8 ECOLOGY

8.1 INTRODUCTION

8.1.1 This Chapter presents the approach and findings of the assessment of potential effects of the Proposed Development on ecology and nature conservation. The Chapter first presents the relevant legislation and policy which has informed the assessment. The methods that have been followed to obtain the baseline information, subsequent assessment of their value and impacts on these are presented.

8.1.2 The Chapter then presents a summary of the baseline conditions at the Application Site (the boundary of which is indicated in **Figure 8.1**) and surrounding area, as appropriate. The Chapter goes on to identify important ecology features that could be affected by the Proposed Development, and describes any potential effects. It then assesses the likely magnitude and significance of these effects, taking into account the mitigation already designed into the scheme as set out in the Composite Parameter Plan included in **Figure 4.1**. Appropriate additional avoidance, mitigation or compensation measures necessary to reduce these effects to an acceptable level are identified, and the significance of any residual effects are finally assessed. The residual effects are further considered cumulatively with those of other schemes, as identified in Chapter 2: EIA.

8.2 LEGISLATIVE AND POLICY FRAMEWORK

National Planning Policy Framework

8.2.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is the presumption in favour of sustainable development; all developments that accord with the development plan should be approved without delay. The following paragraphs of the NPPF are relevant to the consideration of ecological matters in this ES.

8.2.2 Paragraph 9 sets out how pursuing sustainable development in relation to the quality of the natural environment can be achieved, in particular, by moving from a net loss of biodiversity to achieving net gains for nature. Paragraph 109 expands on this point. It states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible.

8.2.3 Paragraph 117 of the NPPF makes a provision that local authorities should seek to promote the preservation, restoration and re-creation of priority habitats and recovery of priority species populations, linked to national and local targets, through planning policies. Priority habitats and species referred to in the NPPF relate to Species of Principal Importance (SPI) and Habitats of Principal Importance (HPI) listed in accordance with section 41 of the NERC Act 2006.

8.2.4 With reference to planning applications and biodiversity, paragraph 118 of the NPPF states that:

> **"When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:**
>
> **If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful**

impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

Proposed development on land within or outside a Site of Special Scientific Interest (SSSI) likely to have an adverse effect on a SSSI (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs;

Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;

Opportunities to incorporate biodiversity in and around developments should be encouraged;

Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and

The following wildlife sites should be given the same protection as European sites: (1) potential Special Protection Areas (SPA) and possible Special Areas of Conservation (SAC); (2) listed or proposed Ramsar sites; and (3) sites identified, or required, as compensatory measures for adverse effects on European sites, potential SPAs, possible SACs, and listed or proposed Ramsar sites."

Planning Practice Guidance

8.2.5 The government's Planning Practice Guidance was released as an online resource in March 2014 and variously updated and supersedes historic planning guidance documents and circulars.

8.2.6 The Planning Practice Guidance (DCLG, 2014) provides further guidance with respect to ecological issues. In Paragraph 007 (Reference ID: 8-007-20140306), it reinforces what was laid out in the National Planning Policy Framework:

"Pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution."

Adopted Cherwell Local Plan (2011-2031) Part I

8.2.7 Part I of the Local Plan was formally adopted by CDC on 20 July 2015. In this plan, the policies relevant to this application are as follows, together with relevant extracts.

Policy ESD 10 Protection and Enhancement of Biodiversity and the Natural Environment

8.2.8 Protection and enhancement of biodiversity and the natural environment will be achieved by the following:

- In considering proposals for development, a net gain in biodiversity will be sought by protecting, managing, enhancing and extending existing resources, and by creating new resources.
- The protection of trees will be encouraged, with an aim to increase the number of trees in the District.
- The reuse of soils will be sought.
- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or as a last resort, compensated for, then development will not be permitted.
- Development which would result in damage to or loss of a site of international value will be subject to the Habitats Regulations Assessment process and will not be permitted unless it can be demonstrated that there will be no likely significant effects on the international site or that effects can be mitigated.
- Development which would result in damage to or loss of a site of biodiversity or geological value of national importance will not be permitted unless the benefits of the development clearly outweigh the harm it would cause to the site and the wider national network of SSSIs, and the loss can be mitigated to achieve a net gain in biodiversity/geodiversity.
- Development which would result in damage to or loss of a site of biodiversity or geological value of regional or local importance including habitats of species of principal importance for biodiversity will not be permitted unless the benefits of the development clearly outweigh the harm it would cause to the site, and the loss can be mitigated to achieve a net gain in biodiversity/geodiversity.
- Development proposals will be expected to incorporate features to encourage biodiversity, and retain and where possible enhance existing features of nature conservation value within the site. Existing ecological networks should be identified and maintained to avoid habitat fragmentation, and ecological corridors should form an essential component of green infrastructure provision in association with new development to ensure habitat connectivity.
- Relevant habitat and species surveys and associated reports will be required to accompany planning applications which may affect a site, habitat or species of known or potential ecological value.
- Air quality assessments will also be required for development proposals that would be likely to have a significantly adverse impact on biodiversity by generating an increase in air pollution.
- Planning conditions/obligations will be used to secure net gains in biodiversity by helping to deliver Biodiversity Action Plan targets and/or meeting the aims of Conservation Target Areas. Developments for which these are the principal aims will be viewed favourably.
- A monitoring and management plan will be required for biodiversity features on site to ensure their long term suitable management.

Policy ESD 11 Conservation Target Areas

8.2.9 Where development is proposed within or adjacent to a Conservation Target Area biodiversity surveys and a report will be required to identify constraints and opportunities for biodiversity enhancement. Development which would prevent the aims of a Conservation Target Area being achieved will not be permitted. Where there is potential for development, the design and layout of the development, planning

conditions or obligations will be used to secure biodiversity enhancement to help achieve the aims of the Conservation Target Area.

Policy ESD 17: Green Infrastructure.

8.2.10 The most relevant measure connected to ESD 17 concerning ecology is:

- Pursuing opportunities for joint working to maintain and improve the green infrastructure network, whilst protecting sites of importance for nature conservation.

Cherwell Local Plan (2011-2031) Part 2

8.2.11 The emerging Cherwell Local Plan (2011-2031) Part 2 has reached the Regulation 18 consultation stage. With reference to the Natural environment, this identifies "**the need for more detailed Development Management policies on biodiversity enhancement**" and "**consider the need for additional guidance on areas of tranquillity**".

8.2.12 There are however currently no more detailed policies being put forward which add to those in the adopted plan.

Cherwell Local Plan 1996

8.2.13 A number of policies from the Cherwell Local Plan (Adopted 1996) continue to be used when making planning decisions until they are replaced by the Local Development Framework.

8.2.14 The nature conservation policies contained within these Plans which are of relevance to the assessment are listed below.

- C1: The Council will seek to promote the interests of nature conservation. Development which would result in damage to or loss of sites of special scientific interest or other areas of designated wildlife or scientific importance will not normally be permitted. Furthermore, the council will seek to ensure the protection of sites of local nature conservation value. The potential adverse effect of development on such sites will be a material consideration in determining planning applications.
- C2: Development which would adversely affect any species protected by Schedule 1, Schedule 5 and Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) and by the EC Habitats Directive 1992 will not normally be permitted.
- C4: The council will seek to promote the creation of new habitats. In urban areas the council will promote the interests of nature conservation within the context of new development and will establish or assist with the establishment of ecological and nature conservation areas, where such areas would further the opportunity for environmental education and passive recreation and would not conflict with other policies in the plan.

The Conservation of Habitats and Species Regulations 2017

8.2.15 The Conservation of Habitats and Species Regulations 2017 consolidates the various amendments that have been made to the original (2010) Regulations, transposing the Habitats Directive (Directive 92/43/EEC) and the Birds Directive (Directive 2009/147/EC), which set out the rules for protection, management and exploitation of European Protected Species and Habitats.

8.2.16 “European protected species” (EPS) of animal are those which are present on Schedule 2 of the 2017 Regulations. They are subject to the provisions of Regulation 43

of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended).

8.2.17 The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. Under the Regulations, competent authorities i.e. any Minister, Government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive.

The Natural Environment and Rural Communities (NERC) Act, 2006

8.2.18 This Act places a duty on all public bodies to have regard to the conservation of biodiversity when exercising their duties, and requires the secretary of state to identify a list of habitats and species which are of principal importance for the conservation of biodiversity in England (Section 41 habitats and species). The presence of species or habitats of principal importance is a material consideration in planning decisions, in accordance with the NPPF and Planning Practice Guidance.

The Wildlife and Countryside Act, 1981 (as amended)

8.2.19 This act provides national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive) in Great Britain. The Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs), provides protection to all wild birds and special protection for certain species of birds, animals and plants listed in the Schedules of the Act.

8.2.20 Certain plant species are listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended, making it an offence to plant or cause them to grow in the wild).

The Countryside Rights of Way Act, 2000

8.2.21 The "CRoW Act" primarily provides for public access on foot to areas of open land. However, it also strengthens the legal protection for species under the Wildlife and Countryside Act, 1981 (as amended) and introduces a new offence relating to reckless disturbance and/or killing and injury of these species. The CRoW Act also provides increased powers for the protection and management of SSSIs.

The Protection of Badgers Act, 1992

8.2.22 This Act 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. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. This legislation was introduced for welfare, rather than for reasons of conservation.

The Wild Mammals (Protection) Act, 1996 (as amended)

8.2.23 Under the Wild Mammals (Protection) Act 1996 it is an offence to cause unnecessary suffering to wild mammals, including crushing and asphyxiating. This Act is primarily concerned with animal welfare and aims to prevent cruelty. As a result, offences include those actions with the intent to inflict unnecessary suffering. A wild mammal includes any mammal which is not domestic or captive. Red foxes, wild deer and other mammals such as rabbits are therefore covered by the Act.

Other Guidance

BS42020 - Biodiversity. Code of practice for planning and development

8.2.24 BS42020:2013 (BSI, 2013) sets out a code of practice for planning and development with regard to biodiversity. With reference to Ecological Impact Assessment, it states that ecological impacts should be assessed, and recommendations for appropriate mitigation, compensation and enhancement made, in accordance with CIEEM Guidance (IEEM, 2006).

Biodiversity and Planning in Oxfordshire

8.2.25 Biodiversity and Planning in Oxfordshire (BBOWT et al., 2014) was produced by Berks, Bucks and Oxon Wildlife Trust (BBOWT), Oxfordshire County Council and Thames Valley Environmental Record Centre (TVERC). It highlights the main biodiversity issues which must be considered at the planning stage of any proposals, including Habitats of Principal Importance (HPI) and Species of Principal Importance (SPIs) as defined by the NERC Act 2006, as well as Conservation Target Areas (CTAs). The potential presence in the Application Site and the inclusion of any of these in the proposed Nature Conservation Areas is considered in this Ecology chapter. Particular attention has been paid in this chapter to lowland meadow, ponds, reed beds and hedgerows in terms of HPIs and brown hairstreak and farmland birds as these are the most relevant.

8.3 ASSESSMENT METHODOLOGY

Study Area

8.3.1 The Study Area was chosen to include the area over which the Proposed Development would potentially exert biophysical changes (both direct effects, such as habitat loss, and indirect effects, such as increased recreational pressure) that might impact upon ecology features. The Study Area for habitats and the majority of species under consideration is limited to the Application Site and its boundaries. However due to the fact that certain species such as bats and birds are mobile, this has had to be considered in the assessment.

8.3.2 Designated wildlife sites have been considered up to the following distances from the Application Site: International/European sites - 5 km; National and County/District sites - 2 km. These distances reflect the assumption that large sites designated at the European level are likely to be subject to much higher recreational impacts, with people travelling many kilometres in order to visit them, whereas small locally designated sites typically have a much smaller catchment area for visitors, and the movement of the species for which these local sites have been designated (typically plants, reptiles and invertebrates) is often limited to relatively short distances.

Surveys

Desk Study

8.3.3 The data search carried out to inform the baseline and subsequent assessment has included both a data search with the Thames Valley Environmental Records Centre (TVERC), a consultation of available online interactive mapping tools (magic.gov.uk[1]), and a consultation of previous baseline and monitoring reports which cover the Application Site or parts of it.

[1] Accessed on 05 September 2017.

8.3.4 The desk study carried out with TVERC included a request for all records of protected, notable and invasive species and information on all non-statutory designated sites within 2km of the Application Site's boundary.

8.3.5 The information pertaining to designated sites (national within 2km and international within 5km) was gained through consulting available online interactive mapping tools (magic.gov.uk[1]).

8.3.6 The baseline and monitoring reports[2] used to gain further background information include:

- National Vegetation Classification (NVC) surveys were conducted within the Application Site in 2014, 2015 and 2016 (4Acre Ecology, 2014, 2015 and 2017a).
- 4Acre Ecology (2016a). *Heyford Park, Oxfordshire Flying Field Monitoring - Summary Report.*
- 4Acre Ecology (2016b). *Heyford Park Flying Field - Breeding Bird survey 2016*.
- 4Acre Ecology (2017b). *Heyford Park Flying Fields Invertebrate Survey 2016.*
- 4Acre Ecology (2017c). *Heyford Park Flying Field Reptile Monitoring Survey 2016.*
- 4Acre Ecology (2017d). *Heyford Park, Oxfordshire - Great Crested Newt Survey 2014*.

