry
Sow-thistle, prickly
Sow-thistle, smooth
Speedwell, germander
Speedwell, thyme-leaved
Spindle
Spruce, Norway
Spurge, sun
Spurge, wood
Sycamore
Teasel
Thistle, creeping
Thistle, spear
Thistle, welted
Trefoil, lesser
Vetch, common
Violet, sweet
Watercress, fool's
Wayfaring tree
Willowherb, broad-leaf
Wintercress, common
Woodruff, sweet
Woundwort, hedge
Yarrow
Yorkshire fog

Skylark
Willow warbler
Pheasant
Red kite

Roe deer
Brown hare
Rabbit
Grey squirrel
Badger

Red admiral
Common blue
Speckled wood
Small tortoiseshell

6.5 Photographic record of the site

Description 1

Description 2

Description 3

Description 4

Description 5

Description 6

Description 7

Description 8

Description 9

Description 10

Description 11

Description 12

Description 13

Description 14

Description 15

Description 16

Description 17

Description 18

Description 19

Description 20

Description 21

Description 22

Description 23

Description 24

	
Description 25	Description 26

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