



BLENHEIM ESTATE

HOMES

Land East of
Park View
Woodstock

Environmental Statement
Main Report

7 Natural heritage

Introduction

- 7.1 BSG Ecology Ltd was appointed to undertake the assessment of the potential for effects on natural heritage, including as a result of habitat loss and creation, disturbance of protected and priority species, and effects on designated nature conservation sites. The findings of the assessment are summarised in this chapter and the full report is included as technical appendix E. The references and data sources used in the assessment are shown in table 7.1.

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Bat Conservation Trust, 2010, Species factsheet: Leisler's bat
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BSG Ecology Ltd, 2022, Long Hanborough North. Land North of A4095. Technical Appendix: Natural Heritage
Chartered Institute of Ecology and Environmental Management, 2022, Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2
Collins, J. (Ed.), 2016, Bat Surveys: Good practice guidelines. 3 rd Edition
Defra and the Environment Agency, 2019, Pollution Prevention for Businesses
Joint Nature Conservation Committee, 2010, Handbook for Phase 1 habitat survey – a technique for environmental audit
Maddock, A., 2011, UK Biodiversity Action Plan; Priority Habitat Descriptions
Natural England, 2018, Internal guidance. Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations. V1.4 Final
Office of the Deputy Prime Minister, 2005, Government Circular 06/05 Biodiversity and Geological Conservation: Statutory Obligations and Their Impact Within the Planning System
Oxfordshire Bat Group, 2020, Oxfordshire bats. Available online at: http://www.oxfordshirebats.org/oxfordshire-bats.php
Stantec, 2020, Garden Village Oxfordshire. Environmental Statement – Volume 2. H.3 Ecological Appraisal
Wray, S., Wells, D., Long, E. and Mitchell-Jones, T., 2010, Valuing Bats in Ecological Impact Assessment in 'In Practice: Bulletin of the Institute of Ecology and Environmental Management', Number 70, December 2010, pp 23-25
Table 7.1: References and data sources

Legislation and policy

Legislation

- 7.2 The Conservation of Habitats and Species Regulations 2017 (as amended) provide for the designation of 'European sites', now known as 'national site network (NSN) sites', the protection of 'European protected species' and the adaptation of planning and other controls for the protection of NSN sites. Under

the regulations, competent authorities have a general duty to have regard to the EC Habitats Directive (92/43/EEC) in the exercise of their functions.

- 7.3 The Natural Environment and Rural Communities Act 2006 places a duty on public bodies to have regard to the conservation of biodiversity when exercising their duties. It requires the secretary of state to identify a list of habitats and species that are of principal importance for the conservation of biodiversity in England ('section 41' habitats and species). The presence of such species or habitats is a material consideration in planning decisions.
- 7.4 The Wildlife and Countryside Act 1981 (as amended) provides national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) and the EC Birds Directive (2009/147/EC). It provides for the notification and confirmation of sites of special scientific interest (SSSI), provides protection to all wild birds and gives special protection to certain species of birds, animals and plants. The Countryside and Rights of Way Act 2000 strengthens protection for SSSIs and provides a further basis for the conservation of biological diversity.
- 7.5 The Protection of Badgers Act 1992 makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Interference includes disturbing badgers while they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. This legislation was introduced for welfare reasons, rather than conservation purposes.
- 7.6 The Hedgerow Regulations 1997 set out criteria for identifying important hedgerows. These relate to the value of hedgerows from an archaeological, historical, wildlife and landscape perspective.

National policy

- 7.7 The National Planning Policy Framework (NPPF; 2021) sets out the government's planning policy for England. Paragraph 174 requires that the planning system should contribute to and enhance the natural and local environment by:
- "minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures."*
- 7.8 Paragraph 180 sets out a series of principles that local planning authorities should use when determining planning applications to conserve and enhance biodiversity.

Local policy

- 7.9 Policy ESD 10 of the adopted Cherwell Local Plan 2011-2031 Part 1 sets out measures to protect and enhance biodiversity and the natural environment, including requiring development to create a net gain in biodiversity, the incorporation of features to encourage biodiversity and retain and enhance existing features of nature conservation value within sites, and requiring mitigation of potential effects on designated nature conservation sites.

- 7.10 A more detailed review of legislation and national and local planning policy is provided in technical appendix E.

Methodology

Baseline

- 7.11 Baseline ecological data were collected through a desk study and a range of field surveys. The desk study collated data from published sources and databases, including Thames Valley Environmental Records Centre (TVERC). The references and data sources used in the study are set out in table 7.1. Information was obtained on statutory and non-statutory designated nature conservation sites and protected and notable species within a 2 km radius of the site. Additional information was obtained on the Oxford Meadows Special Area of Conservation (SAC) in order to allow potential effects on this site to be assessed.
- 7.12 The following ecological surveys have been carried out on the site:
- Extended phase 1 habitat survey – April 2021
 - Hedgerow survey and assessment – April 2021
 - Bat survey: ground level tree assessment – April 2022
 - Bat survey: walked activity transects – May to September 2021
 - Bat survey: automated detector surveys – May to October 2021
 - Badger survey – September 2021
 - Great crested newt environmental DNA (eDNA) survey – May 2021
 - Reptile survey – May to September 2021
 - Farmland bird survey – April to June 2021
 - Dormouse survey – May to October 2021
- 7.13 Full details of the survey methodologies are set out in technical appendix E.

Impact assessment

- 7.14 The Chartered Institute of Ecology and Environmental Management's (CIEEM; 2022) guidance is followed in assigning value to a feature and in the assessment of the significance of effects. The value of a feature is assigned by CIEEM to one of seven levels, from international to 'within the immediate zone of the proposal only'. For the purpose of this assessment, all levels are considered. The levels correspond to administrative units, except for the local level, which is applied more subjectively. The justification for selecting the level of value is given for each feature in the assessment. To provide consistency with the approach used in other chapters of this ES, table 7.2 explains how the CIEEM levels relate to the general Terence O'Rourke Ltd approach to assessment described in chapter 3 of this ES.

CIEEM guidelines	Terence O'Rourke Ltd approach
International	High
UK	High
National (England / Northern Ireland / Scotland / Wales)	High to medium
Regional	Medium
County / Metropolitan area	Medium
District / unitary authority / city / borough	Medium
Local	Low
Site	Low
Table 7.2: Relationship between the CIEEM and the Terence O'Rourke Ltd approach for assessing the importance / value of a receptor	

- 7.15 A nature conservation designation does not necessarily imply a level of significance. For example, if a county wildlife site is cited for the population of a particular species of bird, that population is of county importance, but other features of the site may be less important. Similarly, legal protection at a national level, or the presence of a species or habitat of principal importance (HPI), does not imply national importance. The mitigation required to meet legal obligations is provided as separate advice for protected species.
- 7.16 For each feature of value (e.g. habitat or species), the effects of proposed activities during and after construction are assessed and the type of impact characterised according to its extent, magnitude, duration, reversibility, timing, frequency and cumulative effects. The effect of the impact on the function of the ecosystem (integrity), the quality and extent of the habitat or the population size of the species is predicted and an estimate made of the degree of uncertainty in the prediction. Mitigation and enhancement measures, if applicable, are described and the residual effect after these measures have been taken into account is quantified as accurately as possible.
- 7.17 Effects are defined as either significant or not significant and are assessed both before and after mitigation. For example, a proposal that may have a large effect on a bird population for which a county wildlife site is cited without mitigation would result in a significant effect, but when fully mitigated the effect would be of negligible magnitude and would be described as an effect on a feature of county value that was not significant.
- 7.18 In order to provide an assessment of impacts that is in harmony with the other chapters of this ES, a degree is also given to each effect, following protocols developed by Terence O'Rourke Ltd. Significance has been derived from two measures: the importance of receptors (figure 7.1) and the magnitude of change (figure 7.2). These two sets of criteria are used together in the significance matrix (figure 7.3) to derive the generic definitions of the degree of potential effects. Where there is uncertainty over the degree of effect, for example when there is considerable uncertainty about the full extent of the local resource (habitat area or population size), this is stated and as a precaution the higher degree of effect is applied.
- 7.19 The CIEEM guidelines suggest that an effect is either ecologically significant or not, whereas the Terence O'Rourke Ltd approach is a development of this and determines significance based on the degree of the effect. The CIEEM and Terence O'Rourke Ltd approaches are compared in table 7.3.

CIEEM guidance	Terence O'Rourke Ltd approach
Significant	Very substantial
	Substantial
	Moderate
Not significant	Slight
	Negligible

Table 7.3: Comparison of the CIEEM and Terence O'Rourke Ltd approach for assessing potential significance of effects

Limitations and uncertainties

- 7.20 Survey methods and effort were consistent with the guidance documents currently recommended by CIEEM (2022) and were carried out at appropriate times of year and under suitable weather conditions.
- 7.21 Some of the reptile survey mats were found to be missing over the course of the surveys. This was limited to those along the northern edge of the site. As the mats were subsequently replaced, this is not considered to be a constraint on the survey. Intermittent rain was recorded during the farmland bird survey on 14 May 2021. The rain was not heavy enough to be considered a major impediment to the survey and is therefore not considered to be a constraint.

Baseline

Designated sites

Internationally and nationally important sites

- 7.22 There are no internationally important designated nature conservation sites within 2 km of the site. The nearest is the Oxford Meadows SAC, which is approximately 5.2 km to the south of the site. It is primarily designated for the Annex I habitat 'lowland hay meadow'. It is also the larger of only two known sites in the UK that support creeping marshwort (*Apium repens*), which is an Annex II species. The SAC is a receptor of high importance. A number of SSSIs form component parts of the SAC, including Cassington Meadows SSSI, Pixey and Yarnton Meads SSSI, Wolvercote Meadows SSSI, and Port Meadow with Wolvercote Common and Green SSSI. These SSSIs are more than 2 km from the site and are therefore only included in the assessment for the relevance to the SAC.
- 7.23 The nearest statutory designated site is the Blenheim Park SSSI, approximately 1.4 km to the west. The SSSI is designated for excellent parkland and woodland pasture habitat, with veteran oaks, ancient woodland with characteristic flora and nationally scarce invertebrates, and lakes of county importance for breeding, migratory and wintering birds. The SSSI is a receptor of high importance.
- 7.24 Shipton-on-Cherwell and Whitehill Farm Quarries SSSI is approximately 1.3 km to the north east of the site. However, this SSSI is designated for its exposed geological strata and fossils, rather than its ecological interest. It does not have a high level of ecological connectivity with the site or share populations of important species with it. Increases in recreational pressure are unlikely, as there are no public rights of way within the SSSI. Air pollution impacts are also

considered unlikely, given the distance to the site. It is therefore not considered further in this assessment.