Field surveys

8.3.7 A number of field surveys were completed to gain more up to date or detailed information regarding certain ecological features within the Application Site. These are as follows:

- Extended Phase 1 Habitat Survey – The methods and findings of this survey are detailed in the Designated Sites, Habitats and Plants Baseline Report (BSG Ecology, 2017a) included in **Appendix 8.1**. In summary, the Application Site was covered by an extended Phase 1 habitat survey of the Application Site was carried out on 05 April, 06 April, 18 April, 22 May and 10 August 2017 by Stephen Beal ACIEEM. Stephen is a Senior Ecologist at BSG Ecology, with over seven years' experience conducting habitat and botanical surveys.
- Hedgerow Assessment – The hedgerows within the Application Site were subject to a more detailed survey aimed at determining whether they conform to the criteria of Important Hedgerows under the Hedgerow Regulations 1997. The methods and findings of this survey are detailed in the Designated Sites, Habitats and Plants Baseline Report (BSG Ecology, 2017a) included in **Appendix 8.1**.
- Bat surveys – the bat surveys of the Application Site included activity surveys, ground level inspection of trees and buildings for features suitable to support roosting bats and subsequent emergence and/or Potential Roost Features (PRF) inspection by licensed tree climbers targeting features thus recorded. The methods and findings of these surveys are detailed in the Bat Survey Report (BSG Ecology 2017b) included in **Appendix 8.2**.
- Badger surveys – a combination of desk study and direct survey was undertaken. Any evidence noted during the Extended Phase 1 Habitat Survey of the Application Site, such as prints, latrines, dung pits or setts, was recorded. Incidental evidence observed during other surveys of the Application Site were also collated. To be included within **Confidential Appendix 8.3.**

[2] These can be obtained on request from the Applicant.

Consultation

8.3.8 A workshop was held with ecology representatives of Cherwell Locality, Oxfordshire County Council (protected species and Environmental Strategy), Cherwell District Council and Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) on 26 July 2017. The workshop considered a range of ecological issues including; loss of habitat arising from the development and options for mitigation and compensation to ensure a net gain in biodiversity; proposed public use of part of the airfield; proposed filming use of the eastern end of the airfield and approaches to safeguarding protected species, in particular great crested newts and breeding birds.

8.3.9 On 21 February 2018, due to some small amendments to the Masterplan layout, further consultation was carried out at a project meeting with Sarah Postlethwaite (Ecologist for Oxfordshire County Council), Louise Sherwell (Cherwell District Council/Warwickshire County Council), Haidrun Brieth (BBOWT) to discuss the final mitigation and compensation proposals, with special regard to the compensation being proposed to address the potential biodiversity impact as assessed through the use of the Biodiversity Impact Assessment Calculator (Warwickshire Coventry and Solihull, 2014).

Assessment of features and impacts

8.3.10 The EcIA process documented in this Chapter has been undertaken with reference to relevant parts of the Guidelines for Ecological Impact Assessment in the UK and Ireland, published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2016). Although this is recognised as current best practice for ecological assessment, the guidance itself recognises that it is not a prescription about exactly how to undertake an EcIA; rather, it aims to *"***provide guidance to practitioners for refining their own methodologies***".*

Identification of Important Ecological Features

8.3.11 The first step in the EcIA process is determination of which ecological features (habitats, species, ecosystems and their functions/processes) are important. Important features should then be subject to detailed assessment if they are likely to be effected by the Proposed Development. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts such that there is no risk to their integrity or viability.

8.3.12 Ecological features can be important for a variety of reasons and the rationale used to identify these is explained below. Importance may relate, for example, to the quality or extent of designated sites or habitats, to habitat/species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline.

8.3.13 The habitats present were also assessed against criteria for Habitats of Principal Importance (HPI) in England (under Section 41 of the NERC Act 2006) and determining whether they qualify for habitats listed elsewhere such as in Annex I of the EU Habitats Directive. The presence of a HPI would be a planning consideration in accordance with the NERC Act 2006.

Determining Importance

8.3.14 The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case: International (European); National (United Kingdom); Regional (South East England); County (Oxfordshire); Local (Cherwell District); and Site.

Impact Assessment

8.3.15 The impact assessment process involves (1) identifying and characterising impacts (taking account of any designed-in mitigation); (2) incorporating additional measures to mitigate for these impacts (including avoidance and compensation); (3) assessing the significance of any residual effects after mitigation; and (5) identifying opportunities for ecological enhancement.

8.3.16 It is only necessary to assess and report significant residual effects (those that remain after mitigation measures (including avoidance and compensation measures) have been taken into account). However, it is good practice for the EcIA to make clear both the potential significant effects without mitigation and the residual significant effects following mitigation. This process of assessment without mitigation helps to identify necessary and relevant mitigation measures that are proportionate to the size, nature and scale of anticipated impacts.

8.3.17 The assessment only needs to describe those characteristics of impacts that are relevant to understanding the ecological effect and determining the significance. It should consider, as appropriate: direct, indirect, secondary and cumulative impacts and whether the impacts and their effects are of short, medium or long-term duration, permanent, temporary, reversible, irreversible. In this Chapter, positive effects are referred to as beneficial; negative effects as adverse. The assessment of impacts then takes into account the baseline conditions to describe: (1) how the baseline conditions will change as a result of the project and associated activities; (2) cumulative impacts of the proposal and those arising from other developments.

8.3.18 The CIEEM (2016) guidance sets out information in paragraphs 5.25 through to 5.29 about the concept of ecological significance and how it relates to the ability to deliver biodiversity conservation objectives for a given feature.

Significant Effects

8.3.19 The Ecology Chapter focuses on those ecological features likely to experience significant effects (adverse or beneficial). The rationale used to either select ecological features, or scope them out of more detailed assessment, are identified in the text.

8.3.20 Prior to the specification of additional mitigation, significant effects are qualified with reference to an appropriate geographic scale, and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

8.3.21 The nature of the identified impacts on each assessed feature is characterised. This is considered, along with available research, professional judgement about the sensitivity of the feature affected, and consideration of how the impact is likely to affect the designated site, habitat, or species population's structure and ability to continue to function. Where it is concluded that an effect would be likely to reduce the viability or integrity of an assessed feature, it is described as significant. The degree of significance of the effect takes into account the geographic context of the feature's importance and the degree to which its interest is judged to be affected.

8.3.22 After the specification of additional mitigation, the residual effects are then assessed for their significance in the context of national and local planning policy. Significant effects are defined in the CIEEM guidance as follows: "**A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect is a positive or negative ecological effect that should be given weight in judging**

whether to authorise a project." *The guidance further points out that* "**A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission**." (CIEEM, 2016, p. 24).

Achieving a Net Gain in Biodiversity Value

8.3.23 Government policy as set out in NPPF paragraph 9 states that Pursuing sustainable development involves seeking positive improvements in the quality of the built, natural and historic environment, as well as in people's quality of life, including (but not limited to): (2nd bullet point) moving from a net loss of biodiversity to achieving net gains for nature. Paragraph 109 of the NPPF builds on this broad element of sustainable development and states that The planning system should contribute to and enhance the natural and local environment by (3rd bullet point) minimising impacts on biodiversity and promoting net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures. The above method based on that set out for EcIA in CIEEM (2016) aims to assess effects on important ecological features. The effect on biodiversity more widely, including common and widespread habitats and species is hard to assess through this method. Therefore, to ensure compliance with government policy to achieve no net loss and a net gain where possible, a biodiversity offsetting calculator has been used as tool to determine whether the Proposed Development as a whole is likely to be compliant with government policy.

8.3.24 The Biodiversity Impact Assessment Calculator (Warwickshire Coventry and Solihulll, 2014) has been used to calculate the biodiversity value of the Application Site before and after development. This enables determination of whether the proposed development is likely to result in no net loss, loss or gain in biodiversity credits. The calculator is a metric used to numerically quantify the value of biodiversity at any site and can form an evidence base on required mitigation for a development, the amount of residual biodiversity impact and if necessary the amount of required compensation. The metric is limited in that it does not factor in the location of ecological features; so for example, creating new habitat next to existing habitat of high value would obtain the same outcome as creating habitat within an area surrounded by development. In this case the former would be of much greater value to nature conservation, as it will strengthen and connect the existing ecological resource rather than create habitat where it will be isolated and subject to a greater range of indirect impacts from neighbouring development.

Assumption and Limitations

8.3.25 The need for further surveys of the trees within the Application Site has been identified so as to identify the species using the potential roost features (PRFs) and levels of use. Considering current best practice guidance (Collins, 2016), these would take the form of emergence surveys. However, the baseline conditions and subsequent analysis of likely effects is based on a combination of professional judgement and interpretation of other data gathered for the Application Site (such as activity surveys). A precautionary approach to this assessment has therefore been applied.

8.3.26 Due to a technical failure with the automated detector, a lower survey effort was undertaken Location 2 (13 nights rather than 15 with only one in September). However, given that a total of 13 nights of data were obtained for this location already, it is considered that a robust baseline of information was thus gained and this is not a significant limitation to the study.

8.4 BASELINE CONDITIONS

8.4.1 This section sets out the current baseline, as determined through a combination of desk study and direct surveys as set out above in Section 8.3. This is set out with reference to designated sites, habitats and protected and/or notable species or species groups. Each identified feature of ecological interest is evaluated at a geographical context.

Statutory Designated Sites

8.4.2 There are no internationally designated statutory sites (including Ramsar sites, Special Area for Conservation or Special Protection areas) within 5km of the Application Site.

8.4.3 There is one statutory designated site within 2 km of the Application Site boundary cited for its biological value: Ardley Cutting and Quarry Site of Special Scientific Interest (SSSI). This is shown in **Figure 8.1**. This near-linear 40 ha site is located 130 m from the Application Site boundary at the closest point and runs north-west to south-east. It is cited for biological interest (as well as geological) which includes:

- Limestone grassland on the steep banks of the railway cutting and the adjacent quarry which forms the main biological interest. It is one of the largest limestone grassland sites in the Oxfordshire Cotswolds where unimproved grassland is now very rare. The tall sward is either dominated by upright brome *Bromopsis erectus* or a mixture of brome and tor-grass *Brachypodium pinnatum*. The grassland contains a variety of species associated with limestone grassland including quaking grass *Briza media*, basil thyme *Acinos arvensis*, clustered bellflower *Campanula glomerata*, dropwort *Filipendula vulgaris* and sainfoin *Onobrychis viciifolia*. Other species which are locally common in the sward include horseshoe vetch *Hippocrepis comosa*, kidney vetch *Anthyllis vulneraria*, glaucous sedge *Carex flacca*, blue fleabane *Erigeron acer*, bee orchid *Ophrys apifera*, green-winged orchid *Orchis morio* and cowslip *Primula veris*.
- Woodland which includes species such as lords and ladies *Arum maculatum*, wood anemone *Anemone nemorosa* and the uncommon green hellebore *Helleborus viridis*.
- A seasonally dry pool at its base which is contiguous with a low lying, marshy section containing willow carr and a flora dominated by soft rush *Juncus effusus*, reedmace *Typha latifolia*, reed canary grass *Phalaris arundinacea*, and water mint *Mentha aquatica*.
- The invertebrate fauna is particularly rich along the railway cutting, with large populations of calcareous grassland butterflies like small blue *Cupido minimus*, brown argus *Aricia agestis*, dark green fritillary *Argynnis aglaja*, green hairstreak *Callophrys rubi* and Duke of Burgundy *Hamearis lucina*, all of which are uncommon in Oxfordshire. There is also a colony of the nationally rare four-spotted moth *Tyta luctuosa* whose larvae feed on field bindweed *Convolvulus arvensis*, as well as the nationally uncommon leaf beetles *Cryptocephalus hypochaeridis* and *C. moraei*.
- The Cutting and adjacent quarry also support a large population of great crested newt *Triturus cristatus* which spreads into several adjacent quarries.

8.4.4 Given its status as a SSSI, this ecological feature is considered to be of **National value**.

Non-statutory Designated Sites and Areas

8.4.5 There are two non-statutory designated Local Wildlife Sites and two designated Conservation Target Areas within 2km of the Application Site (see **Figure 8.1**). These are:

- **Upper Cherwell Valley Conservation Target Area (CTA)** - This is a designation which aims to target conservation projects to maximise their value for other valuable receptors or designated sites. This site covers a range of habitats including: floodplain grazing marsh, lowland meadows and river. This site also supports a range of protected and notable species including otter *Lutra lutra*, water vole *Arvicola amphibious,* curlew *Numenius arquata* and lapwing *Vanellus vanellus* on the grazing marsh, tree sparrow *Passer montanus*, reed bunting *Emberiza schoeniclus*, skylark *Alauda arvensis*, grey partridge *Perdix perdix*, yellow wagtail *Motacilla flava*, yellowhammer *Emberiza citronella* and bullfinch *Pyrrhula pyrrhula.* This site is located 930m from the western edge of the Application Site. This ecological feature as a whole is likely to be of **County or Regional value**.
- **Tusmore and Shelswell Parks CTA –** This site is located approximately 1.8km to the east and encompasses the parks and woodland at Tusmore and Shelwell Parks and a number of ancient woodlands near Stoke Lyne. This ecological feature as a whole is likely to be of **County or Regional value**.
- **Upper Heyford Airfield Local Wildlife Site (LWS)** – This site measures 74.41 ha and is enclosed in the Application Site boundary. It covers much of the eastern part of the Application Site and includes an area of grassland which ranges in diversity and includes some species-rich areas which are strongly calcareous in character, areas on thicker soils which are more neutral in character. These are contiguous to areas of grassland within the Application Site of similar character which are not within the designated site. The southern part of this LWS includes a series of water tanks known to support a large population of great-crested newts. A range of other protected and notable species are associated with LWS, including 14 species of butterfly, skylark, linnet *Linaria cannabina*, corn bunting *Emberiza calandra*, tree sparrow and grey partridge. Given its designation as a LWS, this ecological feature is of **County value**.
- **Rush spinney LWS -** This 24.1 ha site is located approximately 1,150m from the southwest corner of the Application Site and consists of a small area of marsh within an improved permanent pasture. Part of the site is dominated by tall tussocks of greater tussock sedge *Carex paniculata***.**

8.4.6 There is a further non-statutory designated site within 2km of the Application Site but this is a proposed LWS: Ardley Field Quarry. This site supports an area of restored quarry that includes improved grassland, rough grassland with young planted trees, herb-rich grassland, ponds and wet ditches. The plant communities are still establishing. Given the distance from the Application Site (1.6 km) and the status of the site, this is not considered further in this assessment.

