

**ADDITIONAL CAR PARKING,
PROLOGIS PARK BIRMINGHAM INTERCHANGE,
BLACKFIRS LANE, SOLIHULL**

ECOLOGICAL IMPACT ASSESSMENT

A Report to: IAC Group Ltd.
c/o CBRE

Report No: RT-MME-153311-04, Rev A

Date: January 2021



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REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development". It is compliant with the best practice guidelines for Ecological Impact Assessment in the UK and Ireland, as defined by CIEEM (2018).

Report Version	Date	Completed by:	Checked by:	Approved by:
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The information which we have prepared is true and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 24 months from the date of survey. If works have not commenced by this date, an updated site visit should be carried out by a suitably qualified ecologist to assess any changes in the habitats present on site, and to inform a review of the conclusions and recommendations made.

NON-TECHNICAL SUMMARY

This Ecological Impact Assessment should be read in combination with the Biodiversity Impact Assessment (BIA) (Report RT-MME-153311-05), and the Ecological Mitigation Strategy (EMS) (Report RT-MME-153311-06) for the proposed development.

Middlemarch Environmental Ltd was commissioned by IAC Group Ltd.c/o CBRE to undertake an Ecological Impact Assessment (EclA) to provide an assessment of any significant effects, beneficial or adverse, on ecological features, which may occur as a result of a proposed development at Prologis Park Birmingham Interchange in Solihull. The proposals comprise the creation of additional car parking spaces for Units A and B.

Middlemarch Environmental Ltd previously completed a suite of ecological and arboricultural assessments in 2016 to support a planning application associated with the construction of Buildings A and B (PL/2016/02001/PPOL).

The EclA has been produced based on current best practice guidance for assessing ecological impacts for EIA projects, as defined by the Chartered Institute for Ecology and Environmental Management (CIEEM, 2018). The ecological baseline conditions have been informed by surveys and assessments completed by Middlemarch Environmental Ltd at the site in 2016 and updated surveys and assessments completed in 2020, including an ecological desk study, walkover survey and a Great Crested Newt Habitat Suitability Index (HSI) Assessment of ponds in proximity to the site.

The design of the development has been influenced by the findings of the baseline ecological survey work, to ensure notable habitats are retained and protected where feasible, a measurable net-gain to biodiversity can be delivered and impacts on protected and notable species are avoided or minimized.

The main predicted construction phase impacts are associated with direct habitat loss and potential harm to, or displacement or disturbance of, existing species on site. The EMS (Report RT-MME-153311-06) details how the impacts during the construction phase of the development could be avoided or mitigated by adhering to best practice methods e.g. Reasonable Avoidance Measures (RAMs) and pollution prevention measures to avoid any significant ecological impacts. Enaction of the avoidance and mitigation measures within the EMS can be secured by a suitably worded planning condition.

Predicted operational phase effects include degradation of habitat value due to inappropriate management. Proposed mitigation measures to address these effects have been provided to the project's landscape design team and incorporated within the December 2020 Landscape and Environment Management Operations report (LEMO), which detail the methods and management prescriptions to establish and maintain the onsite habitats to their target condition. The habitat value of the Landscaping Scheme has been calculated as part of a Biodiversity Impact Assessment (RT-MME-153311-05) which demonstrates delivery of a net gain to biodiversity value.

Provided that all recommended avoidance and mitigation measures are implemented, most of the predicted or potential ecological effects can either be avoided entirely or reduced to negligible significance. The few remaining residual adverse effects arising as a result of the proposed development are significant at no greater than the Local (Site) scale and, whilst the permanent loss of habitat cannot be avoided, compensation can be provided in the short to medium-term, through the improvement of remaining habitat and the creation of replacement habitat of high ecological value.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

In August 2020 IAC Group Ltd.c/o CBRE commissioned Middlemarch Environmental Ltd to undertake an Ecological Impact Assessment (EclA) associated with a proposed development at Prologis Park Birmingham in Solihull. This assessment is required to support a planning application associated with the creation of two new additional parking areas adjacent to the existing buildings (units A and B).

Middlemarch Environmental Ltd previously completed a suite of ecological and arboricultural assessments in 2016 to support a planning application associated with the construction of Buildings DC1 and B, comprising:

- Preliminary Ecological Appraisal (Report RT-MME-121758);
- Great Crested Newt Habitat Suitability Index Assessment (Report RT-MME-122297-01);
- Reptile Survey (Report RT-MME-122297-02);
- Breeding Bird Survey (Report RT-MME-122297-03);
- Bat Surveys (Report RT-MME-122297-04);
- Arboricultural Survey (Report RT-MME-122442-01); and,
- Arboricultural Impact Assessment (Report RT-MME-122442-02).

To inform this EclA, Middlemarch Environmental Ltd has completed an updated ecological desk study, a walkover survey and a Great Crested Newt Habitat Suitability Index (HSI) Assessment of ponds in proximity to the site.

