

12 Biodiversity

12.1 Introduction

12.1.1 This chapter will assess the likely significant impacts associated with the Proposed Development on flora and fauna and associated habitats. All receptors associated with the Proposed Development will be described as the baseline condition for the Site and reference any completed, current or programmed mitigation strategies to be implemented, whilst focusing this assessment on those receptors that have not being 'scoped out' by previous work. Through this process any methodologies used in this assessment will be described. Mitigation measures are identified where appropriate that will avoid, reduce or offset any adverse effects identified and / or enhancements that provide likely beneficial effects. Taking account of any mitigation, the nature and significance of the likely residual effects are described.

12.1.2 This Chapter is supported by the following appendices:

- **Appendix G.1:** Habitats Plan (UKHABS)
- **Appendix G.2:** Badger Survey Report and Mitigation Strategy (2022 Update)
- **Appendix G.3:** Reptile Survey Report and Mitigation Strategy (2022) Update)
- **Appendix G.4:** Biodiversity Net Gain Calculations
- **Appendix G.5:** Bat Activity Report (October 2021)
- **Appendix G.6:** HRA Screening document
- **Appendix G.7:** Plan of Designated Sites

12.1.3 This Chapter has been prepared by James Mitchell, a senior ecologist within Wessex Water. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.4**.

12.2 Policy Context, Legislation, Guidance and Standards

12.2.1 Applicable legislation and policy associated with this Chapter is summarised as follows:

- The Conservation of Habitats and Species Regulations 2017;
- Wildlife and Countryside Act 1981;
- The Protection of Badgers Act 1992;
- Natural Environment and Rural Communities Act 2006 (NERC) (sections 40 and 41); and
- Environment Act 2021 (Parts 6 and 7 Nature and Conservation).

National Planning Policy

- 12.2.2 The National Planning Policy Framework (NPPF) sets out the Governments requirements for the planning system published in March 2012 with the most recent version published in July 2021.
- 12.2.3 Achieving sustainable development is at the heart of the NPPF and one of those overarching objectives within this is on an environmental basis (paragraph 8c) “to protect and enhance our natural environment” among others. There is a “presumption in favour of sustainable development” (paragraphs 10 to 11).
- 12.2.4 The NPPF Chapter 15 – Conserving and Enhancing the Natural Environment (paragraphs 174 to 182) ensures that planning decisions should contribute to and enhance the natural and local environment by way of acknowledging topics such as biodiversity gain, coherent and resilient ecological networks, green infrastructure to provide linked wildlife corridors and stepping-stone sites.
- 12.2.5 National Policy therefore implicitly recognises the importance of biodiversity and that development that is planned can co-exist with conservation of the natural heritage and that benefits to biodiversity can be obtained.

Local Planning Policy

- 12.2.6 South Gloucestershire Councils (SGC’s) adopted South Gloucestershire Local Plan, Core Strategy 2006-2027 (2013), objective regarding Natural Heritage is ‘*conserving and enhancing the district’s distinctive landscapes, natural environmental resources and biodiversity*’. Policy CS9 – managing the Environment and Heritage, requires developments to ‘*conserve and enhance the natural environment, avoiding or minimising impacts on biodiversity and geodiversity*’.
- 12.2.7 A new Local Plan (Local Plan 2020) by SGC is currently under consultation and will cover a 15-year period from adoption. SGC intend to adopt the new plan in 2023 which will run until 2038. This will establish ‘*a greater and more positive impact on challenges faced by wildlife and our natural environment*’.
- 12.2.8 SGC published a draft Supplementary Planning Document (SPD) for the proposed Cribbs Patchway New Neighbourhood (CPNN) in 2012 that was endorsed in January 2013 and adopted in March 2014.
- 12.2.9 The CPNN SPD states the following regards to ecology and the natural heritage: ‘*Strategic Green and Blue Infrastructure (GI and BI) will need to comprise a substantial, interconnected and multifunctional network of spaces (both green and blue assets), protecting and enhancing the existing ecological habitats, trees and hedgerows, and their integration through the use of SUDS, the treatment of grey water*’.

12.3 Consultation

- 12.3.1 Consultation with SGC commenced in 2017 for the completion of the 2017 ES Addendum. More recently in 2022 discussions with SGC have been focused on specific subjects relating to the ecology of the Site and include north south links that would provide ecological gain, badger mitigation and the potential for additional protected species in Dormice.
- 12.3.2 Consultation, most recently in February 2022, has been undertaking specifically around Biodiversity Net Gain (BNG) calculations with the SGC Biodiversity Net Gain officer and SGC Ecologist with regards to provision of habitats, offsetting potential and strategy.
- 12.3.3 EIA Scoping was conducted for the Proposed Development for scrutiny by the SGC planners and ecologist that would propose the scope of the EIA and consider the likely significant

effects of the development, and any cumulative effects from existing or approved developments in the locality. Certain receptors within the consultation were considered for 'scoping out' as significant effects are not likely, but through this process an assessment on all receptors would be considered within this chapter.

- 12.3.4 Natural England were also consulted through the planning process as a key statutory consultee who did not return any detailed or site-specific concerns for the development, notwithstanding due diligence for a robust assessment.

12.4 Methodology

Study Area and 'Zone of Influence'

- 12.4.1 The ecological study area is defined as the area contained within the Site; although consideration has also been given to those areas that are 'natural' immediately adjacent to the Site that could be susceptible to adverse effects from the Proposed Development. This is typically habitats within 50m of the ecological study area and also includes those habitats such as ponds within 500m of the Site that have the potential to support great crested newt and fall within impact zones in legislation.
- 12.4.2 The 'zone of influence' was not defined in detail within the scoping report and as such it is described here to allow the reader to understand the assessment process. It has been deemed appropriate that this is set as the application boundary for the development; the Site is set in a relatively industrial area in the north of Bristol and the majority of the immediate surrounding land use is that of industry and commerce with a large proportion of the remainder having received planning consent for development or application for. Pathways to sensitive habitats are not evident along the boundary length with the exception of Hayes/Filton Wood Local Wildlife Site (LWS) which is partly within the Site. Faunal receptors can cross boundaries and whilst assessments will be made on the Site itself and where habitat exists up to 50m beyond to identify badger habitation or where ponds are up to 500m from the Site boundary, these are expected and not necessary to extend what is considered to be the 'zone of influence'. In conclusion for the purposes of the assessment the 'zone of influence' is set as the Site and application boundary with an acknowledgement of consideration to faunal species.
- 12.4.3 The Site is 141.7ha in size and construction of the first phase of development has commenced with some dwellings erected and inhabited and groundworks on the remainder of Phase 1 underway. Nevertheless, this will still be considered within the baseline.

Baseline Data Collection

- 12.4.4 The entirety of the Site has been the subject of extensive ecological surveys since 2011; Terence O'Rourke undertook an initial suite of surveys in 2011, 2012 and 2013 and surveys have been undertaken by Wessex Water since 2015. Survey and assessment works are detailed in the ecology chapters of the 2014 ES and 2017 ES Addendum produced by Wessex Water in support of the extant planning consent.
- 12.4.5 The ecological information collected at the Site was used to inform the commencement of construction in certain parts of the Site as well as for investigative works that would otherwise have had an adverse impact on species present. This has involved the submission of applications for protected species licences for bats, great crested newts and badger as well as the translocation of common reptile from the development area. The surveys have also informed the general maintenance and management of the site collaboratively with the YTL estate managers for the Site.
- 12.4.6 Further survey works have been conducted in 2020 and 2021 by Wessex Water to update time-sensitive protected species assessments to inform this ES. This information is considered as the basis for the current state of the environment.

12.4.7 The methods used for the most recent survey work can be divided into three main areas, namely desk-based study, habitat survey, and faunal surveys. These are discussed in more detail within the baseline survey reports and strategies included within **Appendices G.1.1, 1.2, 1.3 and 1.5**.

12.4.8 A summary of the species-specific surveys completed, and their dates can be seen below in Table 12.1.

Table 12.1: Summary of protected/notable surveys completed to date

Survey	Date of Survey (Historic)	Date of Updated Surveys	Summary of Findings
Phase 1 / UKHABS	2014 / 2015 / 2016	2021 – Site wide	No significant change in habitats
Great Crested Newt	2014 / 2016	Translocation occurred in 2017	N/A
Reptiles	2014 / 2016	2021 - Site wide – suitable habitat within the development boundary.	Small population identified as remnant from translocation process in the northwest corner of the Site. Subsequently translocated
Bats	2014 / 2016	2021 - Site wide – transect surveys to identify bat activity within and adjoining the development boundary.	Initial analysis suggests no significant changes in distribution, diversity or Site usage from previous surveys reported in the 2017 ES Addendum.
Badger	2014 / 2016 / 2018	2021 Ongoing - Site wide – all habitats within the development boundary.	Seasonal changes occur throughout the Site, although no additional setts have been identified since the 2017 ES Addendum.
Hedgehog	2016	No Update	N/A
Birds	Unspecified	Unspecified	Assessments ongoing throughout survey period and observations noted.

12.4.9 Habitat value can be measured against known selection criteria, i.e. the designation of sites such as SPA's and SAC's or 'Guidelines for the selection of biological SSSI's' and Hedgerow Regulations 1997 for example. However, for the majority of commonly encountered sites the most relevant habitat evaluation is at a more local level and based upon such factors as size, diversity, naturalness, rarity and fragility and their ability to be restored or recreated.

- 12.4.10 Species value is based on factors including distribution, status historic trends, population size and rarity and can apply across a geographical frame of reference. In particular regard is given to populations where the UK holds a large of significant proportion of the international population of the species. Certain species, 'Priority Species' as listed in Local Biodiversity Action Plans (LBAPS), can form interest at this level but do not necessarily imply a specific level of importance.
- 12.4.11 Secondary value will also be factored into assessment work and habitats may in themselves have no intrinsic biodiversity value but could still perform an ecological function. For example, buffer zones to valued habitats, linear or continuous green infrastructure or 'stepping-stone' habitats may be of value for the migration or genetic exchange of wild species.
- 12.4.12 This chapter assesses the Proposed Development against the current and 2036 baseline, as set out in **Chapter 5**. The 2036 baseline comprises the extant planning consent, additional as consented through the 2021 S73 which are required for the opening of the Arena, the Arena and any likely changes to the environment between now and 2036. As is set out in this chapter the historic and current state of the environment is well understood; however, it is important to note that the 2036 baseline is likely to be different from the current state of the Environment of the site and is also considered further below.

Assessment of Significance

- 12.4.13 Identification and assessment of likely significant ecology effects of the Proposed Development uses the following established parameters and standard procedures as well as professional judgement and site-based knowledge.
- 12.4.14 The evaluation and impact assessment method are based upon the guidelines produced by the Chartered Institute of Ecology and Environmental Management (CIEEM): *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2018), which will rely upon an approach that involves professional judgement and the use of available information, as well as the provision of definitions to assign habitats and species different levels of sensitivity.
- 12.4.15 Sensitive receptors are those that have been identified as ecologically important features and consist of any statutory or non-statutory designations within the Site, pathways to the Site or in the immediate proximity of the Site. Habitats and species within the Site are also included.
- 12.4.16 The value or sensitivity of each resource has been determined within a defined geographical context:
- International, High level of sensitivity;
 - National (England), High level of sensitivity;
 - Regional (County), Medium level of sensitivity;
 - Local (Parish or District); or Low level of sensitivity; and
 - Within Zone of Influence (Site) only, Low level of sensitivity.
- 12.4.17 There are other key aspects that require consideration when determining the value of any identified receptor, such as, designations, biodiversity value at a local level that may include, priority habitats and species, biodiversity action plans and strategies devised by planning authorities.
- 12.4.18 Having identified the ecologically important features likely to be affected by the Proposed Development, the guidance promotes an approach in which an impact is determined to be significant or not on the basis of an assessment of the factors that categorise it. This includes

characterising the nature of the likely impacts on each important feature in terms of ecological structure and function, by considering the following parameters.