Habitats

8.4.7 Overall the Application Site is dominated by neutral and calcareous grassland, interspersed with areas of hard standing. The majority of the Application Site is dominated by poor semi-improved neutral grassland. In the central and eastern sections of the Site unimproved neutral and calcareous grasslands are present (much of which is located within the Upper Heyford Airfield LWS). Standing water is present within concrete water tanks. These are predominately located in the south and east of the Application Site. Three parcels of disconnected land are present to the south the Application Site. These are occupied by arable and amenity grassland. Table 8.1 summarises the main habitat types and values each on a geographical scale of reference

as set out in Section 8.3. The full details of the habitat descriptions are given in the Designated Sites, Habitats and Plants Baseline Report (BSG Ecology 2017a) included in **Appendix 8.1**. These habitats are shown in **Figure 8.2**.

Table 8.1 – Main habitat types, description and relative value

Habitat	Description and valuation
Species poor semi-improved grassland	This is the dominant grassland type on the Application Site. Dominant grasses include cock's foot *Dactylis glomerata*, false-oat grass *Arrhenatherum elatius*, soft brome *Bromus hordeaceus*, tall fescue *Festuca arundinacea*, red fescue *Festuca rubra* Yorkshire-fog *Holcus lanatus*, and perennial rye-grass *Lolium perenne*. Herbs are present at low frequencies and abundance including: common mouse-ear *Cerastium fontanum*, cow parsley *Anthriscus sylvestris*, hogweed *Heracleum sphondylium*, dandelion *Taraxacum* agg., and beaked hawk's-beard *Crepis vesicaria*. The sward condition varies across the Application Site and includes both areas of well-developed tussocks and areas which are more frequently mown/grazed, resulting in a lower sward with less structure. Small localised patches with species indicative of less improved grasslands are occasionally present. These areas include species such as: bird's-foot trefoil *Lotus corniculatus*, common knapweed *Centaurea nigra*, oxeye daisy *Leucanthemum vulgare* and bulbous buttercup *Ranunculus bulbosus*. There are 147.4 ha of this habitat on the Application Site. This habitat has low floristic diversity and is a relatively widespread and common habitat type, however it is also an extensive area of grassland and as such this ecological feature is likely to be of **Local value**.
Semi-improved neutral grassland	Semi-improved neutral grassland is present within the Northern Bomb Store (NBS). This area is a mosaic of species-rich grassland and rank grassland dominated by cock's-foot and false-oat grass. The area is highly variable with patches of species-rich grassland occurring in rabbit grazed areas, where the growth of vigorous grasses has been suppressed. Small, discrete patches of semi-improved neutral grassland are also present in the south of the Application Site. These areas are dominated by red fescue and cock's-foot with a high proportion of herbs including: bird's-foot trefoil, germander speedwell *Veronica chamaedrys*, wild carrot *Daucus carota*, dandelion, creeping buttercup *Ranunculus repens* and meadow buttercup *Ranunculus acris*. This habitat type covers 4.7 ha of the Application Site. Given its small extent and low floristic diversity, it is likely that this ecological feature is of **Site value**.
Unimproved neutral grassland	Areas of unimproved neutral are present in the south and east of the Application Site. This habitat grades into stands of unimproved calcareous grassland forming a mosaic of grassland types. As a result, calcareous species are present in the areas mapped as unimproved neutral grassland. The sward is

Habitat	Description and valuation
	species-rich and contains species typical of low nutrient conditions. The dominate grasses are: red fescue, common bent *Agrostis capillaris*, Yorkshire-fog, cock's-foot, creeping bent *Agrostis stolonifera* and downy-oat grass *Helictotrichon pubescens*. Herbs present include: yellow-rattle *Rhinanthus minor*, cowslip *Primula veris*, red clover *Trifolium pratense*, common sorrel *Rumex acetosa* and ladies-bedstraw *Galium verum*. This habitat qualifies as 'Lowland meadow', an HPI. This habitat covers 35.3 ha of the Application Site. Despite the relatively limited extent of this habitat compared to the poor semi-improved grassland, its floristic diversity and relative scarcity in the wider area and nationally mean that this is ecological feature is of **County value**.
Unimproved calcareous grassland	Areas of unimproved calcareous grassland fall into two categories. The first type occurs as a mosaic with the unimproved neutral grassland. It consists of a similar suite of species except with a greater abundance of calcicolous species. These include: wild carrot, dwarf thistle *Cirsium acaule*, salad burnet *Sanguisorba minor*, mouse-ear hawkweed *Hieracium pilosella*, upright brome *Bromopsis erecta* and Tor-grass *Brachypodium pinnatum*. The second type is less species-rich and is dominated by upright brome. This is present predominately in the southeast of the Application Site, within the Southern Bomb Store (SBS). Less extensive patches are present within the eastern and central sections of the Application Site. This habitat as a whole qualifies as 'Lowland calcareous grassland', an HPI. This habitat type covers 50.2 ha of the Application Site. It is also relatively diverse floristically. Given that is also forms much of the Upper Heyford Airfield LWS, this ecological feature is likely to be of **County value**.
Semi-improved calcareous	A small patch of semi-improved calcareous grassland is present within the SBS, in the south-east of the Application Site. This area is a transition between upright brome dominated calcareous grassland and rank neutral grassland, dominated by false-oat grass and cock's foot. This increased abundance of rank neutral grassland species indicates higher nutrient levels are present compared to the unimproved calcareous grassland areas. This habitat type covers .75 ha of the Application Site and is of relatively low floristic diversity, though it is an HPI. Therefore, it is likely that this feature is of **Site value**.

Habitat	Description and valuation
Amenity grassland	The most extensive areas of amenity grassland are present in the south-west corner of the Application Site. Small patches are also present surrounding buildings within the south of the Application Site. In all cases the sward is low (as a result of mowing) and is dominated by perennial rye-grass and annual meadow-grass *Poa annua*. There is a low proportion of herbs with common daisy *Bellis perennis* and white clover *Trifolium repens* being the most frequent species. This habitat is of very low floristic diversity and common both locally and nationally, this ecological feature it likely to be of **Site value**.
Ephemeral/short perennial vegetation	Ephemeral/short perennial vegetation is present in areas which have experienced recent disturbance, most likely as a result of areas of concrete being removed. These are present in the western, central and the south-eastern sections respectively. These areas are relatively species-rich but consist of fast-colonising and drought-tolerant plant species and bryophytes. Species present include: perforate St John's-wort *Hypericum perforatum*, creeping cinquefoil *Potentilla reptans*, thyme-leaved sandwort *Arenaria serpyllifolia*, common mouse-ear, creeping thistle *Cirsium arvense*, procumbent pearlwort *Sagina procumbens*, thyme-leaved speedwell *Veronica serpyllifolia* and self-heal *Prunella vulgaris*. This habitat type covers 3.8 ha of the Application Site. In isolation, this habitat type is likely to be of **Site value**. However, as this habitat form a mosaic with other habitats (such as ruderals, scrub and grassland), the mosaics are valued as a whole below.
Plantation woodland	Both coniferous and broad-leaved plantation woodland are present within the Application Site. These are mostly located on the Application Site boundary. The largest areas are in the north of the Application Site (mosaic of coniferous and broad-leaved woodland); the south-west of the Application Site (coniferous woodland) and within the Southern Bomb Stores (SBS). The coniferous areas are predominantly Scots pine *Pinus sylvestris*. Broad-leaved areas contain a mixture of planted and self-sown trees including ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, pendunculate oak *Quercus robur* and cherry *Prunus* sp. The ground flora is typically species-poor and either dominated by rank grasses, such as false-oat grass and cock's-foot or nutrient demanding herbs such as cow parsley and ground-ivy *Glechoma hederacea*. Given the origin and relatively small extent of the plantation woodlands (3.6 ha), these are likely to be of **Site value**.

Habitat	Description and valuation
Hedgerows	A number of hedgerows are present in the Application Site. The species supported include hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elder *Sambuca nigra*, wych elm *Ulmus glabra*, hazel *Corylus avellana*, spindle *Euonymus europaeus*, ash, wayfaring-tree *Viburnum lantana*, buckthorn *Rhamnus cathartica*, blamble *Rubus fructicosus* agg. and dog rose *Rosa canina*. Two of these have been assessed as being important under the Hedgerows Regulations 1997. These are the two hedgerows either side of Chilgrove Drive. This is due to the presence of eight woody species per 30 m length (eastern hedgerow) and due to the presence of six woody species per 30 m section and three qualifying features (the presence of a path or bridleway, a parallel hedgerow and the hedgerow being intact). All hedgerows on the Application Site also qualify as HPIs. However, given their overall short length, this features as whole is likely to be of **Site value**.
Scrub (dense and scattered)	Patches of dense and scattered scrub are present surrounding disused buildings and neglected parts of the Site. The most extensive patches are on the southern boundary of the Application Site, adjacent to Letchmere Farm. The scrub consists mostly of bramble *Rubus fruticosus* agg., and blackthorn *Prunus spinosa*. Self-sown butterfly-bush *Buddleja davidii* shrubs and sycamore trees are also present. Given the relatively low floristic diversity recorded and the small extent of this habitat, this ecological feature is likely to be of **Site value**.
Arable fields and margins	Arable land is present in the southern part of the Application Site in Parcels 16, 17, 18 and 34. Conservation margins are present around hedgerows field edges within the fields which support arable land. These have been sown with a species-rich grassland mix and contain species such as common knapweed and bird's-foot trefoil. Given the small extent of this habitat and the low floristically diversity, this ecological feature as a whole is of **Site value**.
Ditches (dry and seasonally wet)	A ditch is present within the hedgerow in the parcel 17. It is enclosed by the adjacent hedgerow but the presence of great willowherb *Epilobium hirsutum* indicates seasonally wet conditions. A network of dry ditches is present within the southern section of the Application Site. These have recently been excavated to act as a security feature. They are mostly dry and contain rough grassland and scrub. Seasonally wet

Habitat	Description and valuation
	areas are indicated by the presence of great willowherb. Overall this ecological feature is likely to be of **Site value**.
Standing water	Twenty-five water bodies are present within the Application Site. These are concrete-lined tanks historically used to store water and fuel when the Application Site was an active RAF base. Vegetation within the water-bodies is variable. Where an organic substrate is present aquatic plants and emergent vegetation can be abundant. Where no substrate has formed, and the tank sides are vertical, no vegetation is present. Three ponds have been removed in recent years, however their former locations are shown on Figure 8.6. Further water bodies are present off site and include more naturalistic ponds. These water bodies are relatively un-diverse floristically however they are numerous and widespread across the Application Site. A number also are known to support a protected species and therefore these at least qualify as being HPIs. Therefore, this ecological feature as a whole is likely to be of **Local value**.
Buildings and hard standing	The built environment in the Application Site supports little in terms of vegetation and the buildings were not shown to support bat roosts. Therefore, this ecological feature is of **Site value**.

Protected / Notable Species

8.4.8 The baseline with regard to protected and/or notable species has been obtained through a combination of direct field survey and review of recent monitoring reports. The findings of this work are summarised here with regard to each species or species groups.

Bats

8.4.9 The baseline information gathered in 2017 to inform this assessment is detailed in the Bat Survey Report (BSG Ecology 2017b) included in **Appendix 8.2**. In summary, seven buildings (see **Figure 8.3**) were initially assessed as having low suitability to support roosting bats based on ground level and internal inspections. The subsequent surveys carried out in 2017 on those which may potentially be affected by the proposed development revealed that none of these support roosting bats.

8.4.10 Five trees (see **Figure 8.3**) have been assessed as being of moderate suitability to support bats roosts. One further tree has been assessed as being of high suitability and the remaining trees were either low (seven) or of negligible suitability to support roosting bats. These are distributed mainly around the central and southern part of the Application Site.

8.4.11 A Schwegler 1FW Bat Hibernation Box is located on the western edge of Parcel 17 in a large sycamore tree. The levels of use of this bat box have not been assessed. It may be used by a range of species opportunistically during hibernation, however given its proximity to existing recently built residential properties and artificial lighting, the species present are likely to be limited to those tolerant of artificial light and typical of these habitats.