Middlemarch Environmental Ltd has also prepared a Biodiversity Impact Assessment (BIA, Report RT-MME-153311-05) and an Ecological Mitigation Strategy (EMS, Report RT-MME-153311-06).

The report outlines the legislative and policy context for the development in respect of ecology; the EclA methodology; the baseline ecological conditions at the site; the likely impacts on ecological features as a result of the proposed development and the significance of effects; the avoidance and mitigation measures required to offset significant ecological effects; and, the residual effects after avoidance and mitigation has been implemented.

1.2 SITE DESCRIPTION AND CONTEXT

The site under consideration is located at Prologis Park Birmingham Interchange in Solihull, centred at Ordnance Survey Grid Reference SP 18570 85126.

The site is located on the south-eastern fringes of Birmingham and forms part of the Birmingham Business Park, which is situated immediately north of Birmingham Airport and the National Exhibition Centre.

The site comprises an irregularly shaped parcel 5.82ha in size surrounding existing Buildings A and B. The western boundary of the site is delineated by Coleshill Heath Rd and the southern boundary is formed by Blackfirs Lane.

The habitat within the site consists of the existing car parking area and other areas of hardstanding which include small areas of amenity grassland and decorative borders of introduced shrub. The remainder of the site comprises the landscaping scheme for the 2016 development (2109-PL001-1L & 2109-PL001-Q2). The south and west of the site consist of formal landscaping comprising mixed plantation woodland and species poor semi-improved grassland. A large proportion of the 2016 landscaping scheme has been overtaken by tall ruderal growth. In the south west corner of the site two large depressions form a Sustainable Urban Drainage (SUD) scheme. The SUDs comprise of bare earth and lack aquatic vegetation. The SUDs were dry at the time of inspection. Hedgerows run along the southern and western boundaries of the study area.

The habitat surrounding the site is a mixture of low density residential areas, intensively managed grassland, arable land, large industrial units, employment complexes (offices) and small areas of scrubland and mature semi-natural woodland. To the south east of the site Bickenhill Parkway (B4438) and large area of hardstanding (car-parking areas associated with the National Exhibition Centre) act as a significant barrier to the movement of terrestrial animals.

Around the site hedgerows and vegetated domestic curtilage boundaries are common, with some also including mature standard trees. The majority of hedgerows are defunct with large gaps where the woody vegetation has failed.

1.3 DESCRIPTION OF PROPOSALS

This EclA is required to inform a planning application associated with the construction of additional car parking spaces for Units A and B.

The additional car parking spaces would be located to south of Units A and B and to the west of Unit A. The creation of additional areas of hardstanding and soft landscaping is proposed within the development area. The conclusions and recommendations made in this report are based on information provided by the client regarding the scope of the project.

Documentation made available by the client is listed in Table 1.1. and provided in Appendix 1

Document Name / Drawing Number	Author
6632-11 Rev C	Aja architects
6632-01 Rev F	Aja architects
Landscape and Environment Management Operations report	JB Landscape Associates

Table 1.1: Documentation Provided by Client

2. LEGISLATION AND POLICY

This chapter provides an overview of the framework of legislation and policy which underpins nature conservation and is a material consideration in the planning process in England. The reader should refer to the original legislation for the definitive interpretation.

2.1 GENERAL BIODIVERSITY LEGISLATION AND POLICY

Conservation of Habitats and Species Regulations 2017 (The Habitats Regulations 2017)

The Habitats Regulations 2017 consolidate and update the Habitats Regulations 2010 (as amended). The Habitats Regulations 2017 are the principal means by which the EEC Council Directive 92/43 (The Habitats Directive) as amended is transposed into English and Welsh law.

The Habitats Regulations 2017 place duty upon the relevant authority of government to identify sites which are of importance to the habitats and species listed in Annexes I and II of the Habitats Directive. Those sites which meet the criteria are, in conjunction with the European Commission, designated as Sites of Community Importance, which are subsequently identified as Special Areas of Conservation (SAC) by the European Union member states. The regulations also place a duty upon the government to maintain a register of European protected sites designated as a result of EC Directive 79/409/EEC on the Conservation of Wild Birds (The Birds Directive). These sites are termed Special Protection Areas (SPA) and, in conjunction with SACs, form a network of sites known as Natura 2000. The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest.

The Habitats Regulations 2017 also provide for the protection of individual species of fauna and flora of European conservation concern listed in Schedules 2 and 5 respectively. Schedule 2 includes species such as otter and great crested newt for which the UK population represents a significant proportion of the total European population. It is an offence to deliberately kill, injure, disturb or trade these species. Schedule 5 plant species are protected from unlawful destruction, uprooting or trade under the regulations.