Locally important sites

7.25 There are 10 non-statutory designated sites within 2 km of the site: four local wildlife sites (LWS), one proposed local wildlife site (pLWS), two wildlife sites (WS), and three conservation target areas (CTA). Each of these sites is considered to be of medium importance. A summary of these locally designated sites is provided in table 7.4.

Designated site	Distance from site	Site description / reason for designation	Included in assessment?
Sansoms Green Lane WS	200 m north	0.7 ha comprising a double species-rich hedgerow, which is a HPI, on either side of a public right of way. Barn owl (schedule 1) and house sparrow (species of principal importance; SPI) recorded	Yes because of proximity to site
Woodstock Water Meadows LWS	1.1 km north west	Low lying water meadows with areas of lowland fen, wet woodland and floodplain grazing marsh, which are HPI. Mammal SPI recorded include otter and water vole. In addition, a number of bird SPI have been identified, such as turtle dove, marsh tit, spotted flycatcher, cuckoo, reed bunting and two schedule 1 species: kingfisher and quail	Yes because of proximity to A44 and potential for air quality impacts
Blenheim and Ditchley Parks CTA	1.2 km south west	2,651 ha, including Blenheim Park (see SSSI above) and nearby Ditchley Park (also historic parkland / wood pasture with veteran trees and areas of broadleaved woodland). Oxford Biodiversity Action Plan (BAP) targets associated with this area include management of ancient parkland, management / restoration of wood pasture, management / restoration of lowland mixed deciduous woodland, and management and creation of arable field margins	Yes because of proximity to A4095 and potential for air quality impacts
Lower Cherwell Valley CTA	1.4 km north east	609 ha area running along the Cherwell from just south of Lower Heyford to Kidlington. Overlies Langford Meadows LWS, plus Shipton-on-Cherwell and Whitehill Farm Quarries SSSI and Bunker's Hill Quarry LWS. The latter portion is the only section within 2 km of the site. Biodiversity interest of the whole area includes HPI / BAP habitats (fen / swamp / reedbed, limestone grassland, lowland meadow, wet grassland / floodplain grazing marsh, eutrophic standing water, scrub) and species. Oxford BAP targets associated with this area include management and creation of reedbed, management / restoration of lowland fen and rivers, and management / restoration / creation of lowland meadow and floodplain grazing marsh	No – over 1 km from site. Increase in recreational pressure and air pollution impacts unlikely given distance
Bunker's Hill Quarry LWS	1.4 km north east	Overlies Shipton-on-Cherwell and Whitehill Farm Quarries SSSI. Wetlands and calcareous grassland, plus open ground habitats in old quarry areas (total 62.6 ha). Of interest for overwintering / breeding / migrant birds	No – over 1 km from site with no public rights of way and air pollution impacts unlikely
Glyme and Dorn Valleys CTA	1.5 km west	2,496 ha, including the whole Glyme Valley and tributaries, including the Dorn. Encompasses Wootton Jubilee Fields and Glyme Valley LWS. Biodiversity interest includes HPI / BAP habitats (limestone grassland, lowland meadow, fen / swamp / reedbed, parkland, woodland and eutrophic standing water) and species (white-clawed crayfish in the upper Dorn, over 2 km from the site). Oxford BAP targets associated with this area	Yes because of proximity to A44 and potential for air quality impacts

Designated site	Distance from site	Site description / reason for designation	Included in assessment?
		include management and creation of limestone grassland, management / restoration of lowland meadows, fen and rivers, management / restoration / creation of lowland mixed deciduous woodland, and management / restoration of parkland and lowland mixed deciduous woodland	
Blenheim Park – New Park and part of Great Park pLWS	1.5 km west	See Blenheim Park SSSI	Yes because of proximity to A44 and potential for air quality impacts
Langford Meadows LWS	1.5 km south east	11 ha site with wet and lowland meadow, lowland fen habitats and species-rich hedgerows (HPI). Important site for birds, with previous records of breeding including reed bunting and overwintering snipe. Protected mammal species such as noctule and pipistrelle bats and badgers have also been recorded	No – over 1 km from site. Increase in recreational pressure and air pollution impacts unlikely given distance
Bladon Heath LWS	1.6 km south	97 ha comprising remnant acid grassland and patches of lowland mixed deciduous woodland (HPI). Woodland field fauna are particularly species-rich and include ancient woodland indicator species such as bluebell and wild strawberry	No – over 1 km from site. Increase in recreational pressure and air pollution impacts unlikely given distance
Weaveley Furze Firewood Allotments WS	1.7 km north	1.7 ha community woodland. To the east of the site there is a block of broadleaved semi-natural woodland with an open ash canopy, a small seasonal pond and a section of stream. The main part of the site comprises scrub with areas of young planted trees, including wild cherry, ash and field maple	No – over 1 km from site. Increase in recreational pressure and air pollution impacts unlikely given distance

Table 7.4: Locally designated nature conservation sites within 2 km of the site

Habitats and vegetation on the site

- 7.26 The majority of the site supports arable land, currently planted to cereals (figure 7.4). Arable land is considered to be of negligible intrinsic value because of its low floristic diversity and intensive management and is not a HPI (Maddock, 2011). The margins of the field comprise 5 m wide strips of poor semi-improved grassland. They are areas of uncultivated land that support a rough sward. The margins have a low floristic diversity and are not specifically managed for wildlife, so do not meet the arable field margins criteria set out by Maddock (2011) and are not considered to be a HPI. These habitats are common and widespread locally and nationally and are of low ecological value. As a result, no significant effects are anticipated in relation to these habitats, so they are excluded from further assessment.
- 7.27 Much of the northern and eastern boundaries of the site support a narrow band of broadleaved semi-natural woodland. The canopy comprises a mix of oak, ash and sycamore, with the more mature trees supporting ivy. The shrub layer

is dense in most places, particularly along the northern boundary, and comprises hawthorn, wild privet, field maple, hazel, spindle and wayfaring tree. The ground flora comprises ivy and dog's mercury, with occasional garlic mustard, lords-and-ladies and common nettle. A number of veteran trees are present along the northern boundary and there is some standing and fallen deadwood throughout the woodland.

- 7.28 While the majority of the woodland is natural, some management in the form of additional planting is present throughout the eastern strip. There are existing gaps in the form of farm access tracks in both the northern and eastern areas. The woodland is considered to meet the lowland mixed deciduous woodland criteria outlined by Maddock (2011) and is therefore a HPI. The woodland is relatively small in size and is a relatively common habitat nationally, although less widespread locally. It is a receptor of low importance that contributes to local ecological networks suitable for mammals, birds, amphibians, reptiles and invertebrates.
- 7.29 There are three hedgerows on the site (figure 7.4). Hedgerow H1 is a species-poor intact hedgerow along the southern boundary and extending north east to form the boundary with neighbouring properties. It consists largely of hawthorn and ash, with occasional hazel and field maple and a few wayfaring trees. At the time of the survey, the hedgerow had been subject to recent management in the form of flailing. The ground flora is limited, with bare ground present.
- 7.30 Hedgerow H2 is a species-rich hedgerow with trees bordering the arable field to the west, with a dry ditch along its southern half. The woody species include hazel, blackthorn, hawthorn, ash, dog-rose and oak. Bramble and sycamore are also present. The ground flora is dominated by ivy, with small amounts of lords-and-ladies, cleavers, herb Robert, dog violet and creeping thistle. Previous survey work undertaken in 2016 recorded a small stand of bluebell in the southern half of H2.
- 7.31 Hedgerow H3 is a species-rich intact hedgerow at the northern site boundary, between H2 and the woodland. The woody species include hazel, blackthorn, hawthorn, ash, dog-rose and oak. The ground flora is dominated by ivy, with small amounts of lords-and-ladies, cleavers, herb-Robert, dog violet and creeping thistle. All three hedgerows meet the criteria for HPI hedgerows outlined by Maddock (2011). They generally have limited species diversity and the habitat is relatively widespread nationally and within Oxfordshire. Hedgerows are therefore receptors of low importance that contribute to local ecological connectivity for mammals, birds, amphibians, reptiles and invertebrates.

Fauna

Badgers

- 7.32 Two active badger setts were found at the site; as a result of the confidentiality surrounding records of this species, more information is presented in the confidential appendix 2 of technical appendix E. Suitable foraging habitat on site includes the woodland, hedgerows and poor semi-improved grassland and, to a lesser extent, the arable land. Badgers receive legal protection on animal welfare grounds, but are common and widespread in the UK and so are not a

species of particular conservation status. They are a receptor of low importance.

Bats

- 7.33 The site predominantly comprises arable land, which is of limited value to bats, although the boundary hedgerows and woodland provide more feasible foraging and commuting habitat. The woodland on the northern and eastern boundaries provides habitat connectivity to the wider landscape to the north, but connectivity is otherwise limited by the size and extent of the hedgerows. As such, the site is considered to be of low suitability for bats. However, it is close to very good habitat, including Blenheim Park and the River Glyme. There are a number of known roosts of different bat species within Blenheim Estate and the habitats there are of exceptional quality for bats.
- 7.34 The ground level tree assessment recorded trees with suitability to support roosting bats, as summarised in table 7.5 and shown on figure 7.5.