8.4.12 The bat activity walked transects (routes shown in **Figure 8.4**) revealed very low levels of use by bats, with mainly common species being recorded such as common pipistrelle *Pipistrellus pipistrellus*, noctule *Nyctalus noctula* and serotine *Eptesicus serotinus*.

8.4.13 The data obtained through deployment of static bat detectors (locations shown in **Figure 8.4**) revealed several more species, due to the higher survey effort. The highest levels of activity were recorded at Location 6, accounting for 6,095 of the 14,291 passes detected. Common pipistrelle accounted for 4,982 of these passes and soprano pipistrelle for a further 733 passes. Eight barbastelle *Barbastella barbastellus* passes were also recorded from this location. This number of passes by all species suggests that the hedgerow along which this detector is deployed may form an important linear feature connecting the eastern edge of the Application Site and the woodland to the southeast of the junction of Camp Road and Chilgrove Drive and habitats in the wider area.

8.4.14 Given the relatively low number of passes recorded at Location 5 overall, it is possible that bats use the Chilgrove Drive linear feature for foraging and then proceed or arrive from the linear features formed by plantation woodland blocks along the eastern edge of the Application Site or continue onto the habitats associated with the offsite ponds at Letchmere Farm. This is in part supported by the numbers of passes recorded at Location 4 (almost twice as many as from Location 5). A total of 2,113 passes were recorded from this location, including 1,381 common pipistrelle passes, 271 noctule passes, 135 passes by *Myotis* species and 13 passes by barbastelle.

8.4.15 Location 3 accounted for a further 3,419 passes. Of these 3,023 were of common pipistrelle. The number of noctule passes (222) at this location also contributed to the total. Therefore, despite the habitats in the vicinity being dominated by arable and

recent residential development, this location is also likely to be relatively important in the context of the Application Site.

8.4.16 With regard to individual species, common pipistrelle, as noted above, accounted for the highest number of species overall (75% of all passes). This reflects the fact that the species is one of the two commonest in the UK as well as its wide range of habitat preferences (BCT, 2010).

8.4.17 The next highest number of passes was from noctule with 1,698 passes. Of these, 878 were from Location 2. The majority of the passes of this species were recorded in May (1,459), suggesting the Application Site, and especially Location 2 (which accounted for 863 of the May passes) is used primarily during the early part of the season, which either reflects a seasonally available prey resource or the distribution of the species at this time.

8.4.18 Soprano pipistrelle accounted for 991 passes with 733 from Location 6. Overall Myotis species were recorded frequently but in relatively low numbers (227 passes throughout the survey period). Long-eared bats were even less frequent with 58 definitively identified passes throughout the survey period. These were largely from Locations 5 and 6, reflecting the species' preference for darker areas and low tolerance of artificial light.

8.4.19 All UK bat species and their roosts are strictly protected under the provisions afforded to species listed on Schedule 5 of the 1981 Wildlife and Countryside Act (WCA) and Annex IV of the Conservation of Habitats and Species Regulations 2010 (as amended). Some species, such as brown long-eared *Plecotus auritus*, noctule, barbastelle *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii* and soprano pipistrelle *Pipistrellus pygmaeus* are also Species of Principal Iimportance (SPIs).

8.4.20 The buildings within the Application Site offer a roosting resource of **Negligible value**.

8.4.21 The trees which are of moderate or high suitability continue to provide potential roost sites, but no evidence of roosting has been found to date. However, given their location within an area where the activity surveys have revealed little in the way of particularly rare species and the absence of evidence of use of these features, it is likely that the trees assessed as moderate and high suitability are of **Site value**.

8.4.22 Due to the timing constraints, no checks of the levels of use in winter of the hibernation bat box have been completed. This would be necessary to accurately determine its likely value. It is considered likely that the box has been erected as part of a previous bat mitigation licence and can if required be relocated to another tree. However, on a precautionary basis, the Schwegler 1FW Bat Hibernation Box is assessed as being of up to **Local value**. However, the tree survey work for the Application Site has determined that the trees are healthy and therefore there are no immediate plans to remove them from the site to enable this proposed development.

8.4.23 The habitats within the Application Site offer foraging habitats for a range of bat species. Overall these are relatively common and widespread species with the exception of barbastelle. However, this species does tend to forage over a wide area (BCT, 2010) and given the limited number of passes and that these were almost entirely in September, it is unlikely that the Application Site forms part of a core feeding area for the species. Valuing the foraging resource as a whole within the Application Site is problematic given the range of habitats present and different levels of use by the various species. It is likely to be of relatively low value for species which have been recorded less frequently, such as those not tolerant of artificial lighting (such as brown long-eared). It is likely to be higher for the species which have been recorded more

frequently, despite their more common status. As a precautionary approach, the value of the Application Site as a foraging resource is likely to be of **Local value** overall.

Badgers

8.4.24 TVERC has nine records of badger within 2km of Application Site. The most recent was from 2006 and most were from the Ardley Quarry area.

8.4.25 Badgers and their setts are protected under the Protection of Badgers Act 1992. ODPM Circular 06/2005 provides further guidance on statutory obligations towards badger within the planning system. Of particular note is paragraph 124, which states that "The likelihood of disturbing a badger sett, or adversely affecting badgers' foraging territory, or links between them, or significantly increasing the likelihood of road or rail casualties amongst badger populations, are capable of being material considerations in planning decisions."

8.4.26 The Application Site supports a number of setts, most of which are located along its periphery and Chilgrove Drive. The locations are shown in Confidential **Figure 8.5** which due to the nature of the information contained, is included in Confidential **Appendix 8.3.** This feature is likely to be of **Site value**.

8.4.27 No setts have been recorded from the remainder of the Application Site.

Other mammals

8.4.28 TVERC returned no records of brown hare *Lepus europaeus*. However suitable habitat for this SPI in the form of open grassland exists within the Application Site. These are most likely to use the areas with longer sward length to shelter and forage more widely. The southern part of the Application Site, which is dominated by short grassland verges, hardstanding and buildings) is likely to be used sporadically only. No incidental records of the species were made during surveys of the Application Site in 2017 by BSG Ecology. Several observations of the species were however made by 4 Acre Ecology during their bird monitoring surveys. It is likely that the areas of highest value are those at the centre, eastern and west of the flying fields. The smaller areas of grassland between the buildings in the southern part of the Application Site are likely to be of lower value due to the levels of disturbance and management. Overall the Application Site is likely to be of **Site value** for the species.

8.4.29 TVERC returned five records of hedgehog *Erinaceus europaeus* with two from Upper Heyford. An incidental record of a hedgehog was made during an emergence survey at building 171 on 1 August 2017. This species is an SPI. The open habitats (such as short grassland) within the Application Site are likely to offer extensive foraging areas for this species, however the very limited amount of dense ground cover (such as scrub and dense woodland undergrowth) is likely to limit the numbers of this species present. This ecological feature is therefore likely to be of **Site value** as it is likely to be typical of the wider area and further afield.

8.4.30 TVERC returned two records of polecat *Mustela putoris*, both of which are from beyond the railway cutting to the east of the Application Site. This species is an SPI associated with a range of habitats such as farmland, scrub and woodland. However, given the low levels of cover (such as scrubby embankments, rabbit warrens etc.) the species is only likely to occur in low numbers on the Application Site. The Application Site is therefore likely to be of **Site value** for the species.

8.4.31 Although numerous records of water vole *Arvicola amphibius* and otter *Lutra lutra* were returned by TVERC, no suitable habitat exists within the Application Site for either. The small waterbodies do not support the bank-side habitats needed by the

former and are unlikely to support sufficient food and are not sufficiently connected to similar habitats more widely to support the latter.

8.4.32 The small areas of woodland and scrub within the Application Site are considered too small, isolated and of recent origin to support dormouse *Muscardinus avellanarius*.

Reptiles

8.4.33 TVERC returned 48 records of common lizard *Zootoca vivipara* for within the Application Site and seven of grass snake, all but two of which were from the Application Site. All the records from within the Application Site are from 2016 on dates during which the monitoring work was carried out by 4Acre Ecology.

8.4.34 These most recent surveys were used to inform this assessment and are set out in 4Acre Ecology (2017c). These have revealed the Application Site as a whole supports a medium population of common lizard, with most observations being made in the area of grassland and scrub which form the eastern edge of Parcel 22. Very small numbers of this species were also noted in the north and north-eastern edges of the Application Site. A small population of grass snake *Natrix natrix* is present, with most observations from the same area as the majority of the common lizard and one at the north-eastern end of the Application Site.

8.4.35 As two species are present (a medium population of common lizard and small population of grass snake) the reptile population is likely to be of **Local value**.

Great crested newts and amphibians

8.4.36 The Application Site has been shown to support great crested newt. The baseline information used for this assessment has been collated using available published information (see section 8.3). **Figure 8.6** summarises the known status of the water bodies in terms of their use by great crested newts. Baseline information was gained for the ponds within the Application Site and 250 m of it. The majority of those are located within the Application Site and are concrete-lined water storage tanks. Ponds LF1, LF2, LF3, LF4 and LF5 are more natural-looking ponds, though they may artificially be created. Great crested newts were recorded in the majority of the ponds surveyed in 2016.

8.4.37 Broadly, three populations are considered to be present in the area, with the ponds in the Southern Bomb Store area forming one large population (Population A - peak of 136 in 2016 - 4Acre Ecology, 2016), the ponds around Letchmere Farm and on the Application Site adjacent to these supporting a medium population (Population B) and a third large population (Population C) present in the Northern Bomb Store ponds. The two southern populations could be considered as closely connected or a single population with Pond 25 acting as a stepping stone, however they have been considered separate populations here with the gap between Ponds 25 and H as the dividing point (a distance of approximately 290 m)[3].

8.4.38 The species was not found to be present in the other ponds surveyed in 2016.

8.4.39 Pond J, which is within 250 m of Parcels 18 and 16 was surveyed in 2014 and 2016 and the species was not recorded in either year. Pond 3 was not surveyed in 2016 however previous surveys (2012, 2014 and 2015) of this pond have shown that the species is likely to be absent from it, though it was found to be present in 2007. Taken

[3] Typically the species is thought to range during their terrestrial phase up to 250 m from the breeding habitat in the absence of barriers (English Nature, 2011).

with the likely absence from the ponds in this area recorded in 2016, it can be concluded that the species is now virtually absent from the central southern part of the Application Site.

8.4.40 Collectively the meta-population of great crested newt present within the Application Site is likely to be of **Local to County value**.

8.4.41 During the 2016 surveys, common toad *Bufo bufo* was found to be breeding in Pond LF5. This is a SPI. The species was not recorded in the other water bodies and the habitats within the Application Site, although offering foraging opportunities offer limited cover and hibernation opportunities. The value of the Application Site to the species and the population present is therefore likely to be of **Local value**.

Birds

8.4.42 TVERC returned 542 records of bird species which are either Red or Amber listed Birds of Conservation Concern (BoCC - Eaton *et al*., 2015). These included several species known to occur within the Upper Heyford Airfield LWS including corn bunting, grey partridge, skylark, linnet, tree sparrow, curlew, swallow *Hirundo rustica* and yellowhammer *Emberiza citrinella*.

8.4.43 The breeding bird population has been subject to monitoring in recent years, with the results set out in monitoring reports, the most recent covering the 2016 breeding season (4Acre Ecology, 2016b). These surveys covered much of the Application Site, though they concentrated on the central airfield, an area immediately to the south of this and the large area north of the airfield which includes numerous hangars and hardstanding areas. These surveys have revealed that this part of the Application Site supports a breeding bird community which includes species typical of open grassland habitats, such as skylark and meadow pipit *Anthus pratensis*, as well as species more typical of open grassland or arable land associated with hedgerow and scrub, including linnet, corn bunting and yellowhammer.

8.4.44 Skylark were found to be most numerous in the central airfield, where open grassland associated with hard standing offers the more suitable habitats for breeding and foraging, compared to smaller areas of grassland to the north and the mix of buildings and amenity grassland which dominates the existing built up areas to the south of the airfield. In 2016, a peak of 87 registrations[4] of this species was recorded in this central area. This compares to 48 in the area north of the main airfield and 17 to the south of the main airfield. This species has declined nationally due to intensification of agriculture, with earlier harvesting affecting breeding success and lack of winter stubble resulting in lower availability of food during the winter, however it remains a common resident and passage migrant in Oxfordshire (Oxfordshire Ornithological Society - OOS, 2013).

8.4.45 Corn bunting was recorded in the central airfield and eastern end of the airfield. The number of registrations of singing males shown in the field notes for the 4Acre ecology survey carried out in 2016 (4Acre Ecology, 2016b) suggest that between four and eight pairs may be present in these areas. This species is resident in Oxfordshire with a slight decline being recorded in recent years (OOS, 2013).