- Positive or negative – will the activity lead to an adverse, beneficial or neutral impact;
- Extent – geographical scale over which the impact will occur;
- Magnitude – the size, amount, intensity and volume of impact, e.g. the amount of habitat lost or percentage decline in population;
- Duration – the time for which the impact is expected to last prior to recovery or replacement; i.e short-term or long term, permanent or temporary.
- Frequency and timing – some changes may only cause an impact if they coincide with critical life stages or seasons, whilst frequent events may cause greater effect than a single event; and
- Reversibility – an impact may be irreversible in that recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it.

12.4.1 The nature of the impact is then used in conjunction with the ‘conservation status’ to determine whether an impact on a habitat or species is likely to be ecologically ‘significant’. This is assessed in terms of the relevant frame of geographical context. If an impact is found not to be significant at the level at which the resource or feature has been valued, it may still be significant at a more local level. In determining significance, the key consideration is whether the impact will affect the ‘integrity’ of the feature/receptor or affect its condition away from a favourable conservation status. This is interpreted as:

- For Habitats – the sum of the influences acting upon the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical areas; and
- For Species – the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

12.4.2 In the case of impacts to designated sites, consideration will be given as to whether a project is likely to affect the designations conservation objectives, the conservation status or species or habitats for which the site is designated or affect the condition of the site or its interest/qualifying features.

12.4.3 In accordance with CIEEM guidance and EIA Regulations, the detailed assessment of impacts will be focused on those ecological features/receptors for which a significant impact is likely to be generated. Therefore, ecological features/receptors should only be selected for assessment where that feature/receptor is sufficiently valuable, in terms of biodiversity, for an impact to be significant. The relevant decision-making level in this application is at a County (or medium) level. Therefore, any impact on ecological features/receptors of value at or above the County (or medium) level would be considered potentially significant.

12.4.4 Specific species have protection under European or national legislation. If protected species are present/likely present within or adjacent to the application boundary (Site) then an assessment of impacts in these ecological features will be conducted regardless of the feature/receptor’s geographic scale or value.

12.4.5 A desk study was undertaken in 2021 to further assess any information that may have changed since previous assessments undertaken in 2016 and 2017. Any statutory or non-statutory protected sites, protected species or impact zones have been identified under this process.

- 12.4.6 Field survey, in the form of an Extended Phase 1 Habitat Survey was undertaken in May 2021 to update and supplement previous surveys undertaken in 2016 and 2017. All habitats within the Site boundary were identified and mapped in compliance with the Handbook for Phase 1 habitat survey: a technique for environmental audit (JNCC, 2010) and converted into UK Habitat Classification Mapping (UKHABS).
- 12.4.7 Protected species surveys were conducted throughout 2016 and 2017 to support the submitted ES Addendum in 2017 and included badgers, great crested newts, hedgehog, bats and reptiles.
- 12.4.8 Updated surveys for badgers, bats and reptiles were undertaken in 2021 as well as acknowledgement of any bird species using the Site. The remainder of the receptors have been ruled out either due to the completion of mitigation strategies, licensing or not having been identified on site during any previous surveys or as evidence during other surveys.
- 12.4.9 In addition to these surveys undertaken, observations from any site visits identified and recorded any bird species.
- 12.4.10 Previous mitigation undertaken and to be completed that includes documentation such as the Badger Mitigation Strategy, Landscape Environmental Management Plan (LEMP) and the Landscape Parameter green infrastructure strategy agreed will be reviewed for the Proposed Development and confirmed or modified as appropriate.
- 12.4.11 The assessment also gives consideration to Biodiversity Net Gain (BNG) which involves the quantitative comparison of the current baseline with the Proposed Development. With the use of the current DEFRA metric (3.0) an assessment can be undertaken that helps to inform the detailed design process, on the basis that the parameter plans are already set and assists with quantifying any loss or gain in biodiversity that will result from the Proposed Development.
- 12.4.12 BNG is an approach to development that will leave biodiversity in a better state than before and involves the use of a metric system for quantifying and qualifying the adverse impacts of a development on the habitats currently present within a site and calculating how much new or restored/enhanced habitat, and of what types is required to deliver sufficient net gain.
- 12.4.13 The assessment of BNG for the development has been completed using the most up to date metric, (DEFRA metric 3.0), and shows that the development will result in a loss of -39.88% or 246.66 habitat units and a net gain of +127.08% or 44 hedgerow units. The full details of the calculations are shown within **Appendix G.4**.
- 12.4.14 It is also worth noting that the current metric does not account for other forms of mitigation beyond those related to habitats. As such, other ecological betterments such as the provision of bat roosts, (bat boxes etc), hibernacula and log piles, bird boxes and the connectivity created for species specific mitigation that would otherwise be compromised should the sole reason be to achieve habitat net gain and not provide the intended function. Therefore, these need to be considered in addition to the demonstrated net gain calculations.
- 12.4.15 Current consultation (DEFRA January 2022) states that *'mitigation and compensation measures for protected species may be counted towards a biodiversity net gain calculation but should not make up all of a developments BNG. At least 10% of the gain should be delivered through separate activities which are not required to mitigate and compensate for protected species impacts.'* This is not currently qualified or quantified.
- 12.4.16 The results of the metric have been used to help inform the quantum and type of habitat mitigation that will be required on site but to date the build exceeds 20 years and the details of which is not final and will likely evolve. To ensure a 10% net gain can be achieved it is likely that this will need to be achieved through an appropriate offsetting scheme. Options for this

are currently being reviewed by the Applicant and once they are sufficiently advanced the Applicant will discuss these options with SGC.

Limitations

- 12.4.17 The Site has been subject to extensive ecological surveys since before 2014 when the Site was first assessed. Since that time surveys have been adapted, elaborated upon, and repeated for all expected and anticipated faunal species, and is continually assessed through ongoing monitoring by a project ecologist as part of the management of the site. Surveys have been conducted within the appropriate timescales to help determine the application and achieved so that no seasonal constraints are met. Therefore, it is considered that the survey information available forms a robust basis on which to undertake this ecological impact assessment.
- 12.4.18 Evidence has however come to light during the preparation of this chapter that a suspected dormouse nest has been found on an adjacent development in Fishpool Hill to the south of the western end of the Site. Links to this development are present to the western end of the Site and are considered to be limited, and it is considered unlikely the species will be present within the habitats identified on Site. However, the habitat within the adjacent site is suitable and whilst a link remains there are uncertainties with an absence of survey data. Given the timescales of submission of this planning application, dormouse survey will be carried out following submission in 2022 at the appropriate survey time to determine if the receptor is present on the Site.
- 12.4.19 Limitations exist with respect to predicting the 2036 baseline scenario in relation to the type and condition of the habitats that are considered to be present at the Site. However, phasing of the development and extent is known and created habitats will follow existing or proposed management strategies of the Site. Therefore, it is reasonable to expect that the condition of these habitats as part of the 2036 baseline can be predicted.

12.5 Baseline Conditions

Current State of the Environment

- 12.5.1 The current state of the environment is well understood as a suite of survey work has been undertaken in 2021 which has followed ongoing survey work that continues into 2022 on the monitoring and maintenance of mitigation work and management of the Site.

Designated Sites

Statutory Designated Sites

- 12.5.2 The nearest statutory site is Pen Park Hole SSSI and is located 0.9km to the south of the Site. The designation is of geological and faunal importance with nationally important hydrothermal cave systems and invertebrate communities. The 2017 ES Addendum and the extant planning consent concluded that the nature of the designation means that any features would not be adversely affected by the proposal. Pen Park Hole SSSI is a receptor of high (or national) importance.
- 12.5.3 Other statutory sites considered as part of the 2017 ES Addendum and extant planning consent include Winterbourne Railway Cutting SSSI and Cattybrook Brick Pit SSSI, both geological sites within private ownership and no public access 4.3km east and 2.7km north of the Site, respectively that are considered to be receptors of high importance. Horseshoe Bend SSSI located 5km south-west of the Site along the Avon Gorge is another inaccessible cliff face supporting rarely found botanical specimens. Again, being considered a receptor of high importance. Gorse Covert LNR and the Three Brooks LNR are popular public access sites 1km north and 3.3km east of the Site respectively, that are receptors of medium/low importance.

- 12.5.4 The Severn Estuary SSSI/SAC/SPA and Ramsar Site which exceeds 5km to the west of the Site is designated for its migratory fish and for its internationally important populations of migratory and wintering wildfowl and waders.
- 12.5.5 The Severn Estuary SPA qualifies for its overwintering population of Bewick's swan, gadwall, greater white-fronted goose, dunlin, common shelduck, common redshank as well as supporting an internationally important assemblage of overwintering waterfowl.
- 12.5.6 The Severn Estuary SAC Annex I habitats of primary reason for selection are estuaries, mudflats, sandflats and salt meadows. Annex I habitats as a qualifying feature are sandbanks always covered by sea water and reefs. Annex II species that are a primary reason for selection are sea lamprey, river lamprey and twaite shad.
- 12.5.7 The estuary also qualifies under Ramsar criterion 1,3,4,5,6 and 8 and includes the habitats listed above, the migratory fish, salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel. It is also of particular importance for migratory birds during spring and autumn and qualifies due to the populations and assemblages cited within the SPA.
- 12.5.8 The designation was considered as part of the 2017 ES Addendum and the extant planning consent concluding that any features would not be adversely affected. Nevertheless, a HRA screening was undertaken on the potential effects of the Proposed Development and can be seen in **Appendix G.6**.
- 12.5.9 The Severn Estuary is a receptor of high importance.
- 12.5.10 A plan of the location of all statutory designated sites in relation to the Proposed Development can be seen in **Appendix G.7**.

Non-Statutory Designated Sites

- 12.5.11 There are a total of fifteen non-statutory designated sites within 2km of the Site, for completeness these are listed below; however, assessments for the 2014 ES, 2015 and 2017 ES Addendums and extant planning consent identified that impacts are only likely on one of these designations (Hayes Wood LWS) in the form of possible indirect pollutants such as noise, light and dust. As a result, mitigation in the form of a vegetated 30m buffer and protection fencing would be implemented as part of extant planning consent.
- Hayes Wood LWS is found on the northern boundary of the Site and comprises broadleaved woodland with marshy grassland supporting diverse flora.
 - Filton Golf Course LWS lies approximately 0.1km to the south of the Site and comprises amenity grassland with hedgerows, broadleaved woodland, neutral grassland and lake habitats.
 - Brentry Wood LWS is located approximately 1km to the south of the Site and comprises semi-natural broadleaved woodland, neutral grassland and scrub.
 - Blackhorse Wood LWS is located 1km to the north-west of the Site and is comprised of ancient woodland habitats.
 - Filton Railway Cutting LWS is located 0.25km to the south of the Site comprising calcareous grassland that supports a diverse ground flora and invertebrate community.
 - Haw Wood and Mount Skitham LWS is located approximately 1km to the west of the Site and comprises ancient woodland habitats.