Tree no.	Potential roost features	Overall suitability
T1	Semi-mature sycamore with a south-facing knot hole at 2 m	Moderate
T2	Semi-mature oak with a south-facing cavity in the main trunk at 3 m	Moderate
T3	Mature oak with two west-facing woodpecker holes at 5-7 m and two north-facing woodpecker holes at 6-8 m. A broken limb with a north-facing rot hole and potential cavity at 7 m	High
T4	Mature sycamore with two east-facing knot holes at 3 m in a dead part of a southern extending branch	Moderate
T5	Mature field maple with a rotten branch and patches of bark missing and possible cavity behind. The feature is quite exposed, limiting its suitability for bats	Low
T6	Semi-mature sycamore with thick ivy stems. The stems are not tight to the main stem, so their value as a roost site is limited. There was potential for other features to be present behind foliage cover	Low
T7	Mature oak with a small hole in the top of a dead branch and a cavity behind peeling bark on an eastern branch	Low
T8	Dead oak with ivy cover and a rot hole at the base of a south-facing dead branch at 4 m. Limb with splits at 6 m	Moderate
T9	Mature oak with ivy cover and rotting bark with potential crevices. The features are quite exposed, limiting their suitability for bats	Low
T10	Mature oak with cavity behind split branches	Moderate
T11	Dead oak with a south-facing rot hole at 8 m in the base of a limb	Moderate
T12	Mature oak with peeling bark on one of the top limbs and a possible cavity behind	Low
T13	Semi-mature sycamore with knot hole and tear out in an east-facing limb. Cavities behind do not appear to extend far into the limbs	Low
T14	Mature sycamore with a south-facing knot hole at 4-5 m	Moderate
T15	Dead oak with fissures in main stem and possible cavity behind	Moderate

Table 7.5: Ground level tree assessment results

- 7.35 The walked activity transect surveys recorded at least six species of bats. The vast majority of the activity was by foraging common pipistrelles, followed by soprano pipistrelles, with low numbers of passes by noctules and Leisler's bats, two passes by *Myotis* species and a single pass by a serotine. Most of the activity was recorded at the western end of the northern woodland band and the western end of hedgerow H1 on the southern boundary. Soprano pipistrelle activity was recorded at all the site boundaries and this was the only species recorded on the eastern boundary.

- 7.36 Early activity within or close to emergence times was limited, but included commuting common and soprano pipistrelles and noctules along the southern edge of the northern woodland band. It is possible that these bats were roosting in trees within the woodland. Overall, the surveys showed that all boundary features are used by commuting and foraging bats, with the woodland in the north of the site and H1 in the south of particular importance in the context of the site.
- 7.37 The automated detector surveys identified that the site is used by at least nine species of foraging bats. The majority of passes were by pipistrelles, of which soprano pipistrelle was by far the most frequently recorded. Lower numbers of common pipistrelle were also recorded and there was a single pass by Nathusius' pipistrelle. The first two species are common and widespread in Oxfordshire, while the latter is rare in the county (Oxfordshire Bat Group, 2020). For common and soprano pipistrelles, the majority of recorded activity was on the western edge of the eastern band of woodland. The Nathusius' pipistrelle pass was at the northern end of hedgerow H2.
- 7.38 *Myotis* species were the next most frequently recorded group, mainly at the northern end of H2. A total of 132 passes of *Nyctalus* species (noctule and Leisler's bats) were recorded, of which the majority were noctules and most of which were recorded at the northern end of H2. Both of these are tree-roosting species that are considered to be uncommon but widespread in Oxfordshire (Oxfordshire Bat Group, 2020). Leisler's bat is a scarce species across the wider UK (Bat Conservation Trust, 2010).
- 7.39 Twenty-six passes by barbastelle bats were recorded. This is a rare species across the UK, but Oxfordshire appears to be a stronghold and it is considered to be widespread but uncommon in the county (Oxfordshire Bat Group, 2020; Bat Conservation Trust, 2010). It is a tree-roosting species typically associated with woodland and parkland, and there are known populations present on Blenheim Estate. Barbastelles were recorded at both monitoring locations, with the majority at the northern end of hedgerow H2.
- 7.40 Twenty-one passes by brown long-eared bats were recorded, most of which were at the northern end of H2. These bats are often under-recorded because of the quiet and directional nature of their echolocation calls, so the actual level of activity is likely to be higher. Brown long-eared bats are widespread and relatively common in Oxfordshire. A single serotine pass was recorded on the western edge of the eastern band of woodland. This is an uncommon species nationally and is described as widespread but uncommon in Oxfordshire, with few known roosts (Oxfordshire Bat Group, 2020).
- 7.41 Overall, the recorded timing of calls indicated possible roosting by four bat species on or close to the site: common and soprano pipistrelle, noctule and Leisler's bat. It is plausible that mature trees within the woodland and on / beyond the western site boundary could be used by roosting bats. Hedgerow H2 is likely to be a regularly used commuting route from soprano pipistrelle roosts and is also likely to be used by common pipistrelles and noctules to commute from roosts.
- 7.42 Guidance by Wray et al (2010) was used to assess the geographic importance of the site for bats and it is considered to be important at the county scale for

most of the species present. However, it is important at the local scale for brown long-eared bats and three rarer species (serotine, Leisler's bat and Nathusius' pipistrelle) as a result of the very limited number of records. It is important at the regional scale for barbastelle because of the overall rareness of this species. Overall, the site is considered to be of county value for bats, which are receptors of medium importance.

Dormice

- 7.43 Dormice are known to have a patchy distribution throughout Oxfordshire and are thought to be very under-recorded at county level. No evidence of dormice was found during the 2021 surveys. However, previous surveys undertaken in 2014 recorded two unoccupied nests that showed features strongly indicative of having been built by dormice. One was in hedgerow H3 and the other in the southern part of the eastern woodland band. The nests were recorded in autumn, when dispersal of dormice (often juveniles) from areas of optimal habitat occurs. It is considered that the nests may have been constructed by a juvenile dormouse as part of its dispersal from areas to the north of the site, which does not form part of a small population of dormice resident within the site itself.
- 7.44 Five records of dormice were returned during the desk study, three of which were within the site from 2014, one immediately north of Shipton Road and one over 1 km to the east. Despite the lack of evidence that dormice are currently using the site, taking into account the desk study results, 2014 survey results and the presence of suitable habitat in the form of hedgerows and woodland on site, it is assumed that dormice are present at low densities in suitable habitat on a precautionary basis. Dormice are a European protected species and a SPI and are considered to be a receptor of medium importance.

Other mammals

- 7.45 The desk study returned records of five other mammal species within 2 km of the site: brown hare, otter, water vole, polecat and hedgehog. These are all SPI. Given the habitats present on site, brown hare, hedgehog and polecat all have the potential to be present. However, it is likely that this will be in very low (non-significant) numbers. There are no suitable habitats on site for otter and water vole. Other mammals are therefore not considered further in the assessment.

Reptiles

- 7.46 A small population of common lizard was recorded on site in 2021, with a peak count of two individuals in May: one on the southern boundary and one on the southern section of the eastern boundary. No further sightings were recorded on site after 19 May 2021, although a small population of slow worm was identified in fields to the north of Shipton Road in both 2021 and 2014 and a grass snake was recorded on site in 2014. The grassland, hedgerows and woodland at the site provide suitable habitat for common reptile species, all of which are SPI. Reptiles are considered to be receptors of low importance.

Great crested newts

- 7.47 There is some suitable foraging and commuting habitat on site for great crested newts, including rough grassland field margins and hedgerow bases. The

woodland and hedgerow bases provide potential sheltering and hibernation habitat. There are two ponds within 250 m of the site, both approximately 35 m to the west in the grounds of Pest Houses. The eDNA survey results for both ponds were negative for great crested newts. Given this, and the limited terrestrial habitats on site, this species is considered unlikely to be present on site and is not assessed further.

Other amphibians

- 7.48 The desk study returned records of two other species of amphibians within 2 km of the site: smooth newt and common frog. The closest record was for smooth newt, approximately 305 m north west of the site within ponds at The Marlborough Church of England School. As neither of these species was recorded on site, and the terrestrial habitats on site are of limited value for amphibians, they are considered unlikely to be present on site and are not assessed further.

Breeding birds

- 7.49 The breeding bird survey recorded a total of 16 bird species within the site, all of which were recorded defending territories. A total of 58 territories were identified, none of which relate to schedule 1 protected species. The greatest density of territories and other activity was associated with the broadleaved woodland on the northern and eastern site boundaries. No territories or other activity were recorded at hedgerows H1 and H3. There were territories of two SPI and species of conservation concern within the site: one song thrush territory within the woodland and four skylark territories within the arable field. The remaining territories included three amber listed species of conservation concern (dunnock, wren and woodpigeon) and several common and widespread species.
- 7.50 The majority of the remaining records relate to common and widespread species defending territories off site. The assemblage of breeding birds is considered typical for the habitats present. Breeding birds are considered to be receptors of low importance.

Invertebrates

- 7.51 The desk study returned records of three invertebrate species within 2 km of the site, although none were from the site itself. The closest record was for Roman snail, 1.4 km to the south east. The other species recorded were the pinhole borer beetle and black hairstreak butterfly. It is considered unlikely that the black hairstreak would be present on site because its preferred habitats are blackthorn thickets within woodlands and dense scrub. Similarly, the Roman snail is unlikely to be present on site because it prefers well-drained lime-rich soils in relatively undisturbed grassy or scrubby habitats. The oak trees within the woodland may support pinhole borer beetles, although none were noted at the site.
- 7.52 Overall, the habitats at the site are likely to be of limited value to invertebrates because of the intensively farmed nature of the arable land and the regular management of the species-poor grassland field margins. The woodland is likely to hold the most interest. Some deadwood was recorded in the woodland,

but this was typically on smaller trees and not in an open parkland setting, so it is not likely to support the saproxylic species listed as a designated interest feature for the Blenheim Park SSSI. As no protected species or species / assemblages of significant conservation value are likely to be present on site, invertebrates are not considered further.

Future baseline

- 7.53 In the absence of the proposed development, the site is likely to remain in its current use and the agricultural practices would continue.

Primary mitigation and habitat creation and enhancement

- 7.54 During the design evolution of the proposed development, the findings of the ecological surveys were carefully considered and the mitigation hierarchy was applied to avoid and / or minimise impacts. The master plan has therefore been designed to minimise the loss of important habitats and features and to incorporate and enhance these through the provision of new habitats and networks of green infrastructure.
- 7.55 The main habitats of conservation value that will be retained on the site are as follows:
- The majority of the broadleaved semi-natural woodland along the northern and eastern boundaries, although a section measuring approximately 0.39 ha will be removed for the new access road
 - Hedgerows H1 and H2 will be largely retained, although removal of approximately 11 m for footpaths through H1 and 24 m for the link road and footpaths through H2 will occur. Hedgerow H3 will be retained in full
- 7.56 In addition to the above, enhancements will be provided for several species present on the site and to provide habitats for other species. Extensive areas of green space have been incorporated into the master plan and boundary features largely retained to ensure that connectivity for wildlife is provided within the site and to the surrounding habitats. This includes the creation of a number of habitats that will strengthen and enhance the retained habitats listed above. The planting schemes will provide:
- An overall increase in the area of habitats of conservation value within the site, including hedgerows, species-rich grassland, trees, woodland and scattered scrub
 - A mosaic of habitats to benefit a range of different species during different stages of their life cycles and throughout the year
 - Improved functional ecological corridors throughout the site for commuting, foraging and dispersal by a range of species to provide a continuous linkage for biodiversity within the area

Effects during construction

Designated sites

- 7.57 The proposed development is not within or directly adjacent to any of the designated sites, so there will be no direct loss of, or damage to, habitats at

these designated sites as a result of construction works. As discussed in the air quality report submitted in support of the planning application, the proposed development is not predicted to generate significant dust or emissions during construction. Standard pollution prevention measures will be implemented during the construction phase, such as those set out in Defra and the Environment Agency's (2019) *Pollution Prevention for Businesses* to ensure that habitats and watercourses are protected. There is therefore no potential for significant effects on the designated sites as a result of the proposed development.