The Wildlife and Countryside Act (WCA) 1981 (as amended)

The WCA, as amended, consolidates and amends pre-existing national wildlife legislation in order to implement the Bern Convention and the Birds Directive. It complements the Habitats Regulations 2017, offering protection to a wider range of species. The Act also provides for the designation and protection of national conservation sites of value for their floral, faunal or geological features, termed Sites of Special Scientific Interest (SSSIs).

Schedules of the act provide lists of protected species, both flora and fauna, and detail the possible offences that apply to these species.

The Countryside and Rights of Way (CRoW) Act 2000

The CROW Act, introduced in England and Wales in 2000, amends and strengthens existing wildlife legislation detailed in the WCA. It places a duty on government departments and the National Assembly for Wales to have regard for biodiversity, and provides increased powers for the protection and maintenance of SSSIs. The Act also contains lists of habitats and species (Section 74) for which conservation measures should be promoted, in accordance with the recommendations of the Convention on Biological Diversity (Rio Earth Summit) 1992.

The Natural Environment and Rural Communities (NERC) Act 2006

Section 40 of the NERC Act places a duty upon all local authorities and public bodies in England and Wales to promote and enhance biodiversity in all of their functions. This is clarified in paragraph 9 of the Planning Policy Guidelines (PPG) 2019 as to have regard, in the exercise of their functions, to the purpose of conserving biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making throughout the public sector, which should be seeking to make a significant contribution to the achievement of the commitments made by government in its 25 Year Environment Plan. Sections 41 (England) and 42 (Wales) list habitats and species of principal importance to the conservation of biodiversity. These lists superseded Section 74 of the CRoW Act 2000.

The Hedgerow Regulations 1997

The Hedgerow Regulations make provision for the identification of important hedgerows which may not be removed without permission from the Local Planning Authority.

UK Post-2010 Biodiversity Framework

The UK Biodiversity Action Plan (BAP), published in 1994, was the UK Government's response to signing the Convention on Biological Diversity (CBD) at the 1992 Rio Earth Summit. The new UK Post-2010 Biodiversity Framework replaces the previous UK level BAP. The UK Post-2010 Biodiversity Framework covers the period 2011-2020 and forms the UK Government's response to the new strategic plan of the United Nations Convention on Biological Diversity (CBD), published in 2010 at the CBD meeting in Nagoya, Japan. This includes five internationally agreed strategic goals and supporting targets to be achieved by 2020. The five strategic goals agreed were:

- Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
- Reduce the direct pressures on biodiversity and promote sustainable use;
- To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
- Enhance the benefits to all from biodiversity and ecosystem services; and,
- Enhance implementation through participatory planning, knowledge management and capacity building.

The Framework recognises that most work which was previously carried out under the UK BAP is now focused on the four individual countries of the United Kingdom and Northern Ireland, and delivered through the countries' own strategies. Following the publication of the new Framework the UK BAP partnership no longer operates but many of the tools and resources originally developed under the UK BAP still remain of use and form the basis of much biodiversity work at country level. In England the focus is on delivering the outcomes set out in the Government's 'Biodiversity 2020: a Strategy for England's Wildlife and Ecosystem Services' (DEFRA, 2011). This sets out how the quality of our environment on land and at sea will be improved over the next ten years and follows on from policies contained in the Natural Environment White Paper.

Species and Habitats of Material Consideration for Planning in England

Previous planning policy (and some supporting guidance which is still current, e.g. ODPM Circular 06/2005, now under revision), refers to UK BAP habitats and species as being a material consideration in the planning process. Equally many local plans refer to BAP priority habitats and species. Both remain as material considerations in the planning process but such habitats and species are now described as Species and Habitats of Principal Importance for Conservation in England, or simply priority habitats and priority species under the UK Post-2010 Biodiversity Framework. The list of habitats and species remains unchanged and is still derived from Section 41 list of the Natural Environmental and Rural Communities (NERC) Act 2006. As was previously the case when it was a BAP priority species hen harrier continues to be regarded as a priority species although it does not appear on the Section 41 list.

2.2 NATIONAL PLANNING POLICY FRAMEWORK AND PRACTICE GUIDANCE

In February 2019, the National Planning Policy Framework (NPPF) was updated, replacing the previous framework published in 2018. A presumption towards sustainable development is at the heart of the NPPF. This presumption does not apply however where developments require appropriate assessment under the Birds or Habitats Directives, unless the assessment concludes that the plan or project will not adversely affect the integrity of the Natura 2000 site.

Chapter 15, on conserving and enhancing the natural environment, sets out how the planning system should contribute to and enhance the natural and local environment by:

- protecting and enhancing existing sites of biodiversity value;
- minimising impacts on and should secures measurable net gains for biodiversity; and,
- establishing coherent ecological networks.

If a proposed development would result in significant harm to the natural environment which cannot be avoided (through the use of an alternative site with less harmful impacts), mitigated or compensated for (as a last resort) then planning permission should be refused. With respect to development on land within or outside of a Site of Special Scientific Interest (SSSI) which is likely to have an adverse effect (either alone or

in-combination with other developments) would only be permitted where the benefits of the proposed development clearly outweigh the impacts on the SSSI itself, and the wider network of SSSIs. Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused unless there are wholly exceptional reasons for the development, and a suitable compensation strategy is provided.