- Spanorium Hill LWS lies 1km to the west of the Site and historically was part of the same ancient woodland habitat as Haw Wood and Mount Skitham LWS, now dissected by the M5 motorway.
- Over Court LWS is approximately 1.5km to the north of the Site and comprises woodland, calcareous grassland and neutral grassland.
- Splatts Wood Abbey LWS lies approximately 2km to the south-east of the Site, comprising of ancient woodland with a diverse ground flora.
- Stoke Brook LWS is approximately 1km to the east of the Site and comprises open flowing water and diverse riverbank vegetation.
- Blaise Castle LWS lies approximately 2km to the south-west of the Site and comprises ancient woodland, semi-natural broadleaved woodland, unimproved calcareous grassland and semi-improved neutral grassland as well as stream and pond habitat.
- Mooregrove Wood and Fields LWS lies 2km to the south of the Site and comprises semi-natural broadleaved woodland and scrub, unimproved and semi-improved neutral grasslands with scattered trees.
- Sheep Wood LWS is located 1.5km to the southwest of the Site and comprises ancient woodland habitats.
- Asda/Walmart Car Park LWS is located 0.7km to the north of the Site and comprises geological interest.
- Site West of Concorde Drive LWS is located 1.8km south of the Site and comprises species rich neutral grassland.

12.5.12 A plan of the location of all non-statutory designated sites in relation to the Proposed Development can be seen in **Appendix G.7**.

12.5.13 All LWS's are considered to be receptors of medium importance.

Habitats

12.5.14 Habitat surveys were undertaken in 2021 to update Phase 1 habitat survey methodologies into UK Habitat Classification (UKHabs) for the purposes of Biodiversity Net Gain. This enabled a thorough, updated survey that could identify the main habitats and associated plant species.

12.5.15 For the purposes of this chapter the work will be described in extended Phase 1 Habitat Survey terms where the habitat types are identified and mapped according to Natural England parameters. Although the plan associated with the application has been converted into UKHabs. This plan can be seen in **Appendix G.1**.

12.5.16 The following main habitat / vegetation types were identified within the Site boundary:

- Semi-Improved Neutral Grassland;
- Semi-Improved Poor Grassland;
- Trees and Scrub;
- Hedgerow;
- Ponds;

- Plantation Woodland; and
- Buildings and Hardstanding.

12.5.17 The vegetation present enabled the habitat types to be satisfactorily identified and an accurate assessment of the ecological interest of the habitats to be undertaken.

Semi-improved Neutral Grassland

12.5.18 Semi-improved neutral grassland is present within certain areas of the Site associated with the lower nutrient, shallower soils on the southern edge of the runway and the majority of the grasslands to the north of the runway and within and immediately adjacent to the 'ecological zone' to the west of the Site. The habitat is currently managed as a hay cut twice yearly. This receptor is considered to be of low level importance.

Semi-improved Poor Grassland

12.5.19 Semi-improved poor grassland habitat is identified throughout the remainder of the Site where buildings, hardstanding and semi-improved neutral grassland are absent. The boundaries between the two types of grassland are not as distinct as mapped but are typically much less diverse and devoid of flowering plants which determine the boundaries. This receptor is considered to be of low importance.

Trees and Scrub

12.5.20 Tree and scrub habitat is at present almost exclusively associated with the boundaries of the Site and varies between dense bramble scrub and outgrown boundary features, not considered to be hedgerow. The management of the habitat currently comprises prevention of scrub encroachment on to the grassland where access is possible. This receptor is considered to be of low importance.

Hedgerows

12.5.21 Hedgerow habitat exists within the north of the Site and was associated with the remnant field boundaries dissected when the airfield was constructed. The hedgerows here are species poor showing typically only 3 woody species. There is currently no active management of the habitat. This receptor is considered to be of medium/low importance.

Ponds

12.5.22 Two small pond habitats exist within the current state of the environment that were created in 2015 as part of the mitigation strategy for the then proposed, and now completed GCN translocation. The habitat is located within the 'ecological zone' and will be retained as part of the Proposed Development. This receptor is considered to be of medium/low importance.

Plantation Broadleaved Woodland

12.5.23 Plantation Woodland habitat is present to the northwest of the Site boundary behind what is currently the engine testing building, it covers a small area of land and is proposed to be retained. There is no current management of the habitat. This receptor is considered to be of low importance.

Buildings and Hardstanding

12.5.24 There are currently several abandoned structures associated with the previous operational status of the runway as well as an office space which previously hailed as the departure lounge building. Areas of hardstanding associated with the current state of the environment

include the runway and associated lay down areas. This receptor is considered to be of low importance.

Priority Habitats

12.5.25 Habitats within the Site that fall within the Priority Habitat descriptions include:

- Ponds; and
- Hedgerows.

12.5.26 Ponds are defined within the UK Biodiversity Action Plan (BAP) as seasonal standing water bodies up to 2ha in size and which meet at least one of the following criteria:

- Of international importance;
- Is host to floral and faunal species of high conservation importance;
- Exceptional assemblages of key biotic groups;
- Of high ecological quality; and
- Limited geographic distribution recognised as important because of their age, rarity of type and landscape context.

12.5.27 Furthermore, ponds recognised for supporting GCN (a species of high conservation importance) are considered to meet the Priority Habitat criterion without other factors influencing the assessment.

12.5.28 All hedgerows consisting predominantly of at least one woody UK native species are covered by the Priority Habitat categorisation. On this basis the Priority Habitat is considered to be present on Site.

Fauna

12.5.29 Spanning the previous 7 years since YTL purchased the Site, comprehensive survey work for a variety of fauna, and in particular, relevant protected species, has been completed. Furthermore, the site has been regularly monitored up to the writing of this chapter and will continue to do so beyond 2022, on all occasions observations of notable findings are recorded. Most recently, 2021, specific surveys have been undertaken for reptiles, bats and badgers as well as monitoring of great crested newt mitigation. Methodologies for surveys associated with this work have been completed with regards to recognised guidance and standards specific to each species. Where relevant these are detailed specifically within the survey reports and/or strategies included in **Appendices G.2, 3 and 5** of this ES.

12.5.30 No surveys have been undertaken for invertebrates within the Site for the previous assessments or since. This has been based upon previous liaison and agreement with SGC and the accepted 2014 ES, 2015 and 2017 Addendums and extant planning consent hereafter that concluded that assessments were not required. Invertebrates have therefore been scoped out and are not further assessed in this chapter. A lack of change, and if anything, a worsening of grassland habitat associated with the Site in this period supports this conclusion.

12.5.31 The following fauna is considered for the Proposed Development and details on updated surveys as well as explanations of previous completed translocations, licences and mitigation:

- Badger;
- Bats;

- Great Crested Newt;
- Common Reptiles;
- Hedgehog;
- Dormice;
- Common Bird Species;
- Barn Owl;
- Peregrine Falcon; and
- Skylark.

Badger

12.5.32 The distribution of badgers remains largely unchanged from the 2014 ES, 2015 ES Addendum and 2017 ES Addendum. Consistent usage of the Site is evident with setts remaining in 3 locations on site and a further 2 immediately offsite in adjacent land holdings. Two single hole outlier setts have also been closed under licence for remediation work for Brabazon Phase 1 and as part of archaeological investigations in 2018. A partial closure under licence of the sett in land to the south of the Site also occurred as a precautionary measure for the development of the West Way ingress to the site; the sett was subsequently re-opened after the completion of the works in 2019. The usage of those existing setts has changed from active and in-active and back again throughout the assessment period. The status currently shows one known active sett on the northern boundary of the Site adjacent to the engine testing building to the west of the development, two disused setts on the northern and southern boundaries and one inactive sett and 1 active sett immediately outside the Site. These are in adjacent land to the south and within Hayes/Filton Wood respectively. Refer to **Appendix G.2** – Badger survey report and mitigation strategy 2022 update. Badgers are considered to be a receptor of low importance.

Bats

12.5.33 Bat activity has been recorded across the Site associated with commuting and foraging only and almost exactly mirrors any evidence identified in the 2014 ES, 2015 and 2017 ES Addendums. Manual transect and point surveys undertaken of the whole Site in 2021 showed that noctule (*Nyctalus noctule*), serotine (*Eptesicus serotinus*) and common pipistrelle (*Pipistrellus pipistrellus*) were identified as they were in 2016 with no additional species.

12.5.34 Static bat detector surveys showed that, in addition to those species found in the manual surveys, greater horseshoe (*Rhinolophus ferrumiquinum*), leisler's (*Nyctalus leisleri*), soprano and nathusius's pipistrelles (*Pipistrellus pygmaeus* and *P. nathusii*), brown long eared (*Plecotus auritus*) and other myotis species. This is broadly similar to that identified in 2016 with the omission of lesser horseshoe (*Rhinolophus hipposideros*) and the addition of greater horseshoe and leisler's. As in 2016 no roosts were identified within the Site, although it was noted that roosts must be in the vicinity due to the timing's bats were first identified using the Site.

12.5.35 A single building (the spitfire hangar) previously identified as having a roost that was subsequently removed under Natural England Licence in 2017, was once again highlighted by the surveys. The assessment could not determine if a roost was present in the building but recommended further work. Refer to **Appendix G.5** – Bat Activity Report October 2021.

12.5.36 Bats are considered to be a receptor of low importance.

Great Crested Newt

- 12.5.37 Translocations of great crested newts (GCN) have been completed on site. The species was identified in the lagoon and silt traps at the eastern end of the Site and under licence removed to the purpose-built receptor site and ponds in the 'ecological zone' in the far west of the development. This was completed in 2018 with monitoring of the mitigation site completed in 2021. The receptor site is isolated from the development using reptile/amphibian fencing, as are the boundaries of the site that abut natural habitat. It is concluded that the impacted habitats from the Proposed Development have been cleared of GCN.

Common Reptiles

- 12.5.38 Translocations of slowworm (the only species of reptile identified) have been completed on site spanning two separate efforts. Initially a sitewide translocation was completed in 2017 where approximately 200 slow worms were moved to the purpose-built receptor site in the 'ecological zone' in the far west of the Proposed Development. Updated surveys of the Site were conducted in 2021 and a further translocation occurred which moved approximately 50 slowworms to the 'ecological zone'. The additional species were from an area that was omitted from the initial translocation in error, where only the perimeters of a section were checked and would account for additional numbers and 4 seasons of reproduction. There was no further evidence of common reptiles from the remainder of the Site. The 'ecological zone' is isolated from the development using reptile/amphibian fencing, as are the boundaries of the site that abut natural habitat. It is concluded that the Site has been cleared of common reptiles and no further work is necessary. Refer to **Appendix G.3 – Reptile Survey Report and Mitigation Strategy 2022 Update**. It is concluded that the impacted habitats from the Proposed Development have been cleared of slowworm.

Hedgehog

- 12.5.39 Hedgehogs have not been identified on Site during any survey assessments and are therefore unlikely to be present. Surveys were undertaken in 2017 for the species but further assessment was not considered to be required as the site has remained isolated since this period.

Dormice

- 12.5.40 It is not known whether dormice are present on Site in the current state of the environment as surveys have not been undertaken. Surveys will be undertaken in 2022 to confirm or prove likely absence from Site. For the purpose of this assessment dormice are considered to be present and are a receptor of medium/low importance.

Common Bird Species

- 12.5.41 Scrub, buildings and grassland associated with the Site provide nesting and foraging habitat for common and widespread species of bird as well as those that are listed as red or amber on the British Trust of Ornithology's (BTO's) Birds of conservation concern. No detailed surveys have been undertaken of the Site in recent applications with only noted species identified during regular visits been accounted for. Common species of bird continue to use the site and are considered to be a receptor of low importance.