8.4.46 Curlew has been recorded within the Application Site. Three individuals being recorded as present in April 2016 and two in May and June, with one individual recorded as calling in June. These observations were largely from the main airfield, in or just north of Parcel 28 or in Parcel 23 (4Acre Ecology, 2016b). Previously the species was

[4] This includes all observations, including non-calling or singing individuals, and therefore is hard to interpret into numbers of pairs.

present in 2015 and in 2014 distraction display was recorded by the surveyors (4Acre Ecology, personal communication). On this evidence, based on the methods described for interpreting breeding evidence used for the recent Bird Atlas 2001-11 (Balmer et al.,2013), it can be concluded that the species was confirmed as breeding in 2014 and possibly breeding in 2015 and 2016. The habitats present are largely grassland with a short sward and open tarmac, which are habitats unlikely to be conducive to successful breeding. This species breeds in a range of habitats in Great Britain, though it prefers those which offer cover for the nest site (such as large tussocks or rush stands) (Brown and Grice, 2005). This species has declined in Britain by 17% since the 1968-72 Atlas (Balmer et al., 2013). The reasons of the decline have subject to intense study in recent years with a study by Franks et al. (2017) showing that habitat loss and degradation is one of the biggest drivers nationally. Lower breeding densities in semi-natural grassland due to changes resulting from agricultural management coupled with greater declines in areas dominated by arable land indicate that agricultural areas are becoming less suitable for the species. This study also concludes that agri-environment schemes may benefit the species but only if they are implemented at a sufficient scale to have meaningful benefit. Given the location of the Application Site within a largely agricultural areas and county, this trend is likely to affect the population recorded at the Application Site in the short to medium term in the absence of large scale initiatives, with a likely absence following this.

8.4.47 Given its likely relative value, the curlew pair which may be present within the Application Site is considered to be of **Regional value**, though this feature may well be absent in the short to medium term due to the decline being noted at a national level.

8.4.48 Other species of conservation concern recorded in the central and northern areas of the airfield include grey partridge, linnet, bullfinch, starling, yellow wagtail *Motacilla flava* and cuckoo *Cuculus canorus* in small numbers.

8.4.49 The southern part of the area covered by these surveys, including Parcels 10, 12, 21, 22, 23, 25 and 30 supports a bird community which is more typical of partly developed areas, though skylark, linnet and corn bunting are present associated with suitable open grassland habitats. Song thrush *Turdus philomelos* and dunnock *Prunella modularis* are also present in suitable habitats (where scrub and woodland are associated with shorter grassland for instance) in small numbers. The remaining species are largely common and widespread species as might be expected given the nature of the habitats present.

8.4.50 Incidental records from the Application Site include house martin *Delichon urbica* utilising several buildings in August 2017 with breeding likely to occur. A barn owl *Tyto alba* was also recorded during a bat activity transect on 25 May 2017 near Chilgrove Drive. This species is suspected to be breeding in building 370, as calls considered to be from owl nestlings were noted, however no internal inspection was carried out due to access restrictions.

8.4.51 Overall the breeding bird community present at the Application Site is likely to be of **Local value**, mainly due to the numbers of corn bunting and skylark. However, given its likely relative value, the curlew pair is considered a feature in its own right of **Regional value**, though this feature may well be absent in the short to medium term due to the decline being noted at a national level.

8.4.52 The main interest in terms of the winter bird assemblage of the Application Site is likely to be centred on the use of the open grassland associated with the central and northern parts of the airfield as these offer suitable foraging areas for wintering birds of prey and waders, depending on the length of the sward. The three survey visits carried out by 4Acre Ecology between 3 December 2016 and 11 February 2017 revealed that a number of additional birds of conservation concern use the Application Site in winter.

These include a sighting of a short-eared owl *Asio flammea* in January and golden plover *Pluvialis apricaria*, although this species was only heard in flight over the area. Continued presence in winter of resident species was also noted including corn bunting in small numbers, grey partridge, dunnock and bullfinch. The southern part of the Application Site is likely to support small numbers of resident species as well as visiting thrushes, such as fieldfare *Turdus pilaris* and redwing *Turdus iliacus*, although the extent of fruiting scrub species is very limited. It is therefore likely that the Application Site as a whole is of no more than **Local value** for winter birds, with the southern part, dominated by built up areas and hardstanding, is likely to be of **Site value**.

Terrestrial invertebrates

8.4.53 TVERC returned records for 38 species of invertebrates which are either notable or of conservation interest for the search area as a whole. The majority of the records were of butterflies and moths, although 32 records of beetles, ants, bees, sawflies and wasps were also returned. Of the above, seven records were from within or adjacent to the Application Site. These include: beetles (*Notiophilus quadripunctatus, Tychius squamulatus* and *Tanymecus palliates* – all Notable-B species5), small heath butterfly *Coenonympha pamphilus* (an SPI and GB-RedList-Post2001) and cinnabar moth *Tyria jacobaeae* (an SPI).

8.4.54 The main invertebrate interest associated with the Application Site is likely to be associated with the unimproved calcareous and unimproved neutral grasslands. The LWS lists a range of invertebrates associated with these habitats.

8.4.55 Further interest is likely to arise from the presence of mosaics of habitats which must be considered collectively. Three such areas have been identified in the Application Site in Parcel 22, immediately adjacent to the western edge of Parcel 30 and at the western end of the former runway. These have developed as a result of concrete that has been disturbed and buildings that have been demolished in the past. These have been assessed against the criteria for 'Open mosaic habitat on previously developed land', an HPI. This assessment (as set out in BSG Ecology, 2017a) has concluded that all three qualify as HPIs. However, given the relatively small extent of the habitat, it is likely that this feature as a whole is of **Site value**.

8.4.56 The remainder of the habitats within the southern part of Application Site is of relatively limited value for invertebrates, given the dominance of hard standing and buildings.

8.4.57 It is reasonable to conclude that the overall invertebrate assemblage is likely to be of **Local value**, with the invertebrate assemblage associated with the more diverse habitats potentially being of up to **County value** and that associated with the southern part of the Application Site being of **Site value**.

Important features

8.4.58 A number of important ecological features have been identified for further consideration. Firstly, features have been identified for further consideration based on their value. Further features have been carried forward for further consideration despite their relatively low value as a result of the potential legal of policy implications of adverse effects. For instance, a single badger sett may be of Site value, but its removal in the absence of mitigation and a licence from Natural England would result in a breach of legislation, therefore a negative effect.

[5] Taxa which don't fall within IUCN categories but are uncommon in Britain and occur in 31-100 10 km sq/ or for less well recorded groups between 8 and 20 vice counties.

8.4.59 The features thus selected are:

- Ardley Cutting and Quarry SSSI
- Upper Heyford Airfield LWS
- Rush Spinney LWS
- Habitats (Species poor semi-improved, semi-improved neutral, semi-improved calcareous, unimproved neutral, unimproved calcareous, standing water, hedgerows)
- Bats (roosting, foraging and commuting)
- Badger
- Other SPI mammals (European hare, hedgehog, polecat)
- Reptiles
- Great crested newts and amphibians
- Birds (breeding and wintering)
- Terrestrial invertebrates (including Open Mosaic of Habitat mosaics)

8.4.60 In order to assess the impact on the biodiversity value of the Application Site as a result of the Proposed Development, 'biodiversity value' is also brought forward for further consideration.

Predicted future baseline

8.4.61 In the event that the Proposed Development is not consented and brought forward, the baseline conditions are likely to remain unchanged, with the exception of natural fluctuations in abundance of certain species and changes through climate change. The most pertinent likely effects on climate change are taken to include increased frequency of extreme weather events, changes in weather patterns and alterations to the ranges of species, habitats, pests and diseases. The "do nothing" future baseline is based on the assumption that overall agricultural land management practices continue as they are presently.

8.4.62 One particular area of change over the duration of the Proposed Development that is proposed to take place over a 20-year period, is changes in legislation and policy. For example, reviews of lists of protected species and species of conservation concern are constantly being undertaken. Changes in distribution of species (both expansion and constriction, influenced by factors such as climate change and agricultural intensification) could mean that species may be upgraded or downgraded at any stage over the 20 year build out period. Such changes would be addressed in each individual Reserved Matters application as new phases of development come forward.

8.5 PREDICTED LIKELY EFFECTS

8.5.1 During the design evolution for the Proposed Development, the initial findings of the ecology work were carefully considered and the mitigation hierarchy of avoid, mitigate and compensate was used to minimise impacts. In many cases, this has meant retention of the features of highest value and avoidance of areas of particular sensitivity. The measures are reflected in the Composite Parameter Plan **Figure 4.1**. Taking each feature, species or habitat in turn, this section identifies the potential effects of the Proposed Development, factoring in this mitigation by design, but in the absence of further mitigation. The effects are identified separately for the construction and post-completion stages. Following this initial assessment, appropriate mitigation (including compensation and enhancement) is set out to address the effects identified.

8.5.2 Additionally a number of measures have been assumed as being put in place which will ensure that legal compliance is assured, thereby avoiding the need to assess

effects to certain features which would not be allowed to occur. These would be secured largely through the preparation and delivery of two key documents: a Construction Environmental Management Plan (CEMP) and a Landscape and Ecology Management Plan (LEMP). The preparation and implementation of both of these documents would be a condition of planning consent for the Proposed Development.

8.5.3 In support of each phase of the Proposed Development brought forward, a CEMP will be prepared and submitted to CBC prior to construction. The Biodiversity component of this document will set out appropriate measures (e.g. through a series of Method Statements) to be followed.

8.5.4 Three key Method Statements that will be necessary to document the appropriate measures applied for the protection of existing features are described below:

- Habitat Protection. All areas of sensitive habitat that will be retained and unaffected by the Proposed Development will be protected through the use of protective fences, exclusion barriers and warning signs as appropriate.
- Timing constraints to habitat removal and building demolition. In order to avoid contravention of legislation protecting nesting birds, measures will be implemented which will dictate the timing of works affecting habitat used by this species group. No vegetation suitable for nesting birds will be removed during the breeding season (March to September inclusive). Many buildings on the Application Site also offer habitat for nesting birds. Therefore, demolition of these will be undertaken outside the nesting bird season. Should removal of suitable vegetation or demolition become necessary during the nesting bird season, checks can be carried out by a suitably experienced ecologist, prior to removal with any nests detected being retained with a suitable buffer until the young have fledged, however this is unlikely to be possible with taller buildings and trees and relying on this measure may cause significant delays.
- Reptiles. In the majority of the Application Site, habitat for reptiles is very limited (with the exception of Parcels 22 and 23). Therefore, a method statement will be prepared to be followed when ground level vegetation suitable for reptiles is to be removed. In order to avoid breaching relevant legislation, these habitats (small areas of rough grassland or scrub) will only be removed under supervision of a suitably experienced ecologist and during the active period for reptiles (indicatively April to September but can be weather dependent). This and the measure set out for nesting birds will work in conjunction with each other, with vegetation removal to 20cm of height being undertaken outside the nesting bird season and ground level vegetation being removed in the reptile active period as needed. In the case of Parcels 22 and 23, additional mitigation measures are set out in the mitigation section below.
- Lighting. Appropriate measures will be put in place to control artificial lighting, in particular spill onto retained features of importance for bats and great crested newts, so as to minimise effects on these features during the construction and operational stages. This includes the planting of vegetation to create screening to reduce light spill on to retained ponds in Parcel 24, a proposed new planting of a linear feature along the eastern edge of the new access road along Chilgrove Drive and the retained habitats within the southern part of Parcel 22, and the careful design of the lighting at the southern edge of Parcel 23 to ensure no light spill affects off site habitats to the south and east.

8.5.5 In advance of the Proposed Development commencing, a LEMP will also be produced and submitted to Cherwell District Council for approval. The purpose of this document will be to set appropriate aims and objectives for the management of the Application Site, and in particular the main areas of green infrastructure, maximising biodiversity benefits for the habitats and species that will be affected by the Proposed Development. This will provide a particular focus on habitats and species included in the

known interest of the LWS within the Application Site and those within the SSSI off site to the northeast, such as ground nesting birds, invertebrates and lowland calcareous and neutral grassland. These aims and habitat management prescriptions will seek to ensure resilience to the effects of climate change. The plan will include a series of management prescriptions and an annual work plan for a standard minimum period of 5 years from completion of the construction of the whole phased development. Where appropriate, these will revise measures in the current Ecological Management Plan being implemented on the Application Site. Personnel responsible for implementation of the plan will be identified. Monitoring will take place annually to ensure that habitats develop according to the targets set, and protected species are not adversely affected. The development shall be implemented in accordance with the approved plan. The production of this plan is consistent with current best practice, notably that identified in BS42020:2013 Biodiversity - Code of practice for planning and development (British Standards Institution, 2013).

8.5.6 Once all mitigation measures have been considered, the residual effects are then assessed and detailed. Table 8.2 below summarises the effects, mitigation and residual effects for each feature in turn.

Effects during Construction

Designated Sites

8.5.7 During the construction phase, no effects are predicted to arise which would affect the off site designated sites (statutory or non-statutory). This is due to the lack of direct land take and the lack of connectivity between the Application Site and the designated sites in the wider area.

8.5.8 A part of the Heyford Airfield LWS is included in Parcel 23. The Proposed development for this section is therefore likely to result in a loss of approximately 7.11ha of the LWS. The entire LWS measures 74.4 ha, therefore this constitutes a loss of 9.5%. In the absence of mitigation, this will constitute a **permanent adverse effect of significance at a County level**.

8.5.9 The proposals for Parcels 24 and 27 include a change of use of the hard standing habitats within the Upper Heyford Airfield LWS. These proposals are unlikely to result in direct effects on the LWS at the construction stage[6].