Chapter 15 identifies that development whose primary objective is to conserve or enhance biodiversity should be supported and opportunities to incorporate biodiversity improvements in and around development should be encouraged, especially where this can secure measurable net gains for biodiversity.

Chapter 11, making effective use of the land, sets out how the planning system should promote use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Substantial weight should be given to the value of using suitable brownfield land within settlements for homes and other identified needs. Opportunities for achieving net environmental gains, including new habitat creation, are encouraged.

In March 2014 the Department for Communities and Local Government released guidance to support the National Planning Policy Framework (NPPF), known as the National Planning Practice Guidance (NPPG).

This has been produced to provide guidance for planners and communities which will help deliver high quality development and sustainable growth in England. The guidance includes a section entitled 'Natural Environment: Biodiversity, ecosystems and green infrastructure' which sets out information with respect to the following:

- the statutory basis for minimising impacts on biodiversity and providing net gains where possible;
- the local planning authority's requirements for planning for biodiversity;
- what local ecological networks are and how to identify and map them;
- the sources of ecological evidence;
- the legal obligations on local planning authorities and developers regarding statutory designated sites and protected species;
- the considerations for local (non-statutory) designated sites;
- definition of green infrastructure;
- where biodiversity should be taken into account in preparing a planning application;
- how development can enhance biodiversity;
- how policy is applied to avoid, mitigate or compensate for significant harm to biodiversity and how mitigation and compensation measures can be ensured; and,
- the consideration of ancient woodlands and veteran trees in planning decisions.

2.3 LOCAL PLANNING POLICY

Solihull MBC Adopted Local Plan 2013, Policy P10, Natural Environment.

Policy P10 states: The Council recognises the importance of a healthy natural environment in its own right, and for the economic and social benefits it provides to the Borough. The full value and benefits of the natural environment will be taken into account in considering all development proposals, including the contribution to the green economy and the health of residents, and the potential or reducing the impacts of climate change. Joint working with neighbouring authorities will be supported, recognising the need for a landscape scale approach to the natural environment and conservation of biodiversity.

The Council will seek to protect, enhance and restore the diverse landscape features of the Borough and to create new woodlands and other characteristic habitats, so as to halt and where possible reverse the degrading of the Arden landscape and promote local distinctiveness. Development should take full account of national and local guidance on protecting and restoring the landscape and the areas in need of enhancement, including guidance relating to the countryside. Developers will be expected to incorporate measures to protect, enhance and restore the landscape, unless it is demonstrated that it is not feasible, disproportionate or unnecessary.

The Council will seek to conserve, enhance and restore biodiversity and geodiversity, to create new native woodlands and other habitats and to protect, restore and enhance ancient woodland and green infrastructure assets across the Borough. Protection of ancient woodland, designated sites and priority habitats shall include the establishment of buffers to any new development. Development should be informed by the latest

information on habitats and species, and take full account of national and local guidance on conserving biodiversity, opportunities for biodiversity enhancement and for improving and restoring the Borough's green infrastructure. When appropriate, development should seek to enhance accessibility to the natural environment, especially for disabled people.

The Council will protect areas of national and local importance for biodiversity and geodiversity, where it is reasonable, proportionate and feasible to do so. Development likely to have an adverse affect on a Site of Special Scientific Interest, whether directly or indirectly, will be subject to special scrutiny and will be permitted only if the reasons for the development clearly outweigh the nature conservation value of the site and the national policy to safeguard such sites. Where development may have an adverse affect on a Site of Special Scientific Interest, developers will be expected to incorporate measures to enhance the condition of the site, unless it is demonstrated that it is not feasible.

Development likely to have an adverse affect on a Local Nature Reserve or a Local Wildlife or Geological Site will be permitted only if the reasons for the development clearly outweigh the nature conservation or geological value of the site and its contribution to wider biodiversity objectives. Where development would have an adverse affect on a site of local value, developers will be expected to incorporate measures to enhance the site or to restore the links between sites in accordance with the Green Infrastructure study, unless it is demonstrated that it is not feasible.

Outside designated sites, developers will be expected to take full account of the nature conservation or geological value, and the existence of any habitats or species included in the Local Biodiversity Action Plan, or sites in the Local Geological Action Plan. Developers will be required to undertake a full ecological survey and to deliver a net gain or enhancement to biodiversity, unless it is demonstrated that it is not appropriate or feasible. In considering the need for green space improvements associated with new development, developers should have regard for the standards and priorities in the Green Spaces Strategy in relation to accessible natural green space.