Barn Owl

- 12.5.42 Barn owls are not known to have nested or roosted on Site since 2014 and have not been identified during surveys or through staff sightings since 2017 where previous sightings of foraging barn owl had been recorded. However, an individual was identified foraging at dusk on two occasions in September 2021 but not identified since, although the site is generally unused at the times the species will be using the Site. The observation suggests that this is an individual seeking advantage of an available resource from known groups of breeding pairs in

Cribbs Village or farther afield from Avonmouth. Although the sightings are extremely sporadic the habitat for foraging is present on site and it cannot be dismissed that barn owls remain using the Site for foraging. Barn Owl is a receptor of medium importance.

Peregrine Falcon

12.5.43 Peregrine Falcon are present on Site and utilise it for foraging. The nest site is located on one of the buildings in the Airbus development and roost overlooking the Site on the Brabazon Hangars to the south. The species has been present on Site for the entire survey period of the development, 2016 onwards, and although the breeding success has not been known covering this entire period young were identified in 2020. Peregrines remain a species that utilises the Site and are a receptor of medium importance.

Skylark

12.5.44 Skylark nest and forage within some of the lower growing grassland habitats on Site. It is not known how many pairs are breeding within the site but analysing known parameters taken from (Browne S., 2000) it is estimated that approximately 4.55 pairs of skylarks would breed in 1km² of suitable habitat. It is reasonable to ascertain that at least 10 pairs are likely to be on Site. Skylark is a receptor of medium importance.

2036 Baseline

12.5.45 This will include the assessment of all habitats that are considered to be present within the 2036 baseline acknowledging habitats not listed in the current baseline that are considered to be created as part of the Proposed Development

Designated Sites

Statutory Sites

12.5.46 All existing statutory designated sites were considered as part of the 2017 ES Addendum and the extant planning consent, concluding that any features would not be adversely affected.

12.5.47 Furthermore, given the level of protection afforded to such designations it can be expected that they will remain present, retaining their features of interest as part of the 2036 baseline.

12.5.48 Given the isolation of the site in an urban environment that in a wider context will continue to develop it is not anticipated that there will be any new statutory sites designated for consideration in the 2036 Baseline.

Non-statutory Sites

12.5.49 Assessments for the 2014 ES, 2015 and 2017 Addendums and extant planning consent identified that impacts are only likely on one of these designations (Hayes Wood LWS) in the form of possible indirect pollutants such as noise, light and dust. As a result, mitigation in the form of a vegetated 30m buffer and protection fencing would be implemented as part of extant planning consent. The 2036 baseline will include the full implementation of these measures. The majority of the designation is outside of the Site boundary.

12.5.50 Given the isolation of the site in an urban environment that in a wider context will continue to develop it is not anticipated that there will be any new non-statutory sites designated for consideration in the 2036 Baseline.

Habitats

12.5.51 The habitats present within the 2036 Baseline have been defined with consideration of the proposed habitat retention, losses, creation and enhancements that result from the

implementation of the extant Planning Consent. Consideration has been given to the likely condition, site management and maturation of such habitat features with respect to the time it will take them to establish (e.g. woodland and trees will mature more slowly than grassland).

12.5.52 The following main habitat / vegetation types are identified:

- Semi-improved neutral Grassland;
- Semi-improved Poor Grassland;
- Trees and Scrub;
- Hedgerows;
- Ponds;
- Plantation Broadleaved Woodland; and
- Buildings and Hardstanding.

12.5.53 Additionally, habitats will be created that are not currently present within the 2036 Baseline and include:

- Amenity Grassland;
- Introduced Scrub / Planting;
- Specimen Trees; and
- Lake / Standing Water.

12.5.54 The extent and condition of these habitats in the context of the 2036 Baseline is considered further below.

Semi-improved Neutral Grassland

12.5.55 Approximately 2.5ha of this habitat will be retained and was enhanced in 2017 as part of the ongoing management of the 'ecological zone' at the west of the development. With the exception of the 'ecological zone' which will mature as part of the 2036 Baseline all existing semi-improved neutral grassland will be lost as part of the 2036 Baseline. There is the opportunity to create species rich verge habitats and areas within parks and other communal areas, but these will need to be detailed in the design at Reserved Matters stage.

Semi-improved Poor Grassland

12.5.56 All of the current semi-improved poor grassland habitat will be lost through the implementation of the extant planning consent in the 2036 baseline.

Trees and Scrub

12.5.57 Small sections of the habitat is proposed to be lost up to the 2036 Baseline, however, enhancement of the boundaries of the Site, and the creation of habitat as part of the proposed GI will occur throughout the Proposed Development. The existing habitat is considered mature although any new planting will not be considered mature as part of the 2036 Baseline.

Hedgerow

- 12.5.58 Approximately 1.5km of the 4.5km of hedgerow identified on Site will be lost as part of the 2036 Baseline. The remaining habitat is considered mature and will be enhanced from the current state of the environment in the 2036 Baseline. The creation of hedgerow features within the Proposed Development is significant and totals approximately 4.7km and is associated with the GI for the site. Although the created habitat will not be considered mature as part of the 2036 Baseline.

Ponds

- 12.5.59 The habitat is located within the 'ecological zone' and will be retained as part of the Proposed Development. Already considered mature the habitats will need to continue to be maintained to function properly and will therefore continue to mature as a suitable habitat into the 2036 Baseline.

Plantation Broadleaved Woodland

- 12.5.60 Plantation Woodland habitat is present to the northwest of the Site and is proposed to be retained and enhanced within the 2036 Baseline maturing by this date. This habitat typology will also be created within the GI as part of the Proposed Development and consist of approximately 5.5ha but will not be mature as part of the 2036 Baseline.

Buildings and Hardstanding

- 12.5.61 Buildings associated with the extant Planning Consent will be considered to be in good condition as part of the 2036 Baseline. Any retained buildings (e.g. Spitfire Hangar) will be considered to be maintained in its current condition due to the requirements around listed structures.
- 12.5.62 Any created features associated with roads, access and parking will be considered to be in well maintained condition as part of the 2036 Baseline.

Amenity Grassland

- 12.5.63 This habitat does not currently exist within the Site and will only be created as part of the Proposed Development. Currently the exact areas that this will encompass is unknown but will be associated with gardens, parks and verge habitat. These habitats will be created and well managed as part of the 2036 Baseline.

Introduced Scrub / Planting

- 12.5.64 This habitat does not currently exist within the Site and will only be created as part of the Proposed Development. Currently the exact areas that this will encompass is unknown but will be associated primarily with gardens and parks. These habitats will be created and well managed as part of the 2036 Baseline.

Specimen Trees

- 12.5.65 There are very few specimen trees located within the Site, where present they are associated with the boundaries of the Site and will be retained as part of the 2036 Baseline. New tree planting will take place and be associated with roadside avenues, park and amenity spaces as well as within gardens and communal spaces of both residential and business. Any new planting provided for the extant planning consent will not be considered mature as part of the 2036 Baseline.

Lake / Standing Water

- 12.5.66 Lake and standing water habitat do not exist in the current state of the environment but will be created as part of the extant planning application in the form of two mixed use features. The proposal is to be a central hub for communal public use whilst providing green infrastructure with swale, edge habitat based on ephemeral native species and reeds. The feature will be created and considered to have matured in the 2036 Baseline and will be well managed as an amenity site with a naturalised function at its edges which will remain more naturalised.

Fauna

- 12.5.67 Consideration is given below to the use of the Site by protected species within the 2036 Baseline as informed by survey work detailing the current state of the environment.

Badger

- 12.5.68 It is expected that none of the current natural setts will be present as part of the 2036 Baseline, although the artificial setts in Hayes Wood will remain. GI associated with the Proposed Development will be created to allow corridors throughout the Site that will allow the species to proliferate. A new artificial sett will also be created to the northwest of the Proposed Development in a secluded woodland habitat currently planned to be within educational land that will not have public access.

- 12.5.69 Pressures on badgers will be increased due to the development of the wider environment and through the completion of this development via land take, additional noise, lighting etc. This will push the species into the remaining suitable habitat within retained areas on Site or that created as part of the extant planning application within the 2036 Baseline. Badgers are expected to remain as part of the 2036 Baseline.

Bats

- 12.5.70 There are no bat roosts under the current state of the environment present within the boundaries of the Site. Furthermore, if management of the Site continues as it is currently it is not anticipated that any existing features will be suitable in the 2036 Baseline for roosting bats.
- 12.5.71 Enhancements as part of the Landscape Ecological Management Plan (LEMP) which was produced for the extant planning consent aims to 'produce content and scoping for the different management regimes and areas for the landscape and ecological spaces across the Site masterplan', will introduce a number of integrated bat boxes along the internal green infrastructure and boundaries of the Site which will likely attract common bat species to roost. Although the designs are not finalised on which structures these will be incorporated within. There will be more opportunity for bats onsite as a result of the implemented LEMP for the extant planning application and therefore will be present in the 2036 Baseline.
- 12.5.72 In respect of the extant planning consent, the majority of the interest for commuting and foraging bats is limited to the periphery of the Site where navigational features are present. The design is such that these areas will be retained and enhanced to maintain 'dark corridors'. The internal part of the Site will be subject to greater levels of light spill and newly created amenity habitats are considered to only be attractive to common species of bat. Links will be created between the north and south and internally which will improve the connectivity and foraging for certain species as part of the 2036 Baseline.
- 12.5.73 The Site within the 2036 Baseline is considered to be utilised by the same species of bat that have been identified as part of the survey work that informs the current state of the environment and are expected to proliferate with the implementation of the LEMP for the extant planning application.

Great Crested Newt

- 12.5.74 The species was translocated under licence in 2018 to the 'ecological zone' that was isolated and enhanced in 2017 and more specifically the purpose-built ponds and immediate surrounding habitat that was created in 2016. This area is isolated from any future development and is managed to maintain its suitability and ecological condition. The species is therefore considered to be present within the 2036 Baseline.

Common Reptiles (Slowworm)

- 12.5.75 The species was translocated in 2017 and 2021 to the 'ecological zone' that was created and enhanced in 2017. This area is isolated from any future development and is managed to maintain its suitability and ecological condition. The species is therefore considered to be present within the 2036 Baseline.

Hedgehog

- 12.5.76 Gardens, boundary enhancements and vegetated links within the internal areas of the developed Site will provide increased foraging and connectivity potential for the species should they populate the Proposed Development. Given the isolated nature of the Site and the lack of evidence the species is present it is not anticipated that hedgehogs will be present on Site within the 2036 Baseline, despite the perceived suitable habitat.

Dormice

- 12.5.77 Boundary enhancements and vegetated links within the internal areas of the developed Site will provide increased linear foraging and connectivity potential for the species. However, the increase in predator species such as domestic cats and the general increase in disturbance introduced by the extant planning consent and cumulative developments will limit the species significantly. The enhancements and creation of linking habitat as part of the extant planning consent means that this species will continue within the Proposed Development into the 2036 Baseline.

Common Bird species

- 12.5.78 The extant planning consent seeks to retain and enhance boundary features as well as create internal links with gardens, aerial connectivity through the joined-up tree canopies, landscaping and north south connectivity. However, all of the existing grassland habitat will be lost with the exception of 2.5ha of retained habitat at the west of the Site. Common species of bird are considered to be present within the 2036 Baseline and are likely to increase through implemented habitat creation through the LEMP as part of the extant planning application.

Barn Owl

- 12.5.79 All of the grassland habitat suitable for foraging will be lost as part of the 2036 Baseline either through development or disturbance to barn owls and the species is likely to be absent from the 2036 Baseline.

Peregrine Falcon

- 12.5.80 The Proposed Development of the site will increase levels of activities considered disturbing such as noise, lighting and the general human presence, however, the species are very tolerant in general to human activity and the pair here are no different with current high levels of construction, industry and operation from both Airbus, BAE and the Site itself which is increasingly active. The Proposed Development up to the 2036 Baseline would likely increase the roosting opportunities, as well as nesting and increase the prey items available to them. The species is therefore considered to remain present within the 2036 Baseline.