Habitats

8.5.10 The habitat losses at the construction stage have been calculated for each habitat type (including that already considered as a loss within the LWS). These include:

- poor-semi-improved grassland – 18.64 ha (of 147.5 ha – 12.6% loss)
- semi-improved neutral grassland – 0.05 ha (of 4.69 ha – 1% loss)
- semi-improved calcareous grassland – 0.21 ha (of 0.74 ha – 28.3% loss)
- unimproved neutral grassland – 0.76 ha (of 35.29 ha – 2.15% loss)
- unimproved calcareous grassland – 10.97 ha (of 50.2 ha – 21.85% loss)
- approximately 60 m of hedgerow (of 1.97km – 3.04% loss)

8.5.11 These losses will occur as a result of habitats lost within parcels of the Proposed Development which will be residential development and the creative city (Parcel 22). and are likely to represent:

[6] The effects on this feature during the operational stage are assessed in the following section.

- A **permanent adverse effect of negligible significance** for semi-improved neutral grassland.
- A **permanent adverse effect of significance at a Site level** semi-improved calcareous and poor semi-improved grassland.
- A **permanent adverse effect of significance at a Local level** for unimproved neutral grassland.
- A **permanent adverse effect of significance at a County level** for unimproved calcareous grassland.

8.5.12 It is predicted that five ponds will be lost as a result of the Proposed Development. As per the mitigation measures set out in relevant section below, eight ponds will be created as part of the measures to implemented for great crested newt (as four of the ponds to be lost support the species). Therefore, overall there will be a gain of three ponds which will result in a **permanent beneficial effect of significance at a Site level**. See **Figure 8.7: Constraints and Opportunity Plan**.

8.5.13 The proposed additional planting along the eastern edge of the new access road at Chilgrove Drive measures approximately 450m and will be tailored to reflect the hedgerow habitats being lost and retained. Therefore, a native mix of woody species will be planted to form a linear feature, with the inclusion of taller tree species such as oak, field maple *Acer campestre* and crab apple. This is therefore likely to result in a **beneficial permanent effect of significance at a Site level**.

8.5.14 Other effects on habitats (including small areas of amenity grassland, scrub, and arable land) are not considered further due to their low intrinsic ecological value. Similarly, the loss or change of use of the buildings within the Application Site is unlikely to result in a significant loss of or effects on ecological features.

8.5.15 The proposals for Parcels 28 and 29 include the creation of a small number of formal paths. This would result in a very small loss of habitat which is likely to constitute a negligible effect on this feature[7].

Bats (roosting)

8.5.16 A number of trees have been identified as being removed as part of the Proposed Development including five trees assessed as being of moderate and one of high suitability to support bats roosts. The PRF inspection carried out on these did not reveal any signs of use, although the features remain present and may be used in future. As a precautionary approach, assuming they may be used by low numbers of bats in future they have been assessed as between Site and Local value. The further surveys will be carried out prior to the felling of these trees. Should roosts be present, a European Protected Species Mitigation (EPSM) licence will be sought. The current mitigation guidance (Natural England, 2004) states that for the kinds of roosts likely to be present in these trees, of low conservation status, such as feeding perches of common or rarer species, roosts used by individual bats of common species or by small numbers of common species (though not maternity sites) there is flexibility about these provisions. However, in order to meet commitments associated with no net loss of biodiversity value, the mitigation proposed and secured through the EPSM licence will aim to make like-for-like provisions for bats. Bats are absent or no evidence of use is found by further survey closer to the time of felling the above would not be necessary. Therefore, in either event, the loss of these trees is unlikely to constitute an adverse effect.

[7] However, the effects post completion of these proposals are assessed in the following section.

8.5.17 As part of the Proposed Development, provisions will be made for roosting bats in the form of roosting features incorporated into the fabric of the buildings adjacent to Green Infrastructure or retained habitats suitable for foraging and commuting. A total of 10 incorporated features will be delivered, including mainly boxes designed for crevice-dwelling species. An additional five boxes will be installed on retained trees along Chilgrove Drive to increase available roosting habitat. Overall this is predicted to result in a **long-term beneficial effect of significance at a Site level as a minimum**.

Bats (foraging and commuting)

8.5.18 The Proposed Development will result in the loss of several areas of habitat identified as being used by small numbers of common and widespread species, such as arable land and grassland. These are the areas in Parcel 16 (and to some extent Parcel 18, where a sports park is proposed). The proposals for these parcels include residential development, Green Infrastructure and an indoor sports park. These new habitats are likely to provide foraging areas of comparable value to those being lost. The loss of habitats within Parcels 21 and 22 will affect small numbers of bats of species which are dependent on dark areas for foraging (such as brown long-eared bat). However, given the small numbers present and the common status of these this is not likely to represent a significant effect. It is likely that due to the provision of Green Infrastructure and gardens, species such as common pipistrelle would continue to use these areas in similar numbers due to their wide habitat preference. Therefore overall, any decrease in use is unlikely to represent a significant effect at any level.

8.5.19 The new access route at the south-east corner of the Application Site along Chilgrove Drive will result in the loss of very small sections of the hedgerows however the planting scheme included in the design mitigation will avoid any losses of linear features used for commuting or foraging. This will aim to create an alternative route along the eastern side of the new access route. The lighting strategy will be designed so as to minimise light shed onto this feature. Therefore, use by bats is predicted to continue with no significant effect.

8.5.20 The Proposed Development of the arable habitats in Parecel17 includes residential development and Green Infrastructure. This change in habitats is unlikely to significantly affect the bat community using this area which includes mostly common pipistrelle and noctule. Any decrease in use is unlikely to represent a significant effect at any level.

8.5.21 The proposals for Parcel 28 include the creation of paths but no significant changes to habitat conditions. Should lighting be included, it is only likely to add to existing lighting from the active parts of the Application Site to the south. As the main species used to be showing this area is noctule, a light tolerant species which habitually forages in sub-urban areas around street lights (BCT, 2010), any lighting is unlikely to have a detrimental effect on the bat community.

Badgers

8.5.22 The proposed construction activities along Chilgrove Drive have the potential to result in an offence, should the badger sett present along here be disturbed, damaged or destroyed. The layout of the Proposed Development in this area would suggest that the new access road does not result in the loss of the sett directly, but some disturbance may occur as the road will be within 10m of the sett entrances. There is further potential for damage to the sett should the current Chilgrove Drive need resurfacing. It is likely therefore that it will be necessary to secure a licence to disturb Sett 1 as a minimum to avoid breaches of legislation. Should the Chilgrove Drive need resurfacing, the sett will need to be closed under licence. Should this be necessary, it will be carried out as per industry standard guidance, including the provision of a replacement sett in the same

territory, as shown in the Constraints and Opportunities Plan (Figure 8.7), within retained habitats to the east. This location would reduce the risk of later deaths of badgers as a result of collision with traffic on the proposed new access route in this area. If this was needed, Sett 1 would then be closed following appropriate measures, including the use of one-way gates and a destructive search. Once these measures are put in place, there is unlikely to be any adverse effects on badger setts during the construction stage. **Figure 8.7** shows the proposed location of a replacement badger sett if this was a needed mitigation.

8.5.23 Given the low value of this feature (due to the low conservation value of badgers) the loss of grassland and scrub as a foraging resource for this species is unlikely to constitute an effect of significance at any geographic scale.

Other SPI mammals

8.5.24 The loss of habitat suitable for brown hare during the construction stage is limited to small areas of grassland in the south-east part of the development and small areas of arable land and arable margins. However, the proposed mitigation included in the design for great crested newts will result in the creation of a more diverse sward in the northern part of the Application Site, likely to offer more shelter for the species. Therefore, it is predicted that there will be no significant effect on this feature.

8.5.25 The loss of habitat suitable for hedgehog during the construction stage is limited to small areas of grassland in the south-east part of the development (including small areas of amenity grassland in the existing built up areas) and small areas of scrub. The Proposed Development includes Green Infrastructure of a comparable size to existing habitat and the planting of further scrub and woodland plots will increase the available cover for the species within the Application Site. Therefore, it is predicted that this will result in a negligible effect on this feature.

8.5.26 The loss of habitat suitable for polecat during the construction stage is limited to small areas of grassland in the south-east part of the development, small areas of hedgerow and arable margins and scrub. Proposed Development includes planting of further scrub and woodland plots which will increase the available cover and foraging areas for the species within the Application Site. Therefore, it is predicted that this will result in a negligible effect on this feature.

Reptiles

8.5.27 The majority of the Proposed Development activities are to take place in areas which are of very low or negligible value to reptiles. No significant effect is therefore predicted, assuming the measures set out in the relevant CEMP to avoid injury to or death of reptiles are adhered to (see paragraph 8.5.4).

8.5.28 The Proposed Development of Parcels 22 and 23 will however result in the loss of an area of approximately 18.5 ha of reptile habitat. This is potentially the most suitable habitat within the Application Site for reptiles, based on the results of the monitoring work carried out to date (4Acre Ecology, 2017c). Suitable habitats in the northern part of the Application Site will be retained. Furthermore, the proposed mitigation measures for great crested newts will create a large area of suitable foraging and hibernating habitat to the west of the Northern Bomb Store (as shown in the **Figure 8.7 Ecological Constraints and Opportunities Plan**). The margins of newly planted woodland and scrub habitat (proposed strategic landscape buffer planting) will also potentially increase the available habitat in areas currently too homogeneous to support reptiles. However, the removal of this habitat without appropriate mitigation would constitute an offence due to the high risk of accidentally killing or injuring the species. Therefore, a mitigation strategy will be prepared which will be set out in detail in the

CEMP for Parcels 22 and 23. This will likely include a translocation exercise based on the mitigation guidance in use at that time. The habitat to which these reptiles are moved will be prepared and enhanced in advance though a modification of the cutting regime, creation of new hibernacula. With these measures in place there is no predicted effect on these species.

Great Crested Newts and amphibians

8.5.29 The Proposed Development will result in the loss of four ponds known to be used by great crested newt (Ponds 1, 10, 25 and 16) from the population located around the Heyford Grange area[8]. Aproximately 25.76 ha of suitable terrestrial newt habitat (not including hard standing, amenity grassland or arable land) within 250 m of great crested newt breeding ponds and a further 6.76 ha located between 250 and 500 m of breeding ponds will be lost as result of the Proposed Development. In the absence of mitigation, this would result in an offence given the legal protection afforded to the species and its places of shelter and breeding sites. Therefore, a mitigation strategy will be prepared which will be prepared to support the application for a EPSM Licence. The principles on which this will be prepared are as follows and shown in the **Figure 8.7 Ecological Constraints and Opportunities Plan**:

- Breeding habitat replacement – The replacement on a two-for-one basis of all lost breeding ponds and a like-for-like basis for terrestrial habitat. The creation of six ponds suitable for use by breeding great crested newt will be created in suitable habitat. A number of these will be located in the eastern part of the flying field, potentially within Parcel 27 with the remainder being located so as to bolster those available to Population C. New pond locations have also been selected to maintain/improve connectivity between the populations within the Application site.
- Terrestrial habitat creation/enhancement - New areas of terrestrial habitat, such as rough grassland and hibernacula, will be created and located so as not to preclude targets for the retention and enhancement of valuable grassland habitats such as unimproved calcareous and neutral grassland. The management of species-poor semi-improved grassland will be reviewed so as to create a sward more suitable for the species during its terrestrial phase. These areas will therefore be located mainly in the northern part of the Application Site. This positioning of terrestrial habitat and ponds will result in enhanced linkage between populations A and C and increased terrestrial and breeding habitat available for Population C.

Birds (breeding)

8.5.30 The proposal within the Application Site will result in habitat losses as outlined above. Part of this habitat to be lost is located in Parcel 30, 23 and parts of 22, and is open grassland which supports ground nesting birds (such as skylark and meadow pipit) and species typical of farmland (yellow wagtail, corn bunting and yellowhammer). Direct loss of habitats used by these species is likely to be limited to 16 ha approximately of grassland, parts of which are adjacent to woodland plots and are therefore likely to be of poor quality for skylark. Small areas of strategic landscape planting are proposed in Parcel 27. The exact nature of this planting is not yet determined; however, it is likely to consist of trees or scrub and this will result in direct loss of grassland and some decrease in the value of adjacent grassland for skylark due to the species' preference for more open grassland. Overall the habitats loss and deterioration is likely to constitute a **permanent adverse effect of significance at a Site level**.

[8] The two further ponds in this area (A and B) have not been shown to be breeding ponds in 2016.

8.5.31 The grassland in the area of Parcels 27 and 28 will be retained and these are the areas where curlew were recorded most frequently in 2016. Areas of strategic landscape planting are however proposed on the northern edge of Parcel 27. The exact nature of this planting is not yet determined; however, it is likely to consist of trees or scrub and this will result in direct loss of grassland and some decrease in the value of adjacent grassland for curlew as the species tends to avoid forested areas and adjacent habitats due to the higher risk of predation. In isolation, this is likely to constitute **a permanent adverse effect of significance at a Site level.**

8.5.32 This planting of woodland or scrub habitat at the eastern end of the airfield may have a detrimental effect on species which depend on open grassland such as skylark and meadow pipit. The increase in visual barriers and available cover and perches for corvids and other predators provided by the woodland or scrub may result in lower breeding success or the abandonment of the area by these species. This would constitute a **permanent adverse effect of significance at a Site level**.

8.5.33 The habitat losses within the remaining Application Site are likely to affect more widespread species, though habitat for BoCC species such as song thrush and dunnock will be lost in short term. Once construction is complete, the gardens, houses and Green Infrastructure Areas are likely to be of comparable value to the existing habitats. Therefore, this is likely to constitute a **short-term adverse effect of significance at a Site level**.