Where development is likely to have significant harmful effects on the natural environment, as a result of the development itself, or the cumulative impact of developments, developers must demonstrate that all possible alternatives that would result in less harm have been considered. Where development is permitted, appropriate mitigation of the impacts and compensation where relevant will be required to deliver a net gain in biodiversity, habitat creation, landscape character and local distinctiveness. Enhancements should be undertaken either on the site, or in its vicinity, but where it is demonstrated that this is not possible, offsetting in alternative strategic locations within the biodiversity or green infrastructure network, to deliver biodiversity or other objectives may be considered. Where appropriate, developers should demonstrate compliance with this policy through an ecological statement or by relevant information in the West Midlands Sustainability Checklist.

3. METHODOLOGIES

3.1 INTRODUCTION

The methodology for this assessment described in the Ecology Chapter is derived from the criteria set out in The Chartered Institute of Ecology and Environmental Management (CIEEM) '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (2019) (herein referred to as the 'CIEEM Guidelines'). The methodology comprises:

- Determination of the ecological baseline including a desk study, an Extended Phase 1 Habitat Survey and, where relevant, further surveys for legally protected species and Species of Principal Importance in England;
- Identification of important ecological receptors within the zone of influence;
- An assessment of the significant effects on important ecological receptors from the construction and operational phases of the Proposed Development;
- A review of the mitigation and assessment of residual effects; and,
- A cumulative assessment with other development proposals in the surrounding area.

Further information regarding the assessment methodology for each phase of the Ecological Impact Assessment is provided in Sections 3.2 and 3.6.

3.2 SCOPE OF THE ASSESSMENT

The assessment considers all activities associated with the construction and operational phases of the proposed development that are likely to have direct, indirect or cumulative impacts on the ecological feature.

The zone of influence for the Ecological Impact Assessment has been defined in accordance with the CIEEM Guidelines (2016). These guidelines state that the 'Zone of Influence' with respect to ecology does not simply relate to the red line boundary of an application site. Activities and effects described above that occur outside of the Application Site can still have a negative or positive impact as a result of the construction, operation and potentially decommissioning of a project. The Zone of Influence in this assessment will therefore consider direct and indirect effects on ecological receptors both within and adjacent to the application site, and potentially associated with other areas that could be affected e.g. through transportation or excavation.

3.3 DESK STUDY

An ecological desk study was undertaken to determine the presence of any designated nature conservation sites and protected species in proximity to the study area. This involved contacting appropriate statutory and non-statutory organisations which hold ecological data relating to the survey area. Middlemarch Environmental Ltd then assimilated and reviewed the desk study data provided by these organisations.

The consultees for the desk study were:

- Natural England - *MAGIC* website for statutory conservation sites;
- Warwickshire Biological Records Centre

The desk study included a search for European statutory nature conservation sites within a 5 km radius of the study area (extended to 10 km for any statutory site designated for bats), UK statutory sites within a 2 km radius and non-statutory sites and protected/notable species records within a 1 km radius.

The data collected from the consultees is discussed in Chapter 4. Selected data and mapping is provided in Appendix 1. In compliance with the terms and conditions relating to its commercial use, the full desk study data is not provided within this report.

3.4 FIELD SURVEYS

Methodologies for each of the surveys undertaken at the site in 2020 are summarised in Table 3.1.

Survey	Date Completed	Brief Description
Phase 1 Habitat Survey	8 th September 2020	A walkover survey was undertaken following the Extended Phase 1 Habitat Survey methodology of the Joint Nature Conservation Committee (2010) and the Institute of Environmental Assessment (1995). Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats. The method provides information on habitats present within the site and assesses the potential for legally protected and notable species to occur in and adjacent to the site.
Great Crested Newt Habitat Suitability Index Assessment (HSI)	8 th September 2020	A Habitat Suitability Index Assessment (HSI) was carried out in accordance with the modified version of Oldham et al (2000), which assesses the suitability of waterbodies to support great crested newts. The survey incorporated all ponds within 250 m of the site which had suitable connectivity to the site and where access was permitted.

Table 3.1: Summary of Ecological Field Surveys Undertaken to Inform Impact Assessment

3.5 IMPACT ASSESSMENT

3.5.1 Zone of Influence

The 'Zone of Influence' for the Ecological Impact Assessment has been defined in accordance with the CIEEM Guidelines (2019). Please see section 3.2

3.5.2 Features of Ecological Importance

The assessment considers all ecological features within the zone of influence that are capable of being a material consideration in the planning process. This includes the following:

- Statutory and Non-Statutory Nature Conservation Sites;
- Statutory Protected Species;
- Habitats and Species of Principal Importance to Nature Conservation in England (as identified in Section 41 of the NERC Act);
- Priority habitats and species identified in the Warwickshire, Coventry and Solihull Biodiversity Action Plan; and,
- Features of importance by virtue of their location, role or function within the ecological landscape.

3.5.3 Determining Importance

The CIEEM guidelines (2019) state that ecological features should be considered within a 'defined geographical context'. The geographical frame of reference used to determine ecological importance in this assessment is detailed in Table 3.2. Assigning importance to ecological features is based on professional judgement informed by available guidance and information and expert advice.