Skylark

- 12.5.81 All of the grassland habitat suitable for foraging and nesting will be lost as part of the 2036 Baseline either through development or disturbance to the species and are likely to be absent from the 2036 Baseline.

Consideration of Approved Developments

- 12.5.82 Approved developments and sites allocated within the Local Strategies are primarily based around the Site and adjacent Arena as well as being part of the Cribbs Patchway Neighbourhood Network (CPNN). In additional schemes associated in the surrounding area include the East of Harry Stoke New Neighbourhood (EoHSNN) which encompasses housing and / or mixed used developments that result in the loss of existing green infrastructure and have the potential to give rise to significant cumulative effects.
- 12.5.83 Those in close proximity or linked to the site are limited to the same pressures on providing green space, ecological benefit and where relevant net gain and therefore will include their own elements of public open space, green infrastructure and species-specific mitigation, some of which will link into designs and plans associated with the Site.
- 12.5.84 Whilst there is an appreciation that the pressures of development within the immediate and linked environment will reduce and squeeze the resources available to ecological receptors within the environment the proposals have considered this, and the effects of these developments are likely to be of negligible significance. They are not considered to inhibit the aims of the enhancements on Site, proposed and completed mitigation of the development.

12.6 Embedded Mitigation

Construction Phases

- 12.6.1 A Construction Environment Management Plan (CEMP) will be prepared for each phase of the development that will aim to mitigate adverse effects on retained receptors that are both on and off site during any activities associated with construction. A Framework CEMP is provided at **Appendix A.9**. This will include pollution prevention from run off, encroachment of vehicles and personnel into restricted areas, and the control of other environmental pollutants such as dust, noise, light and litter. This will be secured through a planning condition.

Landscape Strategy and Design

- 12.6.2 The strategies associated with the Proposed Development and its design have been focussed to meet certain criteria, the provision of screening from engineering, the amenity value associated with public open space, the vision of the development as a whole and for the ecological enhancement and mitigation. Much of the design will produce a dual or multiple purpose landscaping character but certain areas will be more tailored to ecological gain, enhancement and species mitigation from native species, floral diversity to the provision of foraging, communication and sheltering resources. This will help mitigate some of the ecological losses and seek to enhance and provide gain for a number of species on Site.
- 12.6.3 The Landscape Parameter Plan is provided as **Appendix A.2** and shows the extent of green infrastructure that is proposed as part of the development; much of the detail of this is to be finalised through detailed design but will feature interest for ecological receptors to help mitigate any losses of the existing grassland habitats.
- 12.6.4 Landscape corridors that include significant ground cover or aerial linkage will provide for communication through the site that is currently absent for use by faunal species as well as provide opportunities to deliver new habitat within the Site that is of ecological value.

- 12.6.5 A wide north south corridor forms part of the landscape strategy as an ecological value within the environment that is currently absent that would further link adjacent habitats from Charlton Common to the south and the northern fringes of the Site that ultimately link into the Henbury Trym buffer zone. Here human disturbance levels are proposed to be reduced, allowing darker corridors and denser planting that would encourage the usage of species associated with the site.
- 12.6.6 East-west bolstering and enhancement planting of the borders of the site are proposed which will further increase the linkages within the Site that would benefit ecological receptors.
- 12.6.7 A buffer zone of 30m will be demarked from construction and operational activities as well as vegetatively enhanced within to protect Hayes Wood LWS from direct and indirect impacts of the Proposed Development. These could come in the form of pollutions such as dust, noise, lighting and litter and the encroachment of vehicles and combine to prevent any significant impacts upon the habitat. The enhancements will come in the form of native species planting that will complement the existing species whilst absorb some of the indirect effects.

Species Specific Mitigation

- 12.6.8 Species specific mitigation strategies have been implemented on Site from as early as 2016 when a purpose-built pond network at the far west of the Site was created to house GCN translocated under licence from other areas. In addition, the ecological receptor site that can be found at the western perimeter was enhanced to increase diversity of habitats within an area that will remain untouched by the Proposed Development.
- 12.6.9 GCN as mentioned, and common reptiles have all been previously translocated to the ecological area within the development either under licence or as part of a strategy, provided at **Appendix G.3**. which highlights any enhancement and future management of the 'ecological zone' that will continue to benefit both GCN and slowworm.
- 12.6.10 A strategy has also been implemented for badgers throughout the site, which includes mitigation to safeguard the species on site during construction and operation of the site. This is provided at **Appendix G.2**.
- 12.6.11 Additionally, species specific licences have been sought; two badger disturbance licences have been obtained to allow investigative works for the proposal and a bat licence was sought to enable removal of a known roost from site during remedial works to structures on Site. This work has been completed. Further licences are anticipated for badgers; however, no other species-specific licences are anticipated to be required.

Lighting

- 12.6.12 Light can affect protected species, in particular bat species, but this is also the case for other species such as badger, birds and GCN. Mitigation that reduces unnecessary light spill and focuses lighting to where it is most needed for purposes such as security and safety is key and it is anticipated that this will be secured by a suitable worded planning condition (as for the extant planning consent). Consideration to type of luminescence and direction is paramount to lessening any impacts upon species association and will need to follow Guidance Note 8 Bats and artificial lighting (The Institution of Lighting Professionals (ILP) and the Bat Conservation Trust (BCT), 2018).

12.7 Assessment of Likely Effects

- 12.7.1 This section identifies the likely significant effects of the Proposed Development on biodiversity receptors, both during construction and its operation; taking into account the embedded mitigation as set out in **Section 12.6**.

Designated Sites

Statutory Designated Sites

- 12.7.2 There are no statutory designated sites present within the Site.
- 12.7.3 The nearest designated site lies approximately 0.9km to the south of the Site, Pen Park Hole SSSI, which is a geological and faunal below ground cave system with no formal access.
- 12.7.4 Other statutory sites considered as part of the 2017 ES Addendum and extant planning consent include Winterbourne Railway Cutting SSSI and Cattybrook Brick Pit SSSI geological sites and Horseshoe Bend SSSI. Gorse Covert LNR and the Three Brooks LNR complete the national statutory designations considered as part of the Proposed Development.
- 12.7.5 In addition, the Severn Estuary SSSI/SAC/SPA and Ramsar Site which is over 5km to the west of the site and is designated for its internationally important populations of wildfowl and waders. The details of the screening of this European and International designated site can be found in **Appendix G.6**.

Construction Phase

- 12.7.6 There are not anticipated to be any effects from activities associated with the construction phase of the Proposed Development on any of the assessed designated sites. Distance and/or nature of the sites themselves, being geological and/or cave systems with no known pathways for indirect pollutants such as dust, noise, hydrology etc eliminate any potential effect.
- 12.7.7 Construction Phase related effects on Statutory Designated Sites are considered to have **no** effect.

Operational Phase

- 12.7.8 There are not anticipated to be any effects from activities associated with the operational phases of the Proposed Development on any of the assessed designated sites due to distance and/or the nature of the sites themselves. The only potential increase would be recreational pressures on the only site with public access, being Monks Pool and Bradley Brook LNR, which would require significant navigation to reach; suggesting the additional population would not utilise the site without motorised transport and would likely use more purposed amenity-based sites nearby and is therefore considered to have a **negligible** effect.
- 12.7.9 Operational phase related effects on Statutory Designated Sites are considered to have **negligible** effect.

Non-statutory Designated Sites

- 12.7.10 One non-statutory designated site, Hayes Wood LWS lies partly within the northern boundaries of the Site but will not be subject to any direct effects from the Proposed Development.
- 12.7.11 There are a total of fourteen other non-statutory designations within 2km of the Site, none of which were anticipated to be negatively impacted by the previous assessments for the 2014 ES, 2015 and 2017 Addendums, nor are they for the Proposed Development.

Construction Phase

- 12.7.12 There are not considered to be any significant effects from activities associated with the demolition / construction phase on any of the non-statutory designated sites near or in the vicinity of the proposal. Each receptor is considered to be a suitable distance from the

proposal that no pathways for indirect pollutants such as dust, noise, hydrology etc can reach the site, therefore eliminating any potential effect.

12.7.13 Hayes Wood however is within the boundary of the Site and although will remain unaffected by direct construction activities and indirect effects are limited through the creation of a '30m buffer' zone around the designated there remains the potential that indirect impacts from the construction of the proposal may occur.

12.7.14 Although almost all of the sites are considered not to be impacted by the proposal, the demolition / construction phase related effects on Hayes Wood LWS are considered to be **indirect, temporary**, despite the long construction phase, works will only be located within the proximity of the site for a relatively short period, **minor, adverse** at the **regional** level.

Operational Phase

12.7.15 There is not currently any proposal that would allow access to the LWS during the operational phase of the development, with the exception of management and educational purposes. YTL do not own the vast majority of the LWS and intend to maintain the fencing that surrounds the site which restricts access from the public.

12.7.16 Unauthorised access, vandalism and littering cannot be ruled out during the operational phase and are of consideration to the assessment, but it is reasonable to make the assumption with measure implemented from the LEMP that this is negligible.

12.7.17 Operational phase related effects on Non-statutory Designated Sites are considered to be **negligible**.

Habitats

Semi-improved Neutral Grassland

Construction Phase

12.7.18 The extent of semi-improved neutral grassland will be much reduced as part of the Proposed Development with all but 2.5ha of the approximate 40ha being retained and some additional recreated habitats that will be detailed in the design at Reserved Matters and are shown within the landscape parameter plan in **Appendix A.2**. The grassland habitat is not considered to be particularly ecologically diverse but shows certain species association that is considered as features of this habitat type. The habitat is also considered to be an isolated feature of this type within the local environment of the urban setting but is not alone, other sites, more isolated and of better quality are identified within 2km and are noted as LWS's. These can be seen in **Appendix G.7**.

12.7.19 Effects on semi-improved neutral grassland during the construction phase are considered to be **direct, permanent, moderate, adverse** at the **local** level, which is **Significant**.

Operational Phase

12.7.20 The retained grassland, and those areas that will be recreated as part of the Proposed Development will be managed with conservation cuts to promote diversity and located in areas of low public association. Therefore, the operational effects on semi-improved neutral grassland are considered to be **negligible**.

Semi-improved Poor Grassland

Construction Phase

- 12.7.21 Semi-improved poor grassland will be lost as part of the Proposed Development although some areas considered semi-improved poor managed grassland will be recreated habitats that will be detailed in the design at Reserved Matters and are shown within the Landscape Parameter Plan in **Appendix A.2**. The grassland habitat is not considered to be ecologically diverse and has low species association and therefore has limited ecological value.
- 12.7.22 To increase diversity within the development it will be proposed that areas of new grassland that are not to be associated with amenity and sports will be of a higher value to biodiversity than that lost. Again, this cannot currently be quantified but will be paramount in landscape strategies to aid BNG.
- 12.7.23 Construction related effects are considered to be **direct, permanent, minor, adverse** at the **local** level.

Operational Phase

- 12.7.24 There will not be any retained grassland associated with this habitat type, and any recreated grassland will be managed as either amenity level or a more diverse ecological habitat. Therefore, operational effects on semi-improved poor grassland are considered to be **negligible**.

Amenity and Introduced Scrub

Construction Phase

- 12.7.25 This habitat is not present within the current state of the environment but will be created as part of the Proposed Development and therefore be present as part of the 2036 Baseline.
- 12.7.26 Construction related effects are not considered impact upon this habitat type and is therefore of **no** significance.

Operational Phase

- 12.7.27 Amenity grassland and introduced scrub is not considered sensitive to any potential operational effect and are therefore considered of **negligible** significance.