8.5.34 The Proposed Development will include provisions for nesting birds. This will include swift next boxes and house sparrow next boxes within buildings and starling and tree sparrow nest boxes within retained trees. Both these types of boxes can be placed away from the proposed residential areas and destination park (Parcel 28) and sited on the edges of retained and newly planted woodland plots. A minimum of 25 of each of the proposed next boxes will be installed. This is likely to constitute a **long-term beneficial effect of significance at up to a Local level**.

8.5.35 The management of the proposed mitigation areas for reptiles (shown in the Constraints and Opportunities Plan – **Figure 8.7**) will aim to create a rougher and more diverse sward with dense tussocks as well as smaller open patches. This will likely improve the area's suitability for nesting ground nesting birds, such as skylark. This will result in a **long-term beneficial effect of significance of up to a Site level**.

Birds (wintering)

8.5.36 The Proposed Development will result in areas of grassland habitat and a mixture of existing buildings, arable land and amenity grassland. These habitats are unlikely to support large numbers of wintering birds other than residents and small numbers of migrant species such as redwing or fieldfare. Similar habitats such as open grassland and scrub with fruiting species will be available following the construction stage. The gardens will also offer suitable habitat for more widespread wintering or resident species of conservation concern, such as dunnock. Therefore, the loss of habitat on wintering birds is likely to constitute a **short-term adverse effect of significance at a Site level**.

Terrestrial invertebrates

8.5.37 The loss of an area 'Open mosaic habitat on previously developed land' will arise from the Proposed Development of Parcel 22. The proposed development of Parcel 23 and 30 will also result in the loss of some valuable habitat for invertebrates (unimproved calcareous grassland). The Proposed Development of Parcel 30 will result in the loss of further grassland, but as this is species-poor semi-improved grassland, this is likely to

be of low value for invertebrates. Overall therefore the loss of habitats will result in a **permanent adverse effect of significance at a Site level**.

8.5.38 The remaining areas of the Application Site will either be unaffected or the losses will be limited to habitats of negligible value for invertebrates.

Effects during Operation

Designated Sites

8.5.39 No effects on the off-site designated sites are predicted during the operational stage of the Proposed Development. Increased visitor pressure is unlikely to occur, given the lack of direct connectivity to these sites from the Proposed Development within the Application Site and the provision of Green Infrastructure within the Application Site.

8.5.40 In the absence of mitigation, there is the risk that the proposals for Parcels 24 and 27 have the potential to affect the value of the grassland habitats within the Upper Heyford LWS. The activities proposed for these parcels have not been detailed at this stage, although these will be largely limited to the areas of existing hard standings along the former airstrip and taxiways. Much of this area is already in use for similar activities with filming having been undertaken in the past and vehicle storage and testing. The outer taxiway is in use for vehicular access to the southern bomb store area. These new activities are likely to consist of a change in degree of use rather than new usage of previously undisturbed areas. Any effects on the hard-standing habitats are unlikely to have any effect on the integrity of the habitats in the adjacent grassland.

8.5.41 In order to give some certainty to this assessment, a list of prescriptions will be included in the LEMP for the area, which will set out activities which may be potentially damaging to the grassland habitats. These would include vehicular access to the grassland habitats other than with vehicles carrying out necessary management of the grassland, encroachment by large numbers of pedestrians, significant changes in hydrology due to large amounts of water used for filming activities etc. These will therefore limit direct or indirect effects to this LWS to negligible or effects of significance at a Site level only. To determine whether these prescriptions are to be implemented robustly, all new filming projects will be subject to an environmental risk assessment which will assess the proposed activities predicted for any given filming project on the integrity of the LWS. This project-specific risk assessment will be carried out a suitably qualified ecologist and will be presented and approved by the LPA ecologist (or ecologists working on behalf of the LPA) prior to filming activities commencing.

Habitats

8.5.42 The proposals for Parcels 28 and 29 include the creation of a destination park. These include the creation of formal paths and visitors will be encouraged to stay on these without encroaching onto adjacent grassland habitats, so as to reduce any effects due to increased ground disturbance and uncontrolled deposition of nutrients through dog faeces. Therefore, depending on the success of these measures, it is likely that the increased visitor pressure to these areas will only result in a **permanent adverse effect of significance at a Site level only**.

Reptiles

8.5.43 During the operation stage of the Proposed Development, the only potential ongoing predicted effect on reptiles is increased mortality as a result of predation by domestic cats. Given that the mitigation for the effects during construction will have by this time been implemented, the reptile community currently present in the eastern part of the Application Site (Parcels 22 and 23) will have been translocated to suitable habitat

elsewhere within the Application Site. This is likely to be in the northern area of the Application Site, approximately 630m to the north. Therefore, the incidence of predation is predicted to be very low. This is likely to constitute a **permanent adverse effect of significance at a Site level**.

Great crested newt

8.5.44 During the operation stage of the Proposed Development, an ongoing potential effect on great crested newts is predicted through increased mortality as a result of predation by domestic cats. The incidence of predation of great crested newts by domestic cats is likely to be very low and limited to periods when the species are present in terrestrial habitat. This is likely to constitute a **permanent adverse effect of significance at a Site level**.

8.5.45 Due to constraints in access to the retained and newly created ponds by members of the public, detrimental effects through visitor pressure are unlikely to arise.

Breeding Birds

8.5.46 The proposed change of use in Parcels 28 and 29 may also an indirect effect on the breeding bird community, through additional visitor pressure on retained habitats which may cause a decrease in numbers of breeding pairs. The exact extent of this latter effect is hard to quantify at this stage and would depend on the level of access, the number of visitors and the success of the measures which will be put in place to limit access to formal paths. The central airfield and the areas immediately to the south of this area currently already in use as testing areas of storage of large numbers of fleet cars, with regular vehicle and pedestrian movement. Therefore, the proposed usage would likely constitute a change in degree of use. Overall these proposals are therefore predicted to result in a **permanent adverse effect of significance at a Site level**.

8.5.47 The areas in Parcels 28 and 29 have been shown to be used only sporadically by curlew (which would seem to be centred around the central and eastern end of the airfield), however increased disturbance by visitors in this area may affect adjacent retained habitats to the north and east as no screening is proposed. Parcels 24 and 27 are currently in use for vehicle testing and filming, activities much the same as those proposed for these areas, therefore this will only represent a change in degree rather than a step change. However without information on the frequency of the proposed use of Parcels 24 and 27, it is problematic to determine whether there will be an increase in use, a change in the use to activities which may disturb curlew more than the current activities and therefore result in adverse effects on curlew. As a worse-case scenario, should the species stop breeding here as a result of the Proposed Development, an **adverse effect of significance at a County to Regional level** is predicted. However, given the species' status and likely future declines, this loss would only be an effect in the short to medium term.

8.5.48 During the operation stage of the Proposed Development, an ongoing potential effect on breeding birds is predicted through increased mortality as a result of predation by domestic cats. The significance of this effect would depend on the species affected. Within the residential areas of the Proposed Development this is likely to affect common and widespread species. Further afield, this may affect farmland bird species in retained habitats and potentially increase levels of disturbance to curlew, though direct predation is unlikely. This is likely to constitute a **permanent adverse effect of significance at a Site level**.

Summary of Significance of Effects

Table 8.2 – Summary of predicted effects, once design mitigation is considered.

Feature (Value)	Potential Effect	Nature of Effect and Significance (in the absence of mitigation)
During Construction		
Upper Heyford Airfield LWS (County)	Loss of 7.11 ha of the LWS.	Adverse – Permanent (County)
Grasslands (Site to County)	Habitat loss as aresult of development.	Adverse – Permanent (Up to County)
Ponds (Local)	Loss of 5 ponds (4 of which support great crested newt) and creation of eight ponds.	Beneficial - Permanent (Site)
Hedgerow (Site)	Loss of approximately 60 m. Proposed additional planting along Chilgrove Drive	Adverse – Short term (Site) Followed by: Beneficial – Permanent (Site)
Bats – Roosting (Trees – Site; Buildings – Negligible)	Loss of buidlings and trees with features but no roosting recorded. Provision of new roost features in trees and buildings.	Long-term – Beneficial (Site)
Bats - Foraging and commuting (Local)	Loss of habitats	Not significant
Badgers (Site)	Loss of main sett. Replacement sett to be created in retained areas under licence.	Neutral
Other SPI Mammals (Site)	Habitat loss	Not significant
Reptiles (Local)	Habitat loss. Habitat creation through enhancement of existing grassland.	Neutral
Great crested newt (Local to County)	Habitat loss (ponds and terrestrial) and fragmentation. Habitat creation, including corridors, terrestrial habitat enhancement and pond creation and secured through an EPSM.	Neutral.
Breeding birds -grassland and farmland species (Local)	Loss of grassland habitats used by skylark, meadow pipit, corn bunting and farmland birds. Deterioration of value of grassland habitats as a result of planting of	Adverse – permanent (Site)

Feature (Value)	Potential Effect	Nature of Effect and Significance (in the absence of mitigation)
	woodland strip on north-east edge of airfield. Management of grassland for reptiles and amphibians to benefit species such as skylark and meadow pipit.	
Breeding birds – Curlew (Regional)	Small amount of habitat loss or deterioration.	Adverse – Short to Medium-term (Site)
Wintering birds (Site to Local)	Loss of widespread habitats used by common wintering and resident species.	Adverse – Short-term (Site).
Terrestrial Invertebrates (Local)	Loss of Areas of species rich grassland and open mosaic habitat on previously developed land.	Adverse – Permanent (Site).
During Operation		
Upper Heyford Airfield LWS (County)	Potential effects on integrity of site as a result of filming activities.	None or not significant
Grassland habitats (Parcels 28 and 29) (County)	Deterioration of habitat as a result of visitor pressure – depending on success of design mitigation.	Adverse – Permanent (Site)
Reptiles (Local)	Mortality through increased predation by domestic cats.	Adverse – Permanent (Site)
Great crested newts (Local to County)	Mortality through increased predation by domestic cats.	Adverse – Permanent (Site)
Breeding birds (Regional)	Mortality (or disturbance) through increased predation by domestic cats.	Adverse – Permanent (Site)
Breeding birds – Curlew (Regional)	Disturbance around breeding habitat through increased usage.	Adverse – Short to Medium-term (County - Regional)

8.6 SCOPE OF MITIGATION AND ENHANCEMENT

8.6.1 This section sets out the further mitigation and enhancement for the effects identified in the previous section (which were identified with consideration of design mitigation). The word mitigation as used in the following section is a broad term that encompasses measures to avoid, minimise or compensate for residual impacts of the proposed development on top of those measures set out as design mitigation section.

During Construction

Upper Heyford Airfield LWS and Grassland Habitats

8.6.2 In order to compensate for the grassland habitat losses within the Proposed Development, the following mitigation measures will be implemented.

8.6.3 The creation of up 30.82 ha of unimproved calcareous grassland on land which currently supports arable land (Shown in Figure 8.7). The fields identified for habitat creation are located adjacent to the western edge of the Application Site either side of the western end of the airfield. Both fields lie on flat or gently sloping land on the same geological formation as the Application Site, making it suitable for the proposed habitat creation proposal.

8.6.4 This habitat creation (30.82 ha of unimproved calcareous grassland) habitat would more than compensate for the loss of this habitat type (10.97 ha) from the Application Site. It is also predicted to compensate adequately for the other grassland habitat losses and includes grasslands of lower value than unimproved calcareous grassland, including: species poor-semi-improved grassland (18.6ha), semi-improved neutral grassland (0.05 ha), semi-improved calcareous grassland (0.21 ha) and unimproved neutral grassland (0.76 ha). The location of the fields at the western end of the airfield offers good connectivity to existing grassland habitat within the Application Site. This grassland creation contiguous with the airfield will benefit a range of taxa such as reptiles, breeding birds (including skylark and potentially curlew), invertebrates, bats and other SPI mammals.

8.6.5 To ensure good quality calcareous grassland is created within 10 years various restoration techniques will be applied depending on existing soil conditions. These will be set out in a grassland restoration/creation works programme within the LEMP and will include but will not be limited to, soil nutrient reduction measures, use of green hay from the LWS and additional sowing of suitable native wildflower seed mixes. Development of the grassland will be monitored and assessed against defined creation objectives and targets. Where required remedial action will be taken to ensure the grassland develops as intended. Such measures may include treatment of invasive weed species and additional management measures such as targeted mowing or grazing.

During Operation

Grassland habitats (Parcels 28 and 29)

8.6.6 In order to ensure the proposed measures in Parcel 28 are successful in maintaining the habitat in its current condition, monitoring will be implemented. This will be carried out by a suitably experienced ecologist during yearly visits in July to carry out botanical surveys and condition assessment. This will be reported on annually to the LPA. This report will also include any corrective action needed either through modifications to the management of the area, reinforcing access restrictions to affected areas or, if necessary, the creation of an area of new unimproved neutral grassland elsewhere, should the condition deteriorate excessively.

Reptiles, great crested newts and breeding birds

8.6.7 In order to reduce the risk of additional predation by domestic cats affecting reptiles, great crested newts and breeding birds north of Parcel 28, a permanent cat-proof fence will be put in place. This will be associated with already proposed security fencing and will run along the western and northern edges of Parcel 30, northern edge of Parcel 28 and northern and eastern edge of Parcel 23, continuing on along the southern edge of Parcel 24. With this provision in place and the distance to proposed mitigation areas for reptiles, it is likely that no residual effect will arise as a result of additional predation.