Importance	Examples
International	High importance and rarity on an international scale and limited potential for substitution. e.g. Special Areas of Conservation, Special Protection Areas, Ramsar Sites, or an area which meets the published selection criteria for such designation. A regularly occurring, nationally significant population or number of any internationally important species.
National	High importance, quality and rarity on a national or regional scale, with limited potential for substitution. e.g. Sites of Special Scientific Interest, National Nature Reserves and sites which meets the published selection criteria for national designation. A regularly occurring, regionally or county significant population or number of any nationally important species.
Regional	High importance, quality or rarity on a metropolitan scale, or medium quality or rarity on a regional scale, with limited potential for substitution e.g. large-scale metropolitan Wildlife Sites or other sites that exceed the metropolitan-level designations but fall short of SSSI selection criteria, or areas of regionally rare or valuable habitat. A regularly occurring, locally significant number of a regionally important species during a critical phase of its life cycle.
County / Metropolitan	Medium importance, quality and rarity on a metropolitan scale and (limited) potential for substitution. e.g. Local Nature Reserves, metropolitan Wildlife Sites and features such as diverse and/or ecologically valuable hedgerow networks, high quality woodlands and high quality ponds. A regularly occurring, locally significant number of a important species at the metropolitan level during a critical phase of its life cycle.
Local	Borough Medium to high importance, quality and rarity on a local scale, with (limited) potential for substitution e.g. semi-natural vegetation that due to its size, quality or the wide distribution of such habitats within the local area are not considered for the above classifications, medium-sized areas of habitat that could be re-created, such as wildflower meadows, medium to low quality ponds, and low quality woodlands. A regularly occurring, locally significant number of a borough important species during a critical phase of its life cycle. Site Low or very low importance, quality and rarity on a local scale with potential for substitution. e.g. low quality grasslands and intensive agricultural land. Any regularly occurring population of a locally common species.
Negligible	Areas of no ecological value e.g. hardstanding, areas of built development not supporting assemblages of species.

Table 3.2: Geographical Context of Ecological Importance

3.5.4 Characterising Impacts

Impacts arising as a result of development activities on site are described for all features of ecological importance. When describing impacts the assessment refers to characteristics such as the extent; magnitude; duration; frequency; and, reversibility of the impact in order to provide justification for any conclusions about the nature and likelihood of the impact described.

3.5.5 Determining Significant Effects

The CIEEM guidelines (2019) define a significant effect in the context of an Ecological Impact Assessment as *'an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general'*. A significant effect is therefore an effect that is *'sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of a project'*.

Significant effects are determined by assessing any deviation in the baseline conditions of a feature of ecological importance that may occur as a result of individual and cumulative impacts during the construction and operational phases of the proposed development. These effects are expressed in terms of a geographical scale, corresponding to that in Table 3.2, however the geographical scale at which an effect is significant can vary from the geographical importance of the ecological feature being assessed. This assessment uses the above methodology to describe all significant effects on features of ecological importance within the zone of influence.

3.5.6 Confidence in Predictions

The CIEEM Guidelines (2019) also recommends that it is important to consider the likelihood that a change / activity will occur and also the degree of confidence in the assessment of the effect on ecological structure and function. This confidence is described within the summary tables for each feature of ecological importance.

4. BASELINE ECOLOGICAL CONDITIONS AND EVALUATION

4.1 DESIGNATED SITES

The desk study search, undertaken as part of the EclA, identified no European statutory nature conservation sites within a 5 km radius of the site. Five UK statutory sites are located within a 2 km radius and 14 non-statutory sites are located within a 2 km radius. Nature conservation sites in proximity to the site are described further in Table 4.1.

The location of the statutory and non-statutory nature conservation sites are shown on drawing C153311-04-01 in Chapter 7. The distances shown in Table 4.1 are from the edge of the site to the closest edge of the nature conservation site.