Plantation Woodland

Construction Phase

- 12.7.28 There is a small section of plantation woodland in the north-western corner of the Site that will be retained and enhanced as part of the Proposed Development. Currently the ecological value for this habitat is low, being poorly structured and of single species stands. As part of the Proposed Development enhancement and bolstering of this habitat to increase its biodiversity and create the location as a key area in species and landscape strategies in the final layout of the proposal.
- 12.7.29 Nevertheless, there will be some level of construction activities around the habitat type to create the Proposed Development and protection from such work will be required such as a buffer zone and fencing.
- 12.7.30 A significant amount of green infrastructure will be created as part of the Proposed Development of which plantation woodland habitat is included. This is shown in the

Landscape Parameter Plan in **Appendix A.2** and will increase the amenity value and biodiversity value. Size and typology will be detailed in Reserved Matters.

- 12.7.31 Construction phase related effects on plantation woodland are considered to be **indirect, temporary**, despite the long construction phase, works will only be located within the proximity of the site for a relatively short period, **adverse** and **beneficial** at a **local** level and of **negligible** significance.

Operational Phase

- 12.7.32 Recreational use of the habitat within the Site will be encouraged, although some areas will remain out of bounds to the general public, these will either be fenced or located within educational facilities. Trampling effects will increase in certain areas.
- 12.7.33 Where access is provided, areas will be managed via pathways and indeed active management of these features will result in habitats of greater value as they mature.
- 12.7.34 Operational effects on plantation woodlands are considered to be **direct, permanent, minor, adverse** at the **local** level.

Specimen Trees

Construction Phase

- 12.7.35 There are very few specimen trees located within the Site and where present they are associated with the existing and retained boundaries and will themselves be retained within the Proposed Development. New tree planting will take place and be associated with roadside avenues, park and amenity spaces as well as within gardens and communal spaces of both residential and business. At this stage of the Proposed Development the numbers and extent need to be detailed through Reserved Matters; however, the Landscape Parameter Plan highlights areas of proposed green infrastructure and can be seen in **Appendix A.2**.
- 12.7.36 Protection for the remaining trees will be required to prevent any encroachment of excavations or pressure from vehicular access on any root protection zones.
- 12.7.37 Indirect effects such as hydrological changes and pollution such as light and dust may still occur, even with the addition of exclusion zones as mitigation. Where present light spill will be proposed to be reduced through specific measures such as downward pointing and/or targeted lighting. Night work will be limited to reduce lighting. Dust will be suppressed during construction through a CEMP that will describe methods to prevent dust such as spraying, vegetation planting or covering of soil storage.
- 12.7.38 Construction phase related effects on specimen trees are considered to be **indirect, temporary**, despite the long construction phase, works will only be located within the proximity of the site for a relatively short period, **adverse** at a **local** level and of **negligible** significance.

Operational Phase

- 12.7.39 Recreational use of those areas where specimen trees are introduced will be encouraged as amenity value. Those existing trees will be incorporated into enhanced and bolstered woodland or boundary features with limited access, although trampling may occur.
- 12.7.40 Operational effects on specimen trees are considered to be **direct, permanent, minor, neutral** at the **local** level.

Trees and Scrub

Construction Phase

- 12.7.41 Tree and scrub habitat is at present almost exclusively associated with the boundaries of the Site that will be bolstered and enhanced with increased diversity as part of the Proposed Development. Some of these will be lost to the Proposed Development to either accommodate access from the existing highway or construct parcels of land that sit outside the current bounds of the airfield but are within the Proposed Development.
- 12.7.42 New planting will take place and be located throughout the Proposed Development as well as within gardens and communal spaces of both residential and business. At this stage the sizes and extent need to be detailed through Reserved Matters; however, the Landscape Parameter Plan highlights areas of proposed green infrastructure and can be seen in **Appendix A.2**. This will increase biodiversity and be managed that will promote better structure.
- 12.7.43 Construction related effects on trees and scrub are considered to be **direct, permanent, minor, adverse**, and **beneficial** at the **local** level.

Operational Phase

- 12.7.44 Recreational use of those areas where trees and scrub are present is not encouraged and by the nature of densities and growth habits it is of low probability, however its use cannot be ruled out. Fencing these habitats from general use will be put in place, however their use cannot be ruled out. Those existing features will be incorporated into enhanced and bolstered boundary features, strategic landscaping or species mitigation that has limited access, although trampling may occur.
- 12.7.45 Operational effects on trees and scrub are considered to be **direct, permanent, minor, adverse** at the **local** level.

Hedgerow

Construction Phase

- 12.7.46 Some of the hedgerow habitat within the Site will be lost as a result of the Proposed Development with retained sections associated with the boundaries and to the north of the Site. Calculations show that approximately 1.5km will be lost and approximately 3km retained. The hedgerows to be lost are exclusively species poor and have a limited ecological value.
- 12.7.47 Approximately 4.7km of hedgerow is proposed to be created that is associated with the green infrastructure strategy and strategic landscaping. New hedgerow will comprise a diverse level of species and provide ecological links connecting habitats through the Site. Any new planting will provide species rich habitats with trees that significantly add to the biodiversity of the site and increase the linear meterage of hedgerow currently found on site.
- 12.7.48 Protection for the retained hedgerows will be implemented to prevent any encroachment of excavations or pressure from vehicular access on any root protection zones.
- 12.7.49 Construction related effects on hedgerows are considered to be **direct, permanent, minor, adverse** at the **local** level.

Operational Phase

- 12.7.50 Recreational use of those areas where hedgerows are present is not encouraged and by the nature of it, low probability, however its use cannot be ruled out. Those existing features will be incorporated into enhanced green infrastructure within strategic landscaping or species mitigation that has limited access, although trampling may occur.

- 12.7.51 Operational effects on hedgerows are considered to be **direct, permanent, minor, adverse** at the **local** level.

Lake and Standing Water

Construction Phase

- 12.7.52 The existing lagoon at the east of the Site has been used as silt and pollution interceptor for its operational life and is heavily burdened and frequently dries; it is considered to be of low ecological value but will be reconfigured and enhanced as part of the Proposed Development in part to benefit biodiversity.
- 12.7.53 New attenuation features will be created throughout the site, with the main features identified within Brabazon Park that will provide attenuation, amenity value and biodiversity gain via habitat diversity and marginal ecological habitats.
- 12.7.54 Whilst construction of the Proposed Development is ongoing with features present, the CEMP for each phasing plan will ensure that surface pollution prevention from water contamination, dust deposition and litter will be controlled to prevent any incidents associated with the water bodies within the Site.
- 12.7.55 Construction effects on lake and standing water are considered to be **direct, temporary, minor, beneficial**, at the **local** level.

Operational Phase

- 12.7.56 There will be a mix of operational uses of the proposed water bodies on Site with some recreational use encouraged, whilst usage will be actively prevented for others on health and safety grounds. This is anticipated to be achieved through barriers such as fencing, vegetation planting and signage.
- 12.7.57 Shading of the water bodies can lead to adverse impacts upon aquatic plants but this will be managed as such to prevent harmful growth of algae that could be detrimental to biodiversity, public and aesthetics of the features.
- 12.7.58 Operational effects on lake and standing water habitats are considered to be **negligible**.

Ponds

Construction Phase

- 12.7.59 There are two ponds located within the western end of the Site, within the retained ecological receptor zone and will not be directly impacted by the proposals.
- 12.7.60 The ponds will remain fenced off from the construction activities and are located within a buffer zone of 50m from any development.
- 12.7.61 A CEMP for each phasing plan will ensure that surface pollution prevention from water contamination, dust deposition and litter will be controlled to prevent any incidents associated with the water bodies within the Site.
- 12.7.62 Demolition / construction effects on lake and standing water are considered to be **negligible**.

Operational Phase

- 12.7.63 Increased recreational pressure within the vicinity of the pond habitats may result in adverse effects from indirect pollution such as litter. There is a plan in place as part of the licence to

manage and maintain the ponds in a good state. This is considered to include the removal of litter to prevent damage to the habitat.

12.7.64 Fencing is already erected around the ponds, and will remain in place to prevent public access, although unauthorised access may give rise to an adverse effect.

12.7.65 Operational effects on pond habitats within the development are considered to be of **negligible** significance.

Buildings and Hardstanding

Construction Phase

12.7.66 There are a number of structures within the Site boundary that were associated with the functioning of the airfield together with a significant amount of hardstanding that serviced the structures and the operations of the runway.

12.7.67 All relevant buildings that are to be demolished have been surveyed for protected species and their potential to harbour these receptors; the Spitfire Hangar that will however remain will be appropriately protected from the impacts of construction.

12.7.68 Construction effects are considered **direct, permanent, adverse** at a **local** level and of **negligible** significance.

Operational Phase

12.7.69 A significant amount of the built environment will be created by the Proposed Development and will have the potential to provide habitat for a number of species through the incorporation of nesting boxes, integrated roost boxes and create vantage points for species such as peregrine falcon that are associated with the development.

12.7.70 Those structures that remain as part of the development have the potential to be enhanced in the same way, with benefits for the increases in biodiversity; this will be achieved through Reserved Matters applications and the planning process.

12.7.71 The change of land use to a more urban environment will increase the pollution levels of such things as light, dust, noise and disturbance beyond what the current baseline shows.

12.7.72 Operational effects are considered to be **direct, permanent, minor, beneficial** at a **local** level

Fauna

Badgers

12.7.73 The Protection of Badgers Act 1992 consolidates the previous Badger Acts of 1973 and 1991 and aims to protect the species from persecution rather than any response to their conservation status.

12.7.74 The 1992 Act seeks to protect the animal itself and prevents the intentional or reckless destruction, damage or obstruction of a badger sett. This is defined as 'any structure or place, which displays signs indicating current use, by a badger'. Although there is no legal definition for what constitutes 'current use' it should be interpreted by a qualified ecologist and have monitoring in place to conclude such a defence.

12.7.75 Additionally, the intentional elimination of features that are necessary to the proliferation of the species within their territory may, in certain circumstances, be construed as an offence.

12.7.76 Licencing is required from Natural England for any activity that could disturb badgers using the above criteria.

Construction Phase

12.7.77 Setts are present in three locations on Site with two immediately offsite in adjacent land holdings. The usage of those existing setts has changed from active and in-active and back again throughout the assessment period but currently shows one known active sett on the northern boundary adjacent to the engine testing building to the west of the development, two disused setts on the northern and southern boundaries and one inactive sett and one active sett immediately outside the Site. Locations of these are shown in **Appendix G.2**.

12.7.78 There is the potential for badgers to be harmed during the construction phase through entrapment within open trenches or associated excavations for the development. Any pits or trenches that are excavated should therefore be securely covered at night or have a means of egress, such as a ramp or tapered edge. Further details will be set out in the CEMP.

12.7.79 There will be a significant loss of foraging habitat as a result of the Proposed Development through the removal of grassland habitat. The species and landscape strategies will include large areas of linking habitat, some retained grassland and boundary enhancements and food source planting that will offer protected communication and foraging opportunities.

12.7.80 There is also the potential for lighting associated with increased use of the Site during construction to disturb foraging and commuting badgers.

12.7.81 Assessments will be made prior to any new phasing plan that will remove habitat that could be utilised by badger to assess the impacts on the species, and potentially remove vegetation that could uncover any unknown setts. The findings will lead to mitigation appropriate to the species and may require appropriate exclusion zones, licensing and removal. This will be secured through the CEMP for each phase of development.

12.7.82 Although the majority of the used features will be retained up until the 2036 baseline these will eventually be lost, and the strategy will seek to provide sufficient habitat for the proliferation of the species.