Habitats and vegetation on the site

Broadleaved semi-natural woodland

- 7.58 The proposed development will result in the loss of approximately 0.39 ha of broadleaved semi-natural woodland for the main access road off the A4095 Upper Campsfield Road at the eastern boundary. The remainder of the woodland and trees within hedgerows will be retained. Minimal direct habitat loss is therefore anticipated, leading to a small impact and a slight adverse effect that will not be significant.
- 7.59 The proposed development is not anticipated to result in the encroachment of root zones of mature trees. There is some potential for accidental encroachment by machinery during construction and landscaping works. Without adequate fencing, there is a low risk of accidental damage to mature trees by machinery during construction. These will be small impacts, leading to slight adverse effects that will not be significant.

Hedgerows

- 7.60 The proposed development will retain the majority of the hedgerow habitat, apart from a breach of approximately 24 m for the link road and footpaths through hedgerow H2 and 11 m for footpaths through H1. Minimal direct habitat loss is therefore anticipated, leading to a small impact and a slight adverse effect that will not be significant. Without adequate fencing, there is a low risk of damage to soils and vegetation from machinery. This will lead to a small impact and a slight adverse effect that will not be significant.
- 7.61 As construction works are not expected to generate significant dust emissions, and hedgerows are not particularly susceptible to impacts from soil dust, no significant adverse effects are envisaged as a result of dust generation. The hedgerows are not likely to be groundwater-dependent, as the roots of trees and shrubs forming the hedgerows are likely to depend entirely on soil moisture. No hydrological impacts are predicted.

Fauna

Badgers

- 7.62 As badger setts are present at the site, appropriate mitigation will be necessary to ensure that development proceeds in accordance with wildlife legislation. Further details can be found in the confidential version of technical appendix E.

- 7.63 It is possible that badgers may become trapped in open trenches, pits or pipework. This would be an offence under the Protection of Badgers Act 1992. There is not considered to be any effect on the local conservation status of badgers, as this would be a small impact and a slight adverse effect that will not be significant. However, without appropriate mitigation, there is the potential for breaches of wildlife legislation.
- 7.64 In addition, there will be a loss of lower suitability foraging and commuting habitat through the loss of the arable field. However, the hedgerow network and woodland will be largely retained, apart from the sections to be removed for the main access road and footpaths. As badgers are a mobile species and there is suitable foraging and commuting habitat off site that can be used, no significant adverse effects are predicted from habitat loss.

Bats

- 7.65 The proposed development will result in the replacement of arable land with development and the loss of 0.39 ha of woodland to the main access. However, the majority of the arable land will be replaced with areas of green space, including wildflower grassland, woodland and trees, which are of increased value to bats, and there is therefore likely to be an increase in the availability of foraging habitat as a result of the proposed development. The majority of habitats of particular value to foraging bats (the hedgerow network and woodland) will be retained, although small losses of these habitats will occur to create the main access and footpaths. However, the provision of new habitats of value to bats within the proposed development means that there is likely to be minimal fragmentation of foraging and commuting habitats. A small impact is predicted, leading to a slight adverse effect that will not be significant.
- 7.66 Without adequate mitigation, light spillage from floodlighting during construction onto retained habitats has the potential to reduce the value of these habitats as bat roosting, foraging and commuting areas. This will be a medium change, leading to a moderate, significant adverse effect.
- 7.67 A number of trees within the woodland in the east of the site will be removed to create the main access, nine of which have been identified as having bat roost potential (six with low potential and three with moderate potential). Should any bat roosts be present in these trees, there would be a loss of roosting opportunities. None of the trees are suitable for use as maternity or important hibernation sites. Overall, a medium impact is predicted, leading to a moderate, significant adverse effect.
- 7.68 In addition, the removal of the nine trees with bat roost potential poses a risk of killing or injury of bats when the trees are felled if mitigation is not put in place. This will be a medium impact, leading to a moderate, significant adverse effect.

Dormice

- 7.69 Without adequate protection or buffer zones during construction, there is the risk of physical damage to habitats suitable for this species during site clearance and construction. This will be a medium change, leading to a moderate, significant adverse effect.

Reptiles

- 7.70 Small areas of habitat suitable for reptiles, in the form of poor semi-improved grassland, hedgerows and woodland edge, will be lost during construction. This has the potential to lead to a reduction in the population of reptiles on site. As the majority of suitable habitats will be retained, this will be a small change and a slight adverse effect that will not be significant. Without adequate protection around retained habitat features during construction, there is some risk of physical damage to habitats suitable for reptiles, which could also reduce the local population. This will be a small change, leading to a slight adverse effect that will not be significant.
- 7.71 The poor semi-improved grassland that forms the field margins provides habitat connectivity for reptiles. This will largely be retained, as only a small area in the east of the site is to be lost for the main access. The vegetation clearance could also kill or injure reptiles. In the absence of mitigation, this will be a small impact and a slight adverse effect that will not be significant.

Breeding birds

- 7.72 The proposed development will retain the majority of the hedgerows, woodland and trees that are important habitats for breeding birds. There will, however, be small losses of hedgerow and woodland. In addition, the arable field that will be lost supports four breeding skylark territories. There is therefore the potential for a reduction in the breeding bird population on site, which will be a small impact and a slight adverse effect that will not be significant.
- 7.73 There is the potential for the killing and injury of individual birds and damage or destruction of their nests during vegetation clearance or other works to trees. This will be a small impact, leading to a slight adverse effect that will not be significant.

Effects post-construction

Designated sites

Oxford Meadows SAC

- 7.74 This site will be accessed from the proposed development via the A44 and potentially by the A40 and A34 as well. It has public rights of way throughout the lowland hay meadow habitat for which it is designated, meaning that impacts could arise from trampling of ground flora, littering, fly-tipping and dog fouling. The Habitats Regulations Assessment (HRA) of the Cherwell local plan (Atkins, 2018) states that parking provision at the SAC is limited and references previous studies that identified that the majority of visitors to the SAC are from Oxford, walking up to 1.9 km to the SAC. The distance of the site from the SAC and the presence of major roads surrounding the SAC are likely to deter residents of the proposed development from visiting.
- 7.75 In addition, policies ESD 17, BSC 10 and BSC 11 of the local plan require developments to provide public open space over and above that typically required. Accordingly, large areas of public open space will be provided by the proposed development, incorporating several recreational footpaths. This is

likely to ameliorate any increase in visitors to the SAC. The HRA concluded that the local plan will not have an effect on the integrity of the Oxford Meadows SAC, either alone or in combination with other plans and projects. It is therefore concluded that recreational pressure on the SAC from the proposed development will be negligible and not significant.

- 7.76 There is the potential for increased traffic from the proposed development that travels within 200 m of the SAC on the A34 and A40 to negatively impact on its integrity due to increased air pollution. The main pollutants of concern are oxides of nitrogen (NO_x) and ammonia, which can increase rates of nitrogen deposition and adversely affect the quality of semi-natural, nitrogen-limited vegetation. Traffic modelling carried out for the proposed development indicates that increases to annual average daily traffic (AADT) flows are predicted to be 559 vehicles on the A34 south of the A40 and no vehicles on the A40 west of Oxford. These values, which account for all additional traffic, are well below Natural England's 1,000-vehicle screening threshold for adverse effects from road traffic emissions (Natural England, 2018), so any increases in emissions will be negligible.
- 7.77 This is reflected in the air quality assessment submitted in support of the planning application, which shows that the critical levels of NO_x and ammonia are not predicted to be exceeded within the SAC. While the upper critical load for nitrogen deposition is predicted to be exceeded in places, the increase as a result of the proposed development equates to less than 1% of the critical load. As a result, no significant adverse effects are predicted on the SAC from the proposed development.
- 7.78 A sustainable drainage system (SuDS) network will be provided at the proposed development to manage surface water discharge from the site to the wider area. This will also filter any pollutants that may occur, so they are not discharged to watercourses. This, together with the distance of the SAC from the site, means that no significant effects are predicted as a result of changes to water quality or hydrology.

Blenheim Park SSSI

- 7.79 The SSSI is 1.5 km from the site by the shortest walking route on paved paths. There are public rights of way through the woodland sections of the SSSI, the closest of which is 3.3 km from the site. Woodland habitat is not considered to be particularly susceptible to recreational impacts, although there is some potential for trampling of ground flora, littering and fly-tipping. Dogs are permitted in the woodland, so there may also be an increased incidence of dog fouling.
- 7.80 Despite the distance of the accessible areas of the SSSI from the site, Blenheim Park is a well-known and popular destination in the local area. There is therefore the potential for increased public access to the woodland and a resulting increase in recreational pressure, leading to physical damage to the woodland ground flora. However, the presence of footpaths and tarmacked tracks throughout the woodland areas of the SSSI reduces the likelihood of trampling.
- 7.81 Lake habitat is not considered to be particularly susceptible to recreational impacts, although there is some potential for pollution by littering and

disturbance of waterfowl by dogs. The likelihood of the latter is reduced by the fact that owners are encouraged to keep their dogs on leads within Blenheim Estate. In addition, large areas of public open space incorporating footpaths will be provided on site, which is likely to ameliorate any increase in visitors to the SSSI. Overall, a negligible effect that will not be significant is predicted on the SSSI as a result of increased recreational pressure from the proposed development.