Curlew

8.6.8 In order to mitigate for potential effects arising from disturbance on breeding curlew from the proposed use of Parcel 27, prescriptions will be set out in the LEMP for

this Phase of the proposed development and thereafter implemented which will dictate the types of activities to be avoided and periods when no activity on the filming area will be allowed. No activity periods will typically be March and April, when the species is likely to be setting up a nest site and most likely to be sensitive to disturbance. Activities within the grassland, which are likely to be limited anyway by measures to safeguard this habitat, will also be avoided between March and August. The impact to this species as a result of each new filming project will also be assessed through Environmental Risk Assessments that will be completed for each filming project.

8.6.9 The proposed creation of two new areas of grassland similar in nature to those being disturbed within the Application Site (i.e. management for unimproved calcareous grassland) and within the vicinity of the Application Site is likely to compensate for this short to medium-term effect by providing an alternative nesting and foraging site. Therefore, it is unlikely that any effect on the species would occur.

8.7 RESIDUAL EFFECTS ASSESSMENT

8.7.1 This section summarises the likely residual effects of the Proposed Development once the mitigation measures have been implemented. These are summarised in Table 8.3.

Table 8.3 – Summary of residual effects[9].

Feature (Value)	Potential Effect (considering mitigation by design)	Nature of Effect and Significance (in the absence of mitigation)	Mitigation	Residual effect
During Construction				
Upper Heyford Airfield LWS (County)	Loss of 7.11 ha of the LWS.	Adverse – Permamanent (County)	The extent of the LWS will be reduced, however the grassland habitats lost will be compensated for as described for "Grasslands".	Adverse – Permanent (Local) on extent of LWS.
Grasslands (Site to County)	Habitat loss as aresult of development.	Adverse – Permanent (County)	Creation of 30.82 ha of unimproved calcareous grassland habitat with good connectivity to existing grassland habitat within the Application Site.	Option 1: Beneficial Permanent (Local).
Ponds (Local)	Loss of five ponds (of which four support great crested newt) and creation of eight ponds.	Beneficial - Permanent (Site)	None	Beneficial - Permanent (Site).
Hedgerow (Site)	Loss of approximately 60 m. Proposed additional planting along Chilgrove Drive	Adverse – Short term (Site) Followed by: Benficial – Permanent (Site)	None	Adverse – Short term (Site) Followed by: Beneficial –

[9] Option 1 and 2 refer to the options being explored for mitigation as set out above.

Feature (Value)	Potential Effect (considering mitigation by design)	Nature of Effect and Significance (in the absence of mitigation)	Mitigation	Residual effect
				Permanent (Site).
Bats - Roosting (Trees – Site; Buildings – Negligible)	Loss of buidlings and trees with features but no roosting recorded. Provision of new roost features in trees and buildings.	Long-term – Beneficial (Site)	None	Long-term – Beneficial (Site).
Bats - Foraging and commuting (Local)	Loss of habitats	Permanent – Adverse (Not-significant)	None specific. However the creation of 30.82 ha of species rich grassland is likely to benefit a range of bat species. Given its location away from aritificial light, the areas may be used by a wider range of species than what has been recorded in the areas being lost which were affected by artificial light.	Neutral to Long-term Beneficial (Site)
Badgers (Site)	Loss of main sett. Replacement sett to be created in retained areas under licence.	Neutral	None	Neutral.
Other SPI Mammals (Site)	Habitat loss	Permanent - Adverse (Not significant)	Off site creation of 30.82 ha of calcareous grassland will benefit brown hare. This habitat will also be of higher value for foraging polecat.	Beneficial – Permanent (Site).
Reptiles (Local)	Habitat loss. Habitat creation through enhancement of	Neutral	Off site creation of 30.82 ha of calcareous grassland will benefit reptiles.	Permanent – Beneficial (Site).

Feature (Value)	Potential Effect (considering mitigation by design)	Nature of Effect and Significance (in the absence of mitigation)	Mitigation	Residual effect
	existing grassland and translocation.			Option 2 – Neutral.
Great crested newt (Local to County)	Habitat loss (ponds and terrestrial) and fragmentation. Habitat creation, including corridors, terrestrial habitat enhancement and pond creation and secured through an EPSM.	Neutral.	None	Neutral.
Breeding birds - grassland and farmland species (Local)	Loss of grassland habitats used by skylark, meadow pipit, corn bunting and farmland birds. Deterioration of value of grassland habitats as a result of planting of woodland strip on north-east edge of airfield. Management of grassland for reptiles and amphibians to benefit species such as skylark and meadow pipit.	Adverse – Permanent (Site)	Provision of 30.82 ha of calcareous grassland will benefit a range of species, including skylark and meadow pipit. The existing hedgerows bordering this new grassland will also provide nesting habitat for species, such as yellowhammer, and the new grassland will provide improved foraging for these and other species.	Neutral.

Feature (Value)	Potential Effect (considering mitigation by design)	Nature of Effect and Significance (in the absence of mitigation)	Mitigation	Residual effect
Breeding birds – widespread species (Site)	Short term loss of habitat. Provision of nesting sites.	Adverse short-term. Followed by Long-term – beneficial (Local level).	None	Adverse short-term. Followed by Long-term – beneficial (Local level).
Breeding birds – Curlew (Regional)	Small amount of habitat loss or deterioration.	Adverse – Short to Medium-term (Site)	Provision of large grassland areas of similar or equal value. .	Neutral
Wintering birds (Site to Local)	Loss of widespread habitats used by common wintering and resident species.	Adverse – Short-term (Site).	None	
Terrestrial Invertebrates (Site to County)	Loss of Areas of species rich grassland and open mosaic habitat on previously developed land.	Adverse – Permanent (Site).	Provision of 30.82 ha of calcareous grassland will benefit a range of species. This will result in potentially a gain in terms of available species rich habitats. .	Neutral to Permanent and Beneficial (Site).
During Operation				
Upper Heyford Airfield LWS (County)	Potential effects on integrity of site as a result of filming activities.	None or not significant	Environmental Risk Assessment to be completed for each new filming project and presented to LPA and BBOWT for approval.	Neutral.
Grassland habitats (Parcels 28 and 29)	Deterioration of habitat as a result of visitor pressure – depending on	Adverse – Permanent (Site)	Monitoring of retained habitats in Parcel 28 and 29. Corrective action to be prescribed as needed.	

Feature (Value)	Potential Effect (considering mitigation by design)	Nature of Effect and Significance (in the absence of mitigation)	Mitigation	Residual effect
	success of design mitigation.			
Reptiles (Local)	Mortality through increased predation by domestic cats.	Adverse – Permanent (Site)	Installation of cat-proof fence around the northern side of Parcels 23, 28 and 30.	Not significant.
Great crested newts (County)	Mortality through increased predation by domestic cats.	Adverse – Permanent (Site)	Installation of cat-proof fence around the northern side of Parcels 23, 28 and 30.	Not significant.
Breeding birds (Local)	Mortality (or disturbance) through increased predation by domestic cats.	Adverse – Permanent (Site)	Installation of cat-proof fence around the northern side of Parcels 23, 28 and 30.	Not significant.
Breeding birds – Curlew (Regional)	Disturbance around breeding habitat through increased usage.	Adverse – Short to Medium-term (County - Regional)	Management of activities in Parcels 24 and 27 (timing). Provision of large grassland areas of similar or equal value.	Neutral

8.8 CUMULATIVE AND IN-COMBINATION EFFECTS ASSESSMENT

Cumulative Effects

8.8.1 **Table 8.4** below summarises the information gained on the other proposed developments in the vicinity which are to be considered in the cumulative effects assessment. The information provided for the first three and the impact assessment presented is based on documents obtained from the Cherwell District Council Planning portal[10].

8.8.2 In the case of Parcel 15, the level of information available for the first three sites was not available due to the status of the application (i.e. it is allocated in policy Villages 5 of the Local Plan but not application is currently submitted). The information given here was gained through incidental observations of the area from adjacent habitats and freely accessible aerial photography. Further information was gained for bats as one of the static detectors used by BSG Ecology in 2017 was positioned on the western edge of this site. Further information gained by BSG Ecology in 2017 has also been used in the case of the Pye Homes site and the impact assessment has thus been added to.

Table 8.4 – Predicted effects on ecological features as a result of proposed development of other sites in the vicinity

Site (status)	Ecological features	Residual effects
Land south west of Camp Road (Planning sought – awaiting decision)	The only habitats on site of value include (poor or neutral) semi-improved grassland, hedgerow trees and waterbodies. Protected species included three roosts (feeding perches) of species of low conservation value (brown long-eared and Natterer's bat).	None as a result of the mitigation proposed.
Village Centre North, Heyford	The site contains buildings, hard standing, trees and amenity grassland. Two buildings and one tree were assessed as having the potential to support bats. No futher surveys were carried out to determine species present or likely levels of use, however the tree was assessed as potentially supporting small numbers of crevice dwelling species and the buildings may support roosting bats in a cavity accessible through air bricks and external features (such as slipped tiles).	The residual effects would depend on the nature of the roosts present, if any. This has not been determined, but recommendations for enhancement and compensation in the form of bat boxes will be provided. Therefore no resdiual effects are predicted.
Pye Homes site (Planning approved September 2017)	Habitat dominated by an arable field and small areas of semi-improved grassland and hedgerows with trees. Protected species included the potential presence of great crested newt from the Letchmere Farm population, some potential for roosting bats in trees and	None as a result of the very low biodiversity value of the site which is dominated by arable land and the retention of the main features of interest (hedgerow and trees).

[10] https://www.publicaccess.cherwell.gov.uk/online-applications/ Last accessed on 18 September 2017.

Site (status)	Ecological features	Residual effects
	the presence of badgers (no setts present). Further information gained in 2017 by BSG Ecology includes the use by bats as recorded by the automated detector at Location 4, located short distance to the north. This has shown that the area is used by a range of relatively common species, though 13 passes of barbastelle were recorded.	The data gathered by BSG Ecology in 2017 suggests that the use of the area by bats was largely by common and widespread species, though some use by barbastelle in September was recorded. Permanent adverse effect of negligible significance on this feature. The development of this site and the Application Site jointly will result in a loss of foraging habitat for badgers which is likely to be of negligible significance given the low conservation value of badgers.
Parcel 15, Heyford Park Masterplan .	This site supports a small area of improved grassland fields currently under management by grazing. This is located immediately to the north of the Pye Homes sites. Given the proximity and the nature of the habitats present, the constraints on this site are therefore likely to be very simlar to the previous site. The area is used by the same bat community as described in the previous site, given that the automated detector at Location 4.	The residual effects for this site are difficult to detemine given the lack of baseline information and proposals, however the losses of these habitats of low conservation value are unlikely to result in significant residual effects. The use of the area by bats was largely by common and widespread species, though some use by barbastelle in September was recorded. Permanent adverse effect of negligible significance on this feature.

8.8.3 The review of the residual impacts of other sites as set out above has not revealed any cumulative effects which would arise in conjunction with those identified for the Application Site.

8.8.4 The proposed developments in Parcel 15, Heyford Park and the Pye Homes site may add to the habitat loss for rarer bats, namely barbastelle, occurring as a result of the Proposed Development of the Application Site. However, given the very low levels of use of the area (limited to a small number of individuals, or a single bat) in September, it is unlikely that the development of the sites would cumulatively have an effect in this feature of significance at any scale.

In-combination Effects

8.8.5 The EcIA process carried out above already considers the effects of other environmental elements (such as lighting) on ecological features, therefore this section has not been compiled in the same way as for other chapters.

8.8.6 In summary these include:

- Potential impacts from lighting were considered from those receptors considered potentially sensitive to increased lighting (including great crested newts and bats). Due to the provision of mitigation by design, such as the careful design of lighting proposals and the planting of additional screening, these effects have been avoided at the design stage.
- Potential impacts from increased public access to the grassland habitats in Parcels 28 and 29 were identified and mitigation has been proposed to ensure that there will be no impacts by formalising paths in these areas and discouraging uncontrolled access. The provision of public open space within the Application Site with encourage people to stay with the Application Site. No residual impacts from access have therefore been identified.

8.9 CHANGE IN BIODIVERSITY VALUE

8.9.1 The change in biodiversity value, as assessed through the Biodiversity Impact Assessment Calculator (Warwickshire Coventry and Solihull, 2014) considers the likely effects during the construction stage (including habitat losses and creation) and as a result of subsequent changes in habitat condition through sympathetic management or deterioration at the operational stage. Based on the Composite Parameter Plan (Figure 4.1), in the absence of habitat creation, to offset the predicted losses and deterioration, the calculator has predicted a Habitat Biodiversity Impact Score of -352.22 and a Linear Biodiversity Impact Score of +31.32. The full calculator is included in Appendix 8.4.

8.9.2 In order to offset the losses arising from the Proposed Development a number of measures will be implemented, including habitat enhancement within the Application Site and the creation of unimproved calcareous grassland in Good condition within 10 years on land currently in use as arable fields immediately to the west. The details of the creation and management of this area will be set out in the CEMP and LEMP for the first phase of the development and will be informed by soil sampling and investigation to ensure the habitat creation and management prescriptions are suitably tailored to the conditions so as to meet the proposed timeframe for habitat creation. This provision will result in a final Habitat Biodiversity Impact Score of +20.45. In this way, the Proposed Development will deliver a net gain for biodiversity

8.10 REFERENCES

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