12.7.83 Construction phase effects on badgers are considered to be **direct, temporary and minor, adverse**, at the **local** level.

Operational Phase

12.7.84 The potential for increased public access across the Site will likely increase the likelihood that badger setts are identified and disturbed. However, the Badger Survey Report and Strategy within **Appendix G.2** will locate any mitigation in terms of artificial setts in educational sites that will be heavily vegetated and have no public access; this will be secured through the provision of Conditions through planning.

12.7.85 Lighting plans will be designed to reduce light spill into those areas deemed sensitive and are integral to the communication and foraging of badgers. Main linking green infrastructure on the boundaries will be avoided with excessive spill and any linking habitats through the site will allow for dark corridors for safer transit. These will be secured through the provision of Conditions through planning and in the detailed design through the Reserved Matters process.

12.7.86 Increases in traffic will also likely cause conflict and increase the risk of badgers being killed or injured in collisions with vehicles. Where this may occur, particularly on larger roads that dissect communication routes or habitats, badger tunnels will be created on roads that enter the Site from Hayes Way (at Brabazon and San Andreas Roundabouts) currently with potential for more so they can safely negotiate the potential impacts.

12.7.87 Operational phase effects on badgers are considered to be **direct** and **indirect, permanent, minor, adverse** at the **local** level.

Bats

12.7.88 All bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Conservation of Habitats and Species Regulations 1997. These include provisions making it an offence to:

- Deliberately kill, injure, or take (capture) bats;
- Deliberately disturb bats in such a way as to be likely to significantly affect:-
 - i. The ability of any significant group of bats to survive, breed or rear or nurture their young; or to hibernate; or
 - ii. To significantly affect the local distribution or abundance of the species concerned;
- Damage or destroy any breeding or resting place used by bats; and
- Intentionally or recklessly obstruct access to any place used by bats for shelter or protection.

12.7.89 Licences can be granted for development purposes under Regulation 55(e) of the Habitats Regulations through an 'appropriate authority', being in the UK, Natural England, that would permit activities otherwise considered an offence. To gain a licence the authority would have to conclude that the activity must be for imperative reasons of overriding public interest or for public health and safety, no satisfactory alternative or that the favourable conservation status of the species concerned is not compromised.

Construction Phase

12.7.90 There are no known roosts located within the boundaries of the Site. However, manual transect and point surveys as well as static detectors identified that eight species of bat currently use the Site and that it is broadly similar to previous survey assessments indicating no real change.

12.7.91 The loss of vegetation associated with the demolition and construction phase of the development will result in effects to the species through the loss of foraging and commuting habitat, specifically a reduction of grassland and minor losses of linear and scrub habitat.

12.7.92 Lighting during construction is likely to have an adverse effect upon foraging and commuting bats as individuals from most species actively avoid brightly lit areas. This could occur around retained habitats, boundary edges and on the perimeters of phased construction where habitats remain. This will be mitigated through the provision of the CEMP and prevention of light spill and limited night works.

12.7.93 Demolition and construction effects on bats are considered to be **direct** and **temporary, minor, adverse** at the **local** level and of **minor** significance.

Operational Phase

12.7.94 Any lighting will be designed to limit light spill into areas of potential bat foraging and commuting habitat such as retained and enhanced boundaries. This will involve using low level lighting and / or directional and hooded lighting wherever possible to direct light toward those areas where needed, such as roads, building and communal areas and away from vegetated corridors.

- 12.7.95 Amenity features and gardens where light is required whilst actively discouraging some species will attract other species of bat and the presence of a food source and the increased links within the site will likely enhance the wider site for use by certain species.
- 12.7.96 A series of integrated bat boxes will be utilised in some of the parts of development that are linked to areas of green infrastructure that will enhance the site for use by bats and create roosting opportunities where it remains suitable.
- 12.7.97 It is proposed to supply approximately 100 tubes/boxes and or bricks to erect in/on buildings that are either backing onto vegetated edge habitat or that are overlooking green space as part of the Proposed Development.
- 12.7.98 The addition of green infrastructure, garden and public amenity, and the enhancement of existing boundary features will provide for increases in internal communication routes and availability of foraging for certain species.
- 12.7.99 Operational effects on bats are considered to be both **indirect** and **direct, permanent, minor, beneficial** at the **local** level.

Great Crested Newt

- 12.7.100 Great crested newts are protected under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Conservation of Habitats and Species Regulations 1997. These include provisions making it an offence to deliberately kill, injure or capture, within their habitat that includes breeding site, resting place or any structure or place used for 'shelter or protection' and are also protected against reckless damage or destruction. It is also illegal to disturb great crested newts and their eggs deliberately or recklessly, being protected from taking or destroying.

Construction Phase

- 12.7.101 Great crested newt has been recorded on site but is no longer considered present within the impacted areas of the Proposed Development.
- 12.7.102 In 2018 a licenced translocation program was concluded that removed the species from any areas of impact to a purpose-built habitat that lies within an area of the Site where no development is proposed.
- 12.7.103 Demolition and construction phase effects on great crested newts are therefore considered to be **negligible**.

Operational Phase

- 12.7.104 Great crested newt is located in an 'ecological zone' at the western edge of the development that currently has public access but are limited to designated public rights of way. Whilst the pond habitats themselves are fenced for security reasons there is the possibility of indirect pollution and / or vandalism.
- 12.7.105 A diversity of habitats that the development creates around the terrestrial communication distances of the species will provide for a number of habitat opportunities from increased foraging, refugia and communication networks.
- 12.7.106 Upon completion of the development the species will be allowed to spread into the whole development where possible due to the removal of mitigation fencing. This may bring them into conflict with greater numbers of the general public and cause risk or harm to the species.
- 12.7.107 Operational effects on great crested newts are considered to be both **direct** and **indirect, permanent, minor, beneficial** at the **local** level.

Common Reptile (Slowworm)

- 12.7.108 Only slowworm has been recorded on Site and are protected from killing and injuring under the Wildlife and Countryside Act 1981 (as amended). Their habitat is not protected.

Construction Phase

- 12.7.109 Slowworms are not considered to be present within the impacted areas of the Proposed Development. In 2017 and 2021 translocation of the species was concluded that removed through reasonable effort over 250 individuals to a purpose-built habitat that remains excluded from the development.

- 12.7.110 Construction phase effects on slowworm are considered to be **negligible**.

Operational Phase

- 12.7.111 Slowworms are located in an 'ecological zone' at the western edge of the development that currently has public access where there is the possibility of encounters with the general public. Although this is limited to designated Public Rights of Way.
- 12.7.112 A diversity of habitats that the development creates around the ecological zone will provide for a number of habitat opportunities from increased foraging, refugia and communication networks.
- 12.7.113 Upon completion of the development the species will be allowed to spread into the whole development where possible. This may bring them into conflict with greater numbers of the general public and pets and cause risk or harm to the species.
- 12.7.114 Operational effects on slow worm are considered to be both **direct** and **indirect, permanent, minor, beneficial** at the **local** level.

Hedgehog

- 12.7.115 Hedgehogs are listed under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) which makes it illegal to kill or capture wild hedgehogs. They are also listed under the Wild Mammals Act 1996 which prohibits cruel treatment of the species.
- 12.7.116 Hedgehogs are also listed as a species of 'principal importance' under the NERC Act which confers a duty of responsibility to public bodies.

Construction Phase

- 12.7.117 Hedgehogs have not been identified on Site, therefore construction phase effects on hedgehogs are considered to be **negligible**.

Operational Phase

- 12.7.118 The creation of garden habitat, linking green infrastructure and hedgehog 'friendly' garden fencing that allows access and egress through boundaries are all promoted as part of the design of the Proposed Development.
- 12.7.119 Should hedgehogs colonise the site there would be a number of potential effects to the species such as conflicts with the road network, general public and their pets which may cause harm or injury to the species.
- 12.7.120 Lighting strategies will be designed to reduce light spill into those areas deemed sensitive and are integral to the communication and foraging of hedgehogs. Green infrastructure created

will be avoided with excessive light spill and any linking habitats through the site will allow for dark corridors for safer transit.

- 12.7.121 Operational effects on hedgehogs are considered to be **direct, permanent, minor, beneficial** at the **local** level.

Dormice

- 12.7.122 Dormice are protected under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Conservation of Habitats and Species Regulations 1997. These include provisions making it an offence to deliberately kill, injure or capture dormice within their habitat that includes breeding site, resting place or any structure or place used for 'shelter or protection'. Dormice are also protected against reckless damage or destruction. It is also illegal to disturb dormice deliberately or recklessly, being protected from taking or destroying.

Construction Phase

- 12.7.123 It is not currently known whether dormice are present within the Site or on adjacent land as survey work has not been undertaken. Assessments are due to be completed in 2022 to confirm or prove likely absence from Site given anecdotal evidence from an adjacent development has inconclusive evidence that the species may be present. Once results of the surveys are known, and if the species is identified, a mitigation strategy will be completed and implemented that would likely include licencing and site-wide protection and enhancement would occur. This will be fully consulted with the LPA and Natural England.

- 12.7.124 It must be assumed, at this stage that the species is present. For this reason, construction effects on Dormice are considered to be **direct, temporary, minor, adverse** at the **local** level.

Operational Phase

- 12.7.125 Boundary enhancements and vegetated links within the internal areas of the developed Site will provide increased linear foraging and connectivity potential for the species.
- 12.7.126 Increases in lighting may cause disturbance and negative impacts to the species so lighting strategies will be designed to reduce spill into those areas deemed sensitive. Green infrastructure on the boundaries will be avoided with excessive spill and any linking habitats through the site will allow for dark corridors for safer transit.
- 12.7.127 Increases in predator species such as domestic cats and the general increase in disturbance will limit the species proliferation and likely cause harm to the species.
- 12.7.128 The operational effects on dormice are considered to be **direct, permanent, minor, adverse** at the **local** level.

Common Bird Species

- 12.7.129 Section 1 of the Wildlife and Countryside Act 1981 (as amended) is concerned with the protection of wild birds, and with certain exceptions all wild birds and their eggs are protected from intentional killing, injuring and taking. Their nests are also protected whilst being built or in use and cannot be taken damaged or destroyed.

Construction Phase

- 12.7.130 Direct impacts on nesting birds during site clearance can occur through loss of foraging and nesting habitats and the potential to destroy nests. Site clearances, where possible, will be timed to avoid the bird breeding season (considered to be March – August); however, if works

take place within this period then a suitably qualified ecologist will complete nesting birds checks prior to the commencement. If a nest is discovered, then a 5m cordon around that nest should be established and no clearance should take place within the area before any chicks have fledged.

- 12.7.131 A number of bird species that are considered common have been recorded on site but do include species associated with the red list and are on Birds of Conservation Concern and include song thrush, house sparrow, starling, skylark and song thrush. The only species here that are considered to form a reliance on the site are skylark that will be detailed individually below. Other species are associated with the peripheries of the site where habitats will be enhanced and retained and subject to betterment.
- 12.7.132 The landscape strategy for the Proposed Development will provide additional foraging and nesting opportunities for species of birds that are known to utilise the Site and will likely provide additional opportunities for a number of other common species.
- 12.7.133 Construction related effects on common bird species are considered to be **direct, temporary and permanent, minor, adverse** at the **local** level.

Operational Phase

- 12.7.134 Habitats that are favoured by passerines will be incorporated into the landscaping of the development and detailed further in the LEMP. Further nesting opportunities will be created by providing approximately 100 mixed nest boxes and represents a combined mitigation package that will reduce the impacts of the development by increasing the available nesting and foraging resource.
- 12.7.135 Operational effects on birds are considered to be **direct, permanent, minor, beneficial** at the **local** level.