- 7.82 The traffic modelling carried out for the proposed development indicates that the increases to AADT flows are predicted to be 438 vehicles on the A4095 through Bladon, 359 vehicles on the A44 Oxford Road and 98 vehicles on the A44 Manor Road. These increases are well below Natural England's 1,000-vehicle screening threshold for adverse effects from road traffic emissions (Natural England, 2018), so any increases in emissions will be negligible. This conclusion is reflected in the air quality assessment submitted in support of the planning application, which shows that NO_x levels will be well below the critical level for broadleaved, mixed and yew woodland for which the SSSI is designated. Two locations are predicted to experience increases in NO_x of 1% of the critical level as a result of the proposed development, but these are both at the roadside and will not impact the qualifying features of the SSSI.
- 7.83 Similarly, the air quality modelling shows that the proposed development will not significantly increase ammonia levels within the SSSI, as the predicted increases will be largely below 1% of the critical level. One location is predicted to experience an increase above this threshold, but it is at the roadside and concentrations will remain below the critical level. The modelling shows that nitrogen deposition rates are already exceeding the upper critical load for broadleaved, mixed and yew woodland without the proposed development. Traffic from the proposed development will not significantly increase nitrogen deposition within the SSSI, as all the increases will be below 1% of the critical load, except for at two roadside locations.
- 7.84 The lake, for which the SSSI is partly designated, is a eutrophic water body. Nitrogen deposition is unlikely to be very harmful to eutrophic standing waters (APIS, 2016), so the impact of emissions from development traffic is considered to be negligible. The woodland areas of the SSSI are, at their closest point, over 1.2 km from the nearest major road (the A44, which most traffic from the proposed development is likely to use). Studies have shown that, beyond 200 m, pollution levels from vehicle emissions are not significant (Natural England, 2018). It is therefore considered that the effects of air pollution on the SSSI from traffic associated with the proposed development will be negligible and not significant.
- 7.85 The proposed SuDS network at the site has been designed to control surface water runoff and reduce water pollution through the use of infiltration basins, swales and permeable paving. These measures, and the distance of the site from the SSSI, will ensure that there will not be an increase in runoff or pollution in the River Glyme, which feeds into the lake in the SSSI. Negligible effects that will not be significant are therefore predicted on water quality and hydrology in the lake.

Sansoms Green Lane WS

- 7.86 This designated site is 600 m from the site via the shortest route on paved paths proposed as part of the adjacent Park View development. A public right of way is present between the species-rich hedgerows. As for the other designated sites, there is the potential for an increase in recreational pressure, although this is limited by the presence of a marked footpath and will be reduced by the proposed large area of public open space on the site. Overall, a negligible effect is predicted that will not be significant.
- 7.87 There are no habitats in the WS that are considered to be highly sensitive to NO_x levels or nitrogen deposition within 50 m of the site or 50 m of the roads used by development traffic. As a result, no significant adverse effects are predicted on the WS from changes to air quality. There are no watercourses in the WS, so there is no potential for significant effects as a result of changes to water quality or hydrology.

Glyme and Dorn Valleys CTA

- 7.88 This designated site is 1.5 km from the site via the shortest routes on paved paths. Small sections of the CTA have public rights of way through lowland meadow, parkland and woodland. These habitats are not particularly susceptible to recreational impacts, although there is some potential for trampling of ground flora, littering, fly-tipping and dog fouling. There is limited potential for increased public access to these areas, given the distance from the site on foot, and therefore a significant increase in recreational pressure at this CTA is unlikely. Furthermore, marked footpaths within the CTA will reduce the likelihood of trampling of ground flora and the provision of large areas of public open space within the proposed development will also reduce recreational pressure on the CTA. Overall, a negligible effect that will not be significant is predicted.
- 7.89 There are no habitats within the CTA that are considered to be highly sensitive to NO_x levels or nitrogen deposition within 50 m of the site or the roads used by development traffic. As a result, no significant adverse effects are predicted on the CTA from changes to air quality. The SuDS measures discussed in paragraph 7.85, together with the distance of the CTA from the site, will ensure that there will be no adverse effects on the water quality or hydrology of the River Glyme.

Blenheim and Ditchley Parks CTA

- 7.90 This designated site is 1.9 km from the site via the shortest route on paved paths. There are public rights of way through the CTA that run through historic parkland / wood pasture with veteran trees, as well as areas of broadleaved woodland. While these habitats are not particularly sensitive to recreational impacts, there is some potential for trampling of ground flora, littering, fly-tipping and dog fouling.
- 7.91 Despite the distance of the CTA from the site, Blenheim and (to a lesser extent) Ditchley Parks are well-known destinations in the local area, so there is the potential for an increase in recreational pressure as a result of the proposed development. However, the footpaths and tarmacked tracks will reduce the

potential for trampling of ground flora and the large area of proposed open space on the site will reduce recreational use of the CTA. Overall, a negligible effect that will not be significant is predicted.

- 7.92 There are no habitats within the CTA that are considered to be highly sensitive to NO_x levels or nitrogen deposition within 50 m of the site or the roads used by development traffic. As a result, no significant adverse effects are predicted on the CTA from changes to air quality. There are no watercourses in the CTA in the vicinity of the site, so there is no potential for significant effects as a result of changes to water quality or hydrology.

Blenheim Park – New Park and part of Great Park pLWS

- 7.93 This designated site is 1.7 km from the site via the shortest route on paved paths. There are public rights of way running through historic parkland / wood pasture with veteran trees, as well as areas of ancient woodland. As discussed above for the CTA, the potential for significant effects is reduced by the presence of tarmacked tracks and the provision of large areas of public open space as part of the proposed development. A negligible effect that will not be significant is therefore predicted as a result of increased recreational use of the pLWS.

- 7.94 There are no habitats within the pLWS that are considered to be highly sensitive to NO_x levels or nitrogen deposition within 50 m of the site or the roads used by development traffic. As a result, no significant adverse effects are predicted on the pLWS from changes to air quality. There are no watercourses in the pLWS in the vicinity of the site, so there is no potential for significant effects as a result of changes to water quality or hydrology.

Woodstock Water Meadows LWS

- 7.95 This designated site is 1.7 km from the site via the shortest route on paved paths. Public rights of way are present through the wet meadow, neutral grassland and wet woodland. While these habitats are not particularly susceptible to recreational impacts, there is some potential for trampling of ground flora, littering, fly-tipping and dog fouling. The distance of the site on foot from the LWS means that there is limited potential for increased public access and a significant increase in recreational pressure is unlikely. In addition, marked footpaths in the LWS will reduce the likelihood of trampling of ground flora and the provision of large areas of public open space on the site will also reduce recreational pressure on the LWS. A negligible effect is predicted that will not be significant.

- 7.96 The air quality assessment submitted in support of the planning application found that NO_x concentrations at the point of the A44 closest to the LWS will be well below the critical level. The sensitive habitats within the LWS are set back from the road, with the closest area of open meadow 166 m from the road's edge. The increase in NO_x concentrations as a result of the proposed development will be 0.1% of the critical level. Similarly, the increases in ammonia concentrations and nitrogen deposition will also be negligible. The effects of air pollution on the LWS will therefore be negligible and not significant.

- 7.97 The River Glyme flows adjacent to the LWS and influences its hydrology. The SuDS measures discussed in paragraph 7.85, together with the distance of the site from the river, will ensure that there will be no significant adverse effects on the water quality or hydrology of the River Glyme, and therefore the LWS, as a result of the proposed development.

Habitats and vegetation on the site

Broadleaved semi-natural woodland

- 7.98 Trees may be subject to increased arboricultural management post-construction, as a result of the health and safety concerns of management authorities. However, this is predicted to lead to a negligible effect on the habitat that will not be significant.

Hedgerows

- 7.99 Without a suitably detailed conservation management regime for retained and new hedgerows, there is a risk that lack of management may lead to tall, spindly shrubs, offering little cover near ground level, which will reduce their biodiversity value. Alternatively, excessive (i.e. annual) cutting would largely prevent fruiting or flowering and limit the hedgerows' structural complexity. This will be a small impact, leading to a slight adverse effect that will not be significant.

Fauna

Badgers

- 7.100 Badgers are a common and widespread species, protected for reasons of animal welfare rather than nature conservation. Any increase in deaths or injury caused by increased numbers of collisions with road vehicles is not anticipated to have a significant effect on local badger populations.

Bats

- 7.101 Post-construction, there will be an increase in residential and street lighting as a result of the proposed development. Without an appropriate lighting strategy, a reduction in the value of commuting and foraging corridors is likely to occur. This will be a medium impact, leading to a moderate, significant adverse effect.
- 7.102 There is also the potential for increased collisions with road vehicles. The main access road will run through the centre of the proposed development area, limiting the potential for bats foraging and commuting along green corridors to come into contact with vehicles. However, it will pass through the woodland in the east of the site and through hedgerow H2 in the west. The average speed of the road will be low and traffic volumes will be limited because the road will solely serve the proposed development. No significant effects are therefore predicted.

Dormice

- 7.103 Increased lighting at the site also has the potential to reduce the value of suitable habitat for dormouse in the absence of mitigation to minimise light spill. This could affect both new and existing habitats and reduce the population of

dormouse at the site (if present). A medium change is predicted, leading to a moderate, significant adverse effect.

- 7.104 There is likely to be an increase in the predation of dormice by domestic cats as a result of the proposed development. Deaths of dormice caused by cat predation are considered likely to be rare enough not to significantly affect the size of the local population. A negligible effect is therefore predicted that will not be significant.

Reptiles

- 7.105 There is also the potential for an increase in the predation of reptiles by domestic cats as a result of the proposed development. However, deaths of reptiles caused by cat predation are considered likely to be rare enough not to significantly affect the size of the local population. A negligible effect is therefore predicted that will not be significant.

Breeding birds

- 7.106 Where residential areas will be close to retained or new habitat, in particular rough grassland, woodland, trees and hedgerows, there is likely to be an increased predation rate by domestic cats. Considered in isolation, this could potentially reduce the local populations of generalist bird species, which will be nesting / foraging close to developed areas, particularly songbirds and including SPIs such as dunnock. A medium impact is predicted, leading to a slight adverse effect that will not be significant. Recreational disturbance is not considered likely to affect tree and hedgerow-nesting bird species, and no significant effects are predicted.

Mitigation and monitoring

Mitigation for construction effects

- 7.107 A construction method statement (CMS) will be produced, with input from a professional ecologist, subject to a planning condition and approved by Cherwell District Council. It will describe the ecology mitigation works that will precede and accompany the construction phase of the proposed development.