Site Name	Designation	Proximity to Survey Area	Description
UK Statutory Sites			
Marston Green Millennium Wood / Bickenhill Millennium Wood	LNR, LWS	50 m south-east	Site consists of broad-leaved woodland plantation, areas of semi improved grassland and tall ruderal. Woodland species include oak <i>Quercus</i> sp., birch <i>Betula</i> sp., rowan <i>Sorbus aucuparia</i> , goat willow <i>Alix caprea</i> and grey willow <i>Salix cinerea</i> . Common knapweed <i>Centaurea nigra</i> , pyramidal orchid <i>Nacampptis pyramidalis</i> and cornflower <i>Centaurea cyanus</i> can be found in semi improved grassland.
Marston Green Park	LNR	740 m north-west	Site is close to the original Chelmsley Wood and includes a wildflower meadow, ponds and at least one English oak <i>Quercus robur</i> . Low Brook river flows along the western boundary, black poplar <i>Populus nigra</i> is found along the east bank.
Coleshill and Bannerly Pools	SSSI	910 m	This site consists of two pools – Coleshill and Bannerly Pools – and an interjacent area, known as the Bogs, which together form the only valley mire system in Warwickshire. Mature woodlands surround the pools and the Bogs.
Alcott Wood	LNR, LWS, ASNW	1.4 km north-west	A natural example of oak <i>Quercus</i> woodland with ground flora containing several ancient species including wood anemone <i>Anemonoides nemorosa</i> , remote sedge <i>Carex remota</i> and wood sorrel <i>Oxalis</i> sp. Very few non-native trees and scrub can also be found.
Chelmsley Wood	LNR	1.8 km north	No information provided.
Non-statutory Sites			
Colehill Heath Woodland	LWS	15 m west	The site consists of oak <i>Quercus</i> sp. woodland, with frequent birch <i>Betula</i> sp., hazel <i>Corylus avellana</i> , alder <i>Alnus glutinosa</i> , with an elm <i>Ulmus</i> sp. understorey. Ground flora includes broad buckler fern <i>Dryopteris dilatata</i> , patches of wood sage <i>Teucrium scorodonia</i> , honeysuckle <i>Lonicera periclymenum</i> and rosebay willowherb <i>Chamaenerion angustifolium</i> .
Bickenhill Plantations	LWS	20 m south	Approximately half the area is semi-mature coniferous planation of pine <i>Pinus</i> sp. with small areas of western hemlock <i>Tsuga heterophylla</i> . The eastern area consists of a ground layer dominated by purple moor grass <i>Molinia caerulea</i> with abundant broad buckler fern <i>Dryopteris dilatata</i> . Other areas of woodland dominated by birch <i>Betula</i> sp. and oak <i>Quercus</i> sp. occur to the west and north of the site. The ground here is drier and the ground flora is dominated by wavy hair grass <i>Deschampsia flexuosa</i> , creeping soft grass <i>Holcus mollis</i> and common bent <i>Agrostis capillaris</i> . This is the only site in the county for bog bush cricket <i>Metrioptera brachyptera</i> .

Table 4.1: Summary of Nature Conservation Sites (continues)

Site Name	Designation	Proximity to Survey Area	Description
Non-statutory Sites (continued)			
Heath Corner	LWS	200 m west	Small paddock of semi-improved grassland dominated by a mix of sweet vernal grass <i>Anthoxanthum odoratum</i> , common bent <i>Agrostis capillaris</i> and red fescue <i>Festuca rubra</i> . Forbs are abundant and include yarrow <i>Achillea millefolium</i> , common bird's foot trefoil <i>Lotus corniculatus</i> and lesser stitchwort <i>Stellaria graminea</i> . The centre of the field includes an area of predominately acidic grassland vegetation.
Bickenhill Parish Burial Ground	Ecosite	270 m south-west	There is low floral diversity, although a good range of trees exists including common lime <i>Tilia europaea</i> , aspen <i>Populus tremula</i> , oak <i>Quercus</i> sp., hawthorn <i>Crataegus monogyna</i> and hazel <i>Corylus avellana</i> . A variety of common herbs are also present.
Cricket Pitch Rough	Ecosite	330 m north-west	Semi-improved grassland dominated by false oat-grass <i>Arrhenatherum elatius</i> . Some of the more notable species present include common centaury <i>Centaureum erythraea</i> , hop trefoil <i>Trifolium campestre</i> and yellow loosestrife <i>Lysimachia vulgaris</i> . A small wet area within the grassland contains yellow iris <i>Iris pseudacorus</i> and marsh thistle <i>Cirsium palustre</i> , there is also a small hornbeam <i>Carpinus betulus</i> plantation on site.
School Rough	LWS, ASNW	480 m	The site consists of semi-natural woodland, acid grassland and wet areas. Mature oaks <i>Quercus</i> sp. dominate the woodland canopy in the north while silver birch <i>Betula pendula</i> and downy birch <i>Betula pubescens</i> are dominant in the centre and east. The shrub layer is sparse while the ground flora is abundant with creeping soft-grass <i>Holcus mollis</i> and bluebell <i>Hyacinthoides non-scripta</i> , greater stitchwort <i>Stellaria holostea</i> , wood sage <i>Teucrium scorodonia</i> and wood-sorrel <i>Oxalis acetosella</i> . Acid grassland is dominated by Yorkshire fog <i>Holcus lanatus</i> with frequent common bent <i>Agrostis capillaris</i> , red fescue <i>Festuca rubra</i> and creeping soft-grass <i>Holcus mollis</i> .
Kinghurst Brook / Lowbrook, headwaters & Tributaries	Ecosite	670 m west	Kinghurst Brook has a diverse range of vegetation such as reed sweet grass <i>Glyceria maxima</i> , curled pondweed <i>Potamogeton crispus</i> , buttercup <i>Ranunculus</i> sp., yellow iris <i>Iris pseudacorus</i> and Canadian waterweed <i>Elodea canadensis</i> . The surrounding banks are regularly mown and broad-leaved trees have been planted. Ground flora along the banks is quite rich in places and includes a variety of flowering species. Otter <i>Lutra lutra</i> were recorded near Hatchford Brook in 2015.
Wood	Ecosite	720 m north-west	The woodland runs alongside a small stream and contains a mix of crack willow <i>Salix euxina</i> , alder <i>Alnus glutinosa</i> and oak <i>Quercus</i> sp. The ground flora is quite varied and contains pignut <i>Conopodium majus</i> , wood anemone <i>Anemone nemorosa</i> and common bluebell <i>Hyacinthoides non-scripta</i> .
Main Birmingham to London Railway Line	Ecosite	740 m south-east	Marginal habitat of some value as a refuge and distribution corridor for nesting birds and other local species.