Barn Owl

- 12.7.136 Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is a list of the nationally rarer and uncommon breeding birds for which all offences carry special penalties. Species on this list also receive additional protection whilst breeding, as it becomes an offence to disturb adults or their dependant young when at the nest.
- 12.7.137 Barn owl is identified using the Site and is a Schedule 1 bird.

Construction Phase

- 12.7.138 Barn owls are known to utilise the site for foraging and are afforded additional protection from disturbance during the breeding season. Given that this species does not nest on Site but in adjacent land uses it is considered that any disturbance effects are negligible.
- 12.7.139 The loss of grassland habitat however will remove barn owls' ability to use the vast majority of the Site at all for foraging and make it unlikely for communication. The retained grassland comprising 2.5ha of suitable habitat for foraging links into further protected areas through the CPNN and has the potential to be used by the species. A nest box is also provided for, erected in 2017.
- 12.7.140 Construction related effects on barn owls are considered to be **direct, permanent, moderate, adverse**, at the **County** level.

Operational Phase

12.7.141 Habitat retained at the west of the development is considered to be suitable for barn owl foraging and totals 2.5ha, this is where the barn owl box has been positioned. Although this represents a large reduction in the available resource.

12.7.142 Operational related effects on barn owls are considered to be **direct, permanent, moderate, adverse** at the **County** level.

Peregrine Falcon

12.7.143 Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is a list of the nationally rarer and uncommon breeding birds for which all offences carry special penalties. Species on this list also receive additional protection whilst breeding, as it becomes an offence to disturb adults or their dependant young when at the nest.

12.7.144 Peregrine Falcon is identified using the Site and is a Schedule 1 species.

Construction Phase

12.7.145 Barn owls are known to utilise the site for foraging and are afforded additional protection from disturbance during the breeding season. Given that this species does not nest on Site but in adjacent land uses it is considered that any disturbance effects are negligible.

12.7.146 Peregrine Falcons continue to nest in adjacent land to the south of the Proposed Development and not be directly impacted. However, it will alter the foraging conditions, and have a temporary constructional disturbance from increases in visual impacts such as machinery and people as well as noise and therefore have some level of impact.

12.7.147 In many cases, peregrines have become accustomed to life in an urban environment and the riches of prey items developments create. Although there may be some shorter-term impacts to the species from construction it is anticipated that there will be benefits from increased foraging

12.7.148 Construction phase effects on peregrine falcons are considered to be **direct, permanent, minor, neutral** at the **County** level.

Operational Effects

12.7.149 Peregrine falcons are considered to be able to remain in situ and utilise the likely increased prey items and roosting opportunities on Site.

12.7.150 Operational effects on peregrine falcons are considered to be **direct, permanent, minor, neutral** at the **County** level.

Skylark

12.7.151 A number of bird species that are considered common have been recorded on site but do include species associated with the red list and are on Birds of Conservation Concern and includes skylark that is considered to form a reliance on the Site.

Construction Phase

12.7.152 Direct impacts on nesting birds during site clearance can occur through loss of foraging and nesting habitats and the potential to destroy nests. Site clearances, where possible, will be timed to avoid the bird breeding season (considered to be March – August); however, if works take place within this period, then a suitably qualified ecologist will complete nesting birds checks prior to the commencement. If a nest is discovered, then a 10m radius around that

nest should be established and no clearance should take place within the area before any chicks have fledged. It is however notoriously difficult to identify skylark nesting sites and is recommended that any clearances are solely done outside of the nesting season.

12.7.153 The loss of grassland habitat however will prevent skylark from being able to use the Site at all, nesting and foraging opportunities will be lost completely.

12.7.154 Construction effects on skylark are considered to be **direct, permanent, moderate, adverse** at the **County** level, but it is acknowledged that the process will be gradual due to the nature of the phased approach to the development.

Operational Effects

12.7.155 The operational effects of the Proposed Development will have an impact upon skylark with the loss of the existing grassland habitat removing any potential nesting sites. The Proposed Development will provide for a number of green open spaces and some retained grassland habitat within the ecological receptor site. However, any recreated habitat would not be deemed suitable for the species and disturbance from human interaction would be high, therefore any association to the site from the species would be lost.

12.7.156 South Gloucestershire is a predominantly rural county with extensive suitable habitat for species such as skylark in a wider context. Whilst the loss cannot be mitigated on site it is considered that the gradual removal over time of an isolated group of the species within an urban setting, that has taken advantage of a resource relatively recently available to them, is considered to lessen the impact and influence the species into more suitable and permanent habitat.

12.7.157 This loss has been identified throughout the planning history of the Site and most recently has been deemed acceptable through the extant planning consent.

12.7.158 Operational effects on skylark are considered to be **direct, permanent, moderate, adverse** at the **County** level.

12.8 Further Mitigation and Enhancement

12.8.1 An Ecological Mitigation and Management Strategy (EMMS) will be prepared for the Site. This strategy will include consideration of the maintenance / management measures associated with onsite ecological receptors that are to be retained, enhanced and created within the Proposed Development and will include any landscape proposals not specifically associated with the ecological management. The aim of the EMMS will be to deliver a significant long term beneficial ecological effect for the proposal.

12.8.2 The overall aim for the EMMS will be to maintain and enhance features of ecological interest that are retained whilst conserving and improving baseline conditions for targeted species wherever possible. The EMMS will prescribe management objectives that will detail the strategies for mitigation and proliferation of those outlined receptors that will avoid significant adverse impacts and provide neutrality or beneficial outcomes. The EMMS will be secured through final issue of the document and within the provision of Conditions within the planning process.

12.8.3 A LEMP that formed part of the extant 2017 planning application and has since being updated will provide the detail for the landscaping throughout the Site that is associated with the GI as well as species specific mitigation. For example, forming corridors, linking habitat and enhancements and compensation for the benefit of biodiversity with the Site. The LEMP will also prescribe the long-term management and protection of any created features and habitats. This document will be secured through the provision of conditions within the planning process.

- 12.8.4 Monitoring of badger use on Site to further develop the strategy and establish the most appropriate mitigation for the species will also be undertaken. Artificial sett location and badger underpass locations will complement the LEMP and EMMS where landscaping will provide connectivity and habitat needs. This will be secured through the planning process in Reserved Matters applications.
- 12.8.5 Lighting strategies will need to be implemented that will benefit a number of species to include, bats, dormice, badger and common bird species and will be targeted to avoid vegetated areas, leave dark corridors of habitat communication as well as reduce light spill both during construction and operationally by way of low level light columns, or in set pathway lights and directional or hooded lights, as well as the type of light used that would limit the impact on many species. This will be secured through the CEMP during construction and through the planning process in Reserved Matters applications.

12.9 Residual Effects

Non-statutory Designated Sites

- 12.9.1 Residual effects on non-statutory designated sites are considered to be **neutral** at the **local** level.

Habitats

- 12.9.2 Residual effects on all habitats are considered to be **minor and adverse** at the **local** level.

Fauna

Badger

- 12.9.3 Residual effects on badgers are considered to be **neutral** at the **local** level.

Bats

- 12.9.4 Residual effects on bats are considered to be **minor beneficial** at the **local** level.

Great Crested Newt

- 12.9.5 Residual effects on great crested newt are considered to be **neutral** at the **local** level.

Common Reptile (Slowworm)

- 12.9.6 Residual effects on slowworm are considered to be **neutral** at the **local** level.

Hedgehog

- 12.9.7 Residual effects on hedgehog are considered to be **minor beneficial** at the **local** level.

Dormice

- 12.9.8 Residual effects on dormice are considered to be **minor, adverse** at the **local** level.

Common Bird Species

- 12.9.9 Residual effects on common species of bird are considered to be **minor beneficial** at the **local** level.

Barn Owl

12.9.10 Residual effects on barn owl are considered to be **moderate adverse** at the **local** level, which is significant in EIA terms.

Peregrine Falcon

12.9.11 Residual effects on peregrine falcon are considered to be **neutral** at the **local** level.

Skylark

12.9.12 Residual effects on skylark are considered to be **moderate adverse** at the **local** level, which is significant in EIA terms.

12.10 Monitoring

12.10.1 It is not proposed to conduct any monitoring for Skylark despite the significant residual effects on the species from the Proposed Development. This is due to the acknowledgement that the species will no longer be present within the Proposed Development due to the absence of suitable habitat and increased disturbance. Their absence within this process has also been accepted through the extant planning consent.

12.10.2 Barn owl will continue to be monitored through the phases of the Proposed Development to assess the usage of the Site. This is anticipated to reduce up to the 2036 Baseline when the species is considered unable to utilise the Site due to loss of suitable foraging habitat. Barn owl monitoring is secured through the EMMS.

12.10.3 Besides skylark and barn owl, no other significant residual effects have been identified therefore no further monitoring is required under the 2017 EIA Regulations.

12.10.4 However, some monitoring of the translocated GCN population is required to satisfy protected species legislation; this will be completed until the end of the 2022 survey season.

12.10.5 Monitoring of badgers will be necessary to help predetermine the badger mitigation strategy that will lead to the evolution of mitigation. This is currently occurring approximately every 2 months and is secured through an existing planning condition that will be carried forward.

12.10.6 Mitigation exclusion fencing will be checked approximately every 2 months to ensure that the strategies in place for common reptiles and great crested newt continue to meet the current and future needs of the Proposed Development in relation to species mitigation. This will be secured through the provision of conditions within the planning process, likely to be the EMMS.

12.11 Summary

Table 12.2 – Summary of Residual Effects.

Receptor	Receptor Sensitivity	Nature	Duration	Degree of Effect	Level of Certainty
Non-statutory designated sites	Medium	Neutral	Long term	Minor	Reasonable
Habitats	Low	Adverse	Long Term	Minor	Reasonable
Badger	Low	Neutral	Long Term	Minor	Reasonable
Bats	Low	Beneficial	Long Term	Minor	Reasonable
Great Crested Newt	Low	Neutral	Long Term	Minor	Reasonable
Common Reptile (Slowworm)	Low	Neutral	Long Term	Minor	Reasonable
Hedgehog	Low	Beneficial	Long term	Minor	Reasonable
Dormice	Medium/Low	Adverse	Long Term	Minor	Reasonable
Common Bird Species	Low	Beneficial	Long Term	Minor	Reasonable
Barn Owl	Medium	Adverse	Long Term	Moderate	Reasonable
Peregrine Falcon	Medium	Neutral	Long Term	Minor	Reasonable
Skylark	Medium	Adverse	Long Term	Moderate	Reasonable

12.12 References

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal, September 2018. Chartered Institute of Ecology and Environmental Management.
- European Community Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.
- HMSO (1981). The Wildlife and Countryside Act 1981 (as amended). Her Majesty's Stationary Office.
- HMSO (2017). The Conservation of Habitats and Species Regulations 2017 (as amended). Her Majesty's Stationary Office.
- MAGIC Website. Available at: <http://magic.gov.uk>
- South Gloucestershire Biodiversity Action Plan
- English Nature 2001. Great Crested Newt Mitigation Guidelines.
- BCT (2016). Bat Conservation Trust – Bat Surveys: Good Practice Guide.
- Froglife 1999. Froglife Advice Sheet 10: Reptile Survey. Froglife.
- Brown S. (2000). Breeding Skylarks 1997. British Trust for Ornithology.
- Metropolitan Police. Peregrine Falcons: Guidelines on urban nest sites and the law.
- Hawk and Owl Trust. Working for Wild Birds of Prey and their Habitats. South Gloucestershire Group.
- BTO Website. Bird Trends [Http://bto.org](http://bto.org)