Habitats

- 7.108 Protective fencing, such as Heras fencing, will be installed prior to any clearance or construction work at the site around retained semi-natural habitats (including woodland, hedgerows and grassland). Fencing around individual trees and hedgerows will provide a root protection zone in accordance with BS 5837. Standard pollution prevention measures will be implemented during the construction phase, such as those set out in Defra and the Environment Agency's (2019) *Pollution Prevention for Businesses* guidance to ensure habitats are protected from pollution during construction.
- 7.109 New areas of native broadleaved woodland will be planted to the south of the main access in the east of the site and to the south and west of the proposed residential area. This will enhance commuting and foraging networks south east to north west for a range of species, including bats, other mammals, reptiles,

birds and invertebrates. Retained woodland will be enhanced through native scrub planting along the southern and western edges and infill tree planting within the woodland. This will strengthen the existing wildlife corridor formed by the woodland, particularly to the north and north west, for a range of species.

- 7.110 The small lengths of hedgerow that are to be lost will be reinstated through new hedgerow planting along the south eastern boundary adjacent to the off-site residential property. The hedgerow will be native and species-rich and will enhance habitat connectivity between hedgerow H1 and the woodland. The proposed development will also incorporate hedgerow planting in and around the built development and the more landscaped public open space areas, with these hedgerows typically being native, single species hedgerows where possible. The approximate total length of planted hedgerows will be 120 m. The retained hedgerows will be enhanced through infilling and bulking out with native tree species. Grassland and species-rich ground flora will be sown along the margins. The hedgerows will enhance commuting and foraging networks for a range of species, including bats, dormice, other mammals, amphibians, reptiles, birds and invertebrates.

Badgers

- 7.111 The badger setts will not be directly impacted by groundworks. Heras fencing will be provided at appropriate distances from the setts to protect badgers and the setts from construction vehicles. The fencing will encompass the habitats surrounding the setts in all directions and will be open at either end to ensure badgers have a commuting corridor between the setts and to the wider area. A pre-construction badger survey will be undertaken to check there has been no expansion or relocation of the setts closer to the residential development area.
- 7.112 A precautionary method statement, which will include supervision of works by an ecological clerk of works, will be produced to ensure that works between 15 m and 30 m of the badger setts do not impact the setts. If, at any stage, any disturbance to the badger setts is considered likely, works will cease and a badger licence will be sought from Natural England to allow them to proceed.
- 7.113 The following badger protection measures will be put in place through the CMS during construction to protect them from accidental killing or injury as a result of entrapment:
- Where possible, all trenches, pits and other diggings at the site will be sealed before nightfall. Where these must be left overnight, they should be completely covered with boards, or an escape ramp should be provided using boards or suitably compacted earth
 - All pipework and ironworks larger than 35 mm will be sealed or covered overnight
 - Alternatively, such trenches, pipes or other workings may be fenced off to prevent badgers coming into contact with them
- 7.114 The proposed development will result in the enhancement of the woodland and hedgerow networks at the site, as well as new woodland, hedgerows, scrub and native wildflower meadow. These will provide good opportunities for badger commuting and foraging across the site.

Bats

- 7.115 The proposed development includes the retention of the majority of habitats of particular value to foraging and commuting bats, including most of the woodland, hedgerow network and grassland margins. Trees with low to moderate bat roosting potential are to be removed to allow the construction of the main access road in the east of the site. For trees with moderate potential, a tree climbing survey and / or two emergence / re-entry surveys (Collins, 2016) will be undertaken prior to felling to determine whether any bat roosts are present. If evidence of roosting bats is discovered within the tree, an appropriate European protected species mitigation licence for the loss of the roost will be applied for from Natural England. Any mitigation required under this licence, such as the installation of a replacement roost in the form of bat boxes, will be followed. Trees with low potential will be soft-felled under the supervision of a licensed bat ecologist.
- 7.116 New areas of native broadleaved woodland will be planted either side of the main access in the east of the site and to the south and west of the residential area, as set out above. This will enhance and provide high quality commuting and foraging networks for bats, as well as potential roosting features once the woodlands have become established (minimum of 15 years).
- 7.117 The small sections of hedgerow to be lost for the access road and paths will be minimal and unlikely to disrupt bat activity and these hedgerows will be enhanced by filling and bulking out with native tree species. New hedgerows will also be created, as set out above, providing new foraging and commuting opportunities for bats. Together, these hedgerow networks will create good quality foraging and commuting habitat for bats once established (likely to be within five years).
- 7.118 Lighting will be sensitively used during the construction of the proposed development along and around the features of value to bats, to minimise disruption through habitat degradation and abandonment of roosting sites. Lighting will face directly downwards or away from the site boundaries, using directional shields where required. Particular care will be taken to minimise light spill onto the retained and newly created vegetation. Reference will be made to good practice guidance, such as the Bat Conservation Trust and Institute of Lighting Professionals (2018) *Guidance Note 08/18 – Bats and artificial lighting in the UK*.

Dormice

- 7.119 While dormice have not been confirmed as present on the site, a precautionary approach is being taken on the basis of the nearby desk study results, 2014 survey results and suitable habitat on site. Precautionary measures will be adopted during the clearance of the small lengths of hedgerows H1 and H2 and the area of woodland at the eastern boundary. A non-licensed precautionary method statement will be prepared, outlining timings of works and the sensitive removal of suitable habitat to prevent the killing or injury of dormice. Following the lighting measures prescribed above for bats will minimise disruption to dormice from habitat degradation during construction.

- 7.120 A minimum of 10 dormouse nest boxes will be provided within the retained woodland. Their positioning will be advised by an ecologist. The habitat creation and enhancement will improve connectivity across the site and to the wider landscape and will create good quality foraging and commuting habitat for dormice once established.

Reptiles

- 7.121 Given the small areas of suitable terrestrial habitat proposed to be removed, a phased approach will be undertaken to vegetation clearance, rather than a trapping and translocation exercise. Vegetation clearance will take place outside the hibernation period (i.e. from March to October, depending on the weather) and, where applicable, in accordance with the dormouse precautionary method statement. A precautionary method statement will be prepared (forming part of the CMS), outlining the timings of works and the sensitive removal of suitable habitat to prevent the killing or injury of reptiles.
- 7.122 The first stage will be for an ecologist to advise the contractor on the areas of suitable reptile habitat at the site. This will then need to be strimmed down to a height of approximately 10-15 cm. The second stage will be undertaken at least two days later and will involve further strimming down to 5 cm and, in highly suitable areas, stripping the turf to make the habitat unsuitable for reptiles. This mitigation strategy can only be adopted in suitable weather conditions when reptiles are considered to be active.
- 7.123 If vegetation clearance is proposed in the winter (November to February), when reptiles are hibernating, then the focus would be on avoiding harm to reptiles by avoiding clearance of materials that reptiles could use for hibernation purposes, such as rubble piles / bunds and hedgerow bases where gaps are present. An appointed ecologist will advise the contractor what vegetation and material can and cannot be cleared during the hibernation period.
- 7.124 The creation of new wildflower grassland, rough grassland and scrub and enhancement of retained habitats will significantly enhance the site for reptiles and provide greater connectivity, both within the site and to the wider landscape. Arisings from hedgerow and woodland removal will be used to create log and brash piles close to new and retained hedgerows, scrub and woodland to create refugia for reptiles. The measures will also benefit other reptile and amphibian species, should they move into the site from surrounding habitats in the future.

Breeding birds

- 7.125 Standard precautions will be taken during clearance works to avoid impacts to nesting birds. These will include carrying out vegetation clearance outside the bird breeding season (March to August inclusive). It may be possible for a suitably experienced ecologist to search vegetation for nesting birds prior to clearance, allowing vegetation clearance within the breeding season if necessary. If nesting birds are found, the nest and a suitable buffer area would need to be retained until any young have fledged or the nest is otherwise disused.

- 7.126 Creation of new habitat, such as hedgerows, scrub and woodland, as described above, will provide new areas of habitat for general bird species. In addition, newly created areas of native wildflower meadow and rough grassland will provide enhanced foraging habitats for a range of bird species.
- 7.127 It is unlikely that suitable measures can be provided within the proposed development to mitigate the loss of skylark territories adequately, as this species requires open ground to breed. Therefore, provisions for this species will be implemented through the creation of skylark plots within arable land elsewhere within Blenheim Estate's wider landholding. This will provide open areas for skylark to forage in, even once the main crop has become dense in the latter part of the growing season. A shift to types of crop known to be more favourable for skylark, such as growing spring-sown cereals instead of oilseed rape, should also be considered. This is likely to increase the numbers of skylark present in arable farmland areas off site, as well as increasing the reproductive success of these populations, mitigating for the loss of the resource on site.

Conclusion

- 7.128 With the above measures in place, no residual significant adverse effects are predicted on habitats or protected and priority species during construction.

Mitigation for post-construction effects

- 7.129 A landscape environmental management plan (LEMP) will be produced to describe habitat creation works (as identified above) that will precede or accompany the construction phase of the proposed development. It will also detail habitat management and monitoring works that will follow the completion of construction, which are discussed in more detail below.

Habitats

- 7.130 The retained and created hedgerows will be managed to maintain their biodiversity value through strategic cutting to improve and maintain their shape and size. A maximum of one-third of the hedgerow network will be trimmed in any one winter, which will allow flowering and fruiting across the majority of the hedgerows each year. The newly created woodland areas and infill tree planting of retained areas will be managed to ensure that the newly planted trees become established to provide a benefit to biodiversity.
- 7.131 A mowing regime will be established for the grasslands, including the native wildflower meadows and rough grasslands, which will ensure their biodiversity value is maintained. Areas will be set aside that are to be left uncut, which will be changed on a rotational basis. This will provide continual cover and resources of rough grassland for various species, including reptiles, small mammals and invertebrates. Amenity grassland identified within the public open space areas will be managed as such. Any arisings will be removed from the site and there will be no use of herbicides or fertilisers in the grassland areas.
- 7.132 Access will be restricted within certain areas of grassland to maintain their value and prevent disturbance to wildlife. This will be enforced through clearly

identifiable hard substrate and mown footpaths. The nature of the grassland (rough uncut) will also discourage regular use by pedestrians.

- 7.133 To facilitate commuting and foraging by hedgehogs, 15 cm diameter gaps will be provided beneath fences between gardens with connections to open green space.