Table 4.1 (continued): Summary of Nature Conservation Sites (continues)

Site Name	Designation	Proximity to Survey Area	Description
Non-statutory Sites (continued)			
Coleshill Pool Woods	LWS	780 m north-east	An oak <i>Quercus</i> sp. woodland with frequent birch <i>Betula</i> sp., it has an understorey of mainly young birch <i>Betula</i> sp., hazel <i>Corylus avellana</i> , alder <i>Alnus glutinosa</i> and elm <i>Ulmus</i> sp. along the roadside. The ground flora is partly dominated by bramble <i>Rubus fruticosus</i> agg, with frequent broad buckler fern <i>Dryopteris dilatata</i> . There are also some extensive patches of wood sage <i>Teucrium scorodonia</i> , locally abundant honeysuckle <i>Lonicera periclymenum</i> and patches of rosebay willowherb <i>Chamaenerion angustifolium</i> . To the south of the woodland is a semi-natural birch <i>Betula</i> sp. woodland, with a scattered understorey of elder <i>Sambucus nigra</i> and encroaching sycamore <i>Acer pseudoplatanus</i> . The ground flora is dominated by bramble <i>Rubus fruticosus</i> agg with frequent to abundant broad buckler fern <i>Dryopteris dilatata</i> , wood sage <i>Teucrium scorodonia</i> and male fern <i>Dryopteris filix-mas</i> .
Botanical Site	Ecosite	1.5 km north-east	Broad-leaved woodland plantation.
Pendigo Lake and the rough	Ecosite	1.5 km south-east	The lake is used by motorboats, whilst 'The Rough' is the remains of ancient birch <i>Betula</i> sp. woodland.
Denbigh Spinney	LWS	1.7 km south-east	Broadleaved semi-natural woodland with abundant alder <i>Alnus glutinosa</i> , locally frequent downy birch <i>Betula pubescens</i> and pendunculate oak <i>Quercus robur</i> . The ground flora contains abundant broad buckler fern <i>Dryopteris dilatata</i> , three-nerved sandwort <i>Moehringia trinervia</i> , gipsywort <i>Lycopus europaeus</i> , lesser burdock <i>Arctium minus</i> , woodsedge <i>Carex sylvatica</i> , remote sedge <i>Carex remota</i> , lady-fern <i>Athyrium filix-femina</i> and marsh thistle <i>Cirsium palustre</i> .
Chelmsley Wood	LWS	1.9 km north-west	Largely composed of birch <i>Betula</i> sp., with alder <i>Alnus glutinosa</i> dominant at the wetter western end and pendunculate oak <i>Quercus robur</i> in the drier areas. The tree canopy is discontinuous and the shrub layer somewhat lacking. Common bluebell <i>Hyacinthoides non-scripta</i> is very prevalent in the field layer, with common valerian <i>Valeriana officinalis</i> , wild garlic <i>Allium ursinum</i> , creeping jenny <i>Lysimachia nummularia</i> , wood avens <i>Geum urbanum</i> and wood millet <i>Milium effusum</i> present in the wetter areas.
Key: Ecosite: Nature Conservation Site Ungraded LNR: Local Nature Reserve LWS: Local Wildlife Site ASNW: Ancient Semi-Natural Woodland SSSI: Site of Special Scientific Interest			

Table 4.1 (continued): Summary of Nature Conservation Sites

The survey area also falls within the SSSI Impact Risk Zone of several nature conservation sites, the closest of which is Coleshill and Bannerly Pools SSSI (further information regarding this nature conservation site is provided within Table 4.1).

Two designated sites (Colehill Heath Woodland LWS and Bickenhill Plantations LWS) lie within 20m of the development's boundary. However, both sites are >80m away from closest areas of proposed works. Due to the limited scale and scope of the proposed development, the intervening distance, and the intervening roads (Colehill Heath Rd & Blackfirs Lane) between the LWS and the development site it is not considered likely that scheme could result