Badgers

- 7.134 On completion of the development, the existing fence marking the edge of the northern and north eastern band of woodland will be retained and scrub will be planted around the areas closest to the badger setts to create a wider buffer between the setts and publicly accessible areas. This will significantly reduce the likelihood of badgers being disturbed by people and dogs.
- 7.135 The proposed development will result in the enhancement of the woodland and hedgerow network at the site, as well as new woodland, scrub, hedgerows, native wildflower meadows and rough grassland. These will provide good opportunities for badger commuting and foraging across the site.

Bats

- 7.136 The woodland, hedgerow and grassland management regime set out above will maintain habitat corridors for commuting and foraging bats. A sensitive lighting strategy will be produced and agreed with Cherwell District Council prior to development, with input from the project ecologist. This will be designed to minimise light spread and the illumination of features such as woodland, scrub, hedgerows and trees, to ensure that habitats potentially used by foraging bats remain unlit. Where it is not possible to avoid lighting in these areas, for safety reasons, low level bollard or sunken surface design lighting will be used. This will either face directly downwards or away from the boundaries of the site, using directional shields where required, to avoid light spillage into habitats and minimise the risk of disturbance to bats. Reference will be made to industry standard guidance.
- 7.137 As an enhancement, roosting opportunities will be provided through a minimum of 15 integrated bat boxes within the new dwellings and at least 10 bat boxes on trees in the retained and newly created woodland south and west of the residential area. Their positioning will be advised by an ecologist and approximate locations will be identified in the LEMP.

Dormice

- 7.138 The hedgerow management regime set out above will maintain habitat corridors for commuting, foraging and nesting dormice. The habitat creation will increase the area of suitable habitat available, which is likely to increase dormouse populations and outweigh the possible decrease in populations resulting from cat predation. The lighting strategy will ensure that there will be no significant adverse effects on dormice from increased disturbance.
- 7.139 A minimum of 10 dormouse nesting boxes will be provided, as discussed in the construction section above. Their positioning will be advised by an ecologist and approximate locations identified in the LEMP.

Reptiles

- 7.140 The habitat creation and management proposals for grassland areas, hedgerows and woodland will ensure continued provision of habitats and resources for reptiles, including common lizard, and are likely to result in increased populations and the possibility of new species moving into the site. This will outweigh the possible decrease in populations resulting from domestic cat predation.

Breeding birds

- 7.141 The vegetation management described above will be undertaken at appropriate times of year (i.e. between September and February) to avoid impacts on nesting birds. As an enhancement, nesting opportunities in the form of bird boxes will be provided. A minimum of 20 integrated bird boxes will be installed on new dwellings, particularly for sparrows, swifts and starlings. At least 15 bird boxes will be placed on trees within the retained and newly created woodland south and west of the residential area. Their positioning will be advised by an ecologist and approximate locations identified in the LEMP.
- 7.142 The habitat creation will increase the area of suitable habitat available, which is likely to increase bird populations and outweigh the possible decrease in populations resulting from cat predation.

Conclusion

- 7.143 With the above measures in place, no residual significant adverse effects are predicted on habitats or protected and priority species post-construction. The habitat creation and enhancement will be a medium change, leading to a moderate, significant beneficial effect on habitats in the area. This is also predicted to lead to increases in the populations of several species using the site, which will be an impact of medium magnitude and a slight to moderate, significant beneficial effect.

Biodiversity net gain

- 7.144 The current and potential future biodiversity value of the proposed development was evaluated using Defra's Biodiversity Metric 3.1. The assessment found that there will be an overall 36.10% habitat net gain and a 33.09% linear features (hedgerows and lines of trees) net gain as a result of the proposed development. The full net gain assessment and calculations are included in technical appendix E.

Residual effects

- 7.145 The significant residual effects are summarised in table 7.6.

Topic	Significant residual effect	Receptor importance	Impact magnitude	Nature	Duration	Degree of effect	Level of certainty
Natural heritage	Creation and enhancement of a range of habitats	Medium to high	Medium	Beneficial	Long term	Moderate	Reasonable
	Increased populations of a range of protected and priority species	Low to medium	Medium	Beneficial	Long term	Slight to moderate	Reasonable

Table 7.6: Significant residual effects

Cumulative effects

- 7.146 As set out in chapter 3, the potential for cumulative effects with a number of other consented and proposed developments needs to be considered. The Land at Myrtle Farm, Long Hanborough and Land between Wychwood House and Malvern Villas, Freeland schemes are small scale developments at a considerable distance from the site that are unlikely to affect any designated sites. As a result, it is considered that there is no potential for significant cumulative effects with those developments.
- 7.147 The North Witney Strategic Development Area is over 10.5 km from the site, which is a significant distance in ecological terms. Given this, and the fact that the applications submitted for parts of this development did not identify any potential for significant effects on designated sites, it is considered that there is no potential for significant cumulative effects with this scheme. The Oxford Park and Ride site is not a residential development and the planned route would be into Oxford, meaning that additional visitors would not be brought into Woodstock. As such, it is considered that there is no potential for significant cumulative effects with the Park and Ride scheme.
- 7.148 The ecological assessments of the Land East of Woodstock, Land North of Hill Rise and Land North of Banbury Road, Woodstock, Land South of Witney Road and Land North of Witney Road, Long Hanborough developments did not identify any significant residual adverse effects, with net gains identified for biodiversity and protected species populations. There will therefore not be any significant adverse cumulative effects on habitats or species with these developments. The distance of the application site from the Salt Cross Garden Village, Eynsham and East Witney Strategic Development Area sites means that no significant adverse cumulative effects are predicted on habitats or species with these developments either.
- 7.149 The ecological assessment of the Land South of Witney Road, Long Hanborough development (AA Environmental, 2014) did not predict any adverse effects on the Blenheim Park SSSI. It did not consider Oxford Meadows SAC, so no effects are likely from the development on the SAC. No significant cumulative effects are therefore predicted on designated sites with this development.
- 7.150 The Land East of Woodstock, Land North of Banbury Road, Land North of Hill Rise, Land North of Witney Road and Salt Cross Garden Village ecology assessments (BSG Ecology, 2016, 2021 and 2022 and Stantec, 2020) also assessed the potential for effects on Blenheim Park SSSI. They concluded that, while there will be additional visitor pressure from new residents, facilities are in place to ensure the conservation status of the SSSI is not negatively affected. The developments will also all provide public open space on site to reduce visitor numbers within the wider area. No significant effects were predicted from these developments on Blenheim Park SSSI as a result of increased recreational pressure. The distance of East Witney Strategic Development Area from the SSSI means that there is also no potential for significant effects from that development. No significant cumulative effects are therefore predicted on Blenheim Park SSSI from increased recreational use.

- 7.151 The assessments of the above developments also concluded that there would be no significant effects on Blenheim Park SSSI as a result of increased air pollution impacts, either from the developments alone or in combination with other schemes. The current air quality modelling predicted changes in NO_x concentrations above 1% of the critical level between 50 m and 100 m from the A44 and A4095 as a result of the cumulative developments. However, the increases will be small and the critical level will not be exceeded. Changes in ammonia concentrations of over 1% of the critical level were predicted between 0 m and 30 m from the A44 and A4095. Again, however, the critical level will not be exceeded. Nitrogen deposition in excess of 1% of the critical load was only predicted at roadside locations. As discussed above, the woodland areas of the SSSI are beyond the distance at which significant effects from vehicle emissions are considered likely and no significant cumulative effects are predicted.
- 7.152 The distance of all the developments from the Oxford Meadows SAC, the need to travel by car and the limited access to the SAC meant that no significant effects were predicted as a result of increased recreational pressure. Therefore, there will be no significant cumulative effects on the SAC from increased visitor numbers. The other assessments also concluded that there would be no significant effects on Oxford Meadows SAC as a result of increased pollution impacts, either from the developments alone or in combination with other schemes.
- 7.153 The current air quality modelling predicted changes in NO_x, ammonia and nitrogen deposition that equate to more than 1% of the relevant critical levels and loads in parts of the SAC as a result of the proposed development in combination with other schemes. However, the shadow appropriate assessment submitted in support of the planning application concluded that there will be no significant in combination effects on the SAC because the area affected by the changes is relatively small and the exceedances are not likely to prevent the conservation objective of reducing nitrogen deposition below the critical loads being met.
- 7.154 This is because road traffic contributes less than 10% of the nitrogen deposition on the SAC (APIS, 2022). Over one-third of total nitrogen deposition comes from agricultural uses, which are a much more significant source of nitrogen that must be reduced to achieve the conservation objective. In addition, nitrogen deposition from traffic sources has been declining, and is predicted to continue to decrease to 2034. Additional traffic contributions from the developments are not likely to reverse this downward trend. As a result, no significant cumulative adverse effects are predicted on the SAC from changes to air quality.

Sensitivity of receptor – Natural heritage

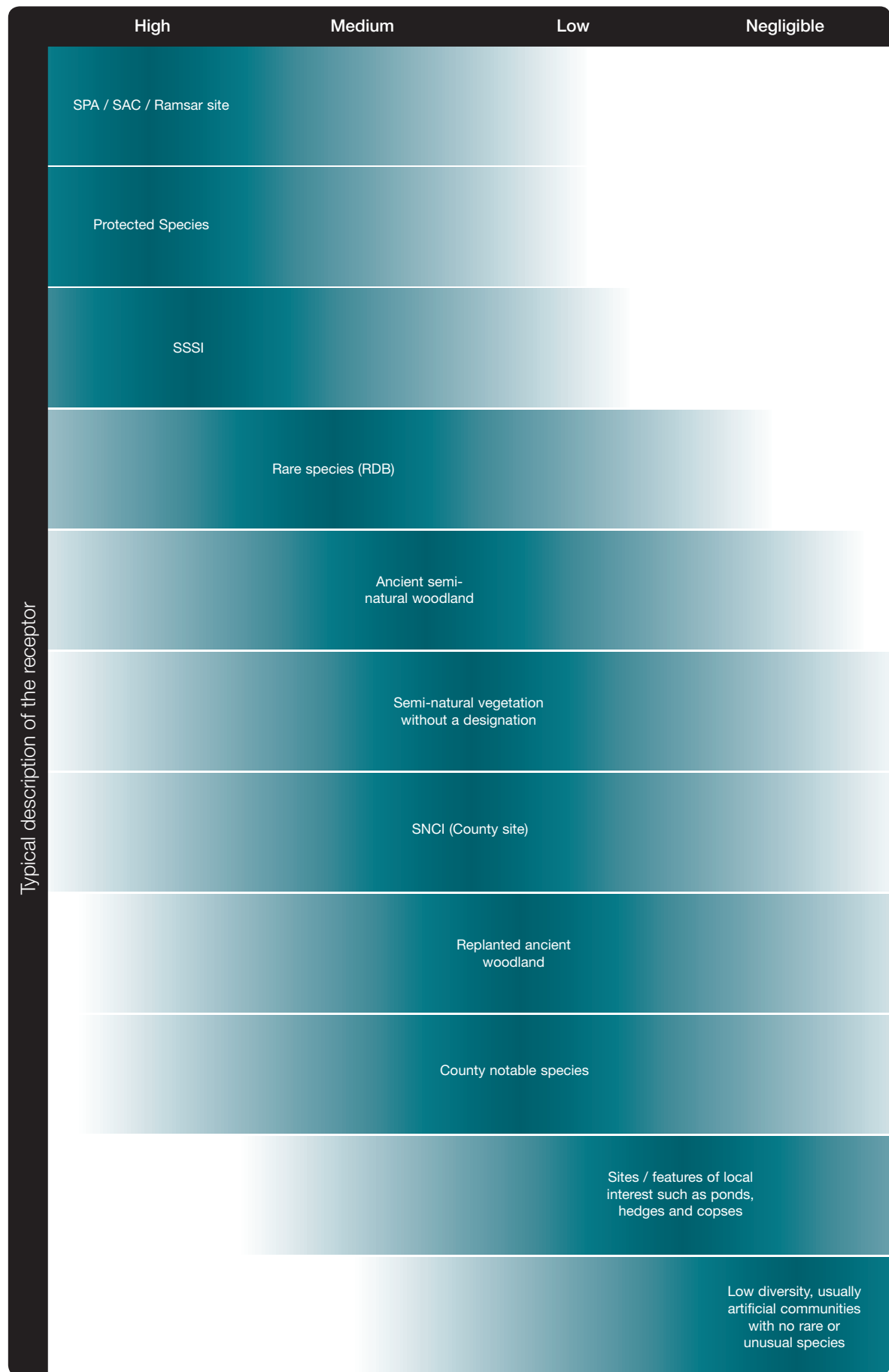


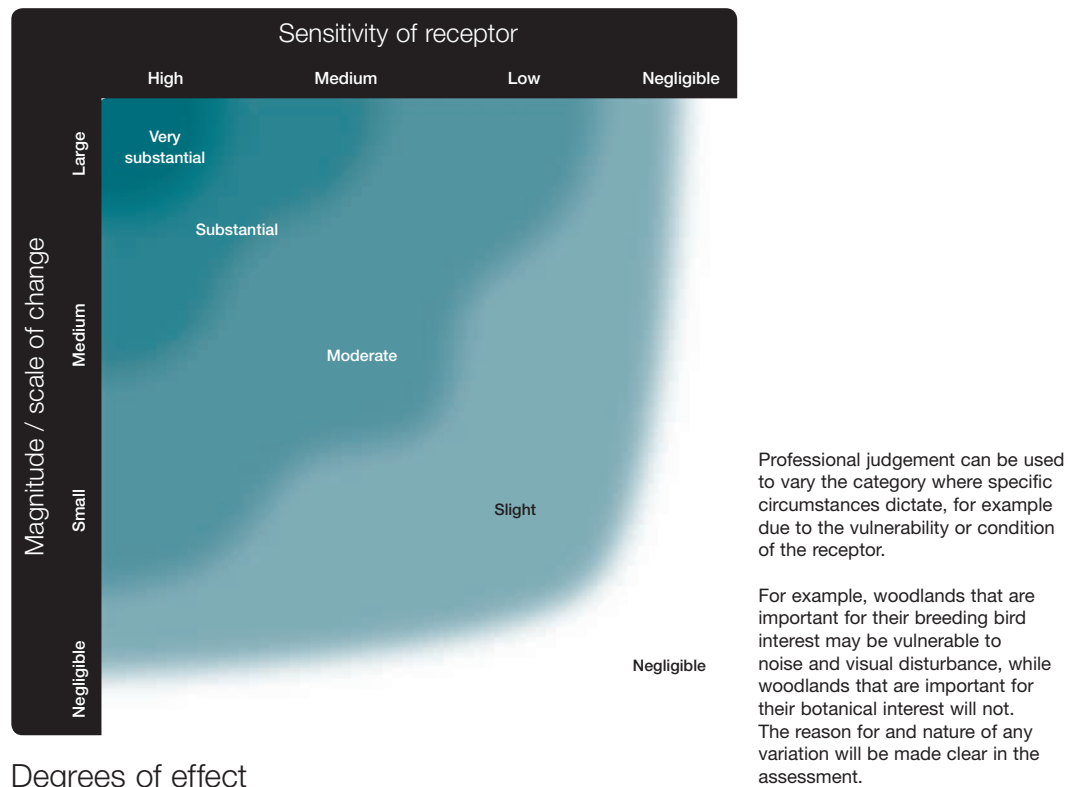
Figure 7.1 Receptor sensitivity (natural heritage)

Magnitude of change – Natural heritage



Figure 7.2 Impact magnitude (natural heritage)

Determination of effect matrix – Natural heritage



Degrees of effect

Very substantial:

A major change in the numbers of one or more very important species or the composition or extent of very important communities, or those which support beneficial or very important species. This might be a reduction or complete eradication of a species, which for some organisms could lead to a negative effect on the functioning of the particular ecosystem and/or other connected ecosystems.

Substantial:

A marked change in the numbers of one or more important or very important species or the composition or extent of important or very important communities, or those which support beneficial or important species.

Moderate:

A marked change in population densities or community composition or extent, but not a change which results in total eradication of a species or community or which has any marked effect on important or beneficial species, or important communities.

Slight:

Some change in the population densities or community composition or extent, but without total eradication of any species or community, and with no effects on important species or communities, or ecosystem function.

Negligible:

No marked changes in any of the populations in the environment or in any ecosystem functions.

Significance

If the degree of effect is moderate or above, then the effect is considered to be significant.



Legend

- Target note
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Hedge with trees - native species-rich
- Dry ditch
- Broadleaved woodland - semi-natural
- Poor semi-improved grassland
- Cultivated/disturbed land - arable
- Site boundary

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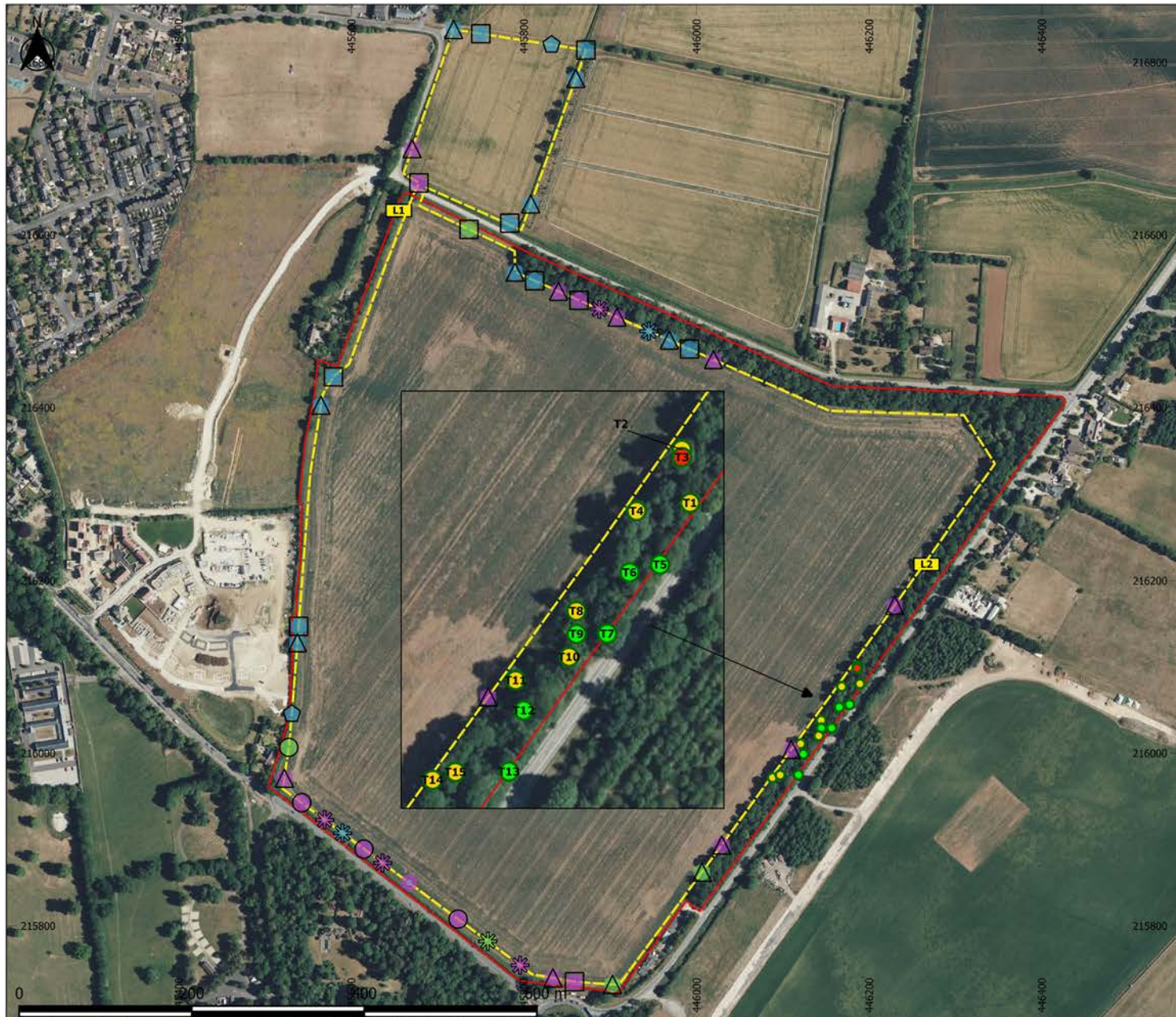
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Figure 7.4 Phase 1 habitat survey



Legend

- L1 Automated detector locations
- Bat transect route
- Bat species
- Common pipistrelle
- △ Soprano pipistrelle
- Leisler's
- ◡ Myotis species
- ☼ Noctule
- Date of survey
- August
- May
- September
- Trees with bat suitability
- High
- Moderate
- Low
- Site boundary

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Land East of
Park View
Woodstock

Figure 7.5 Bat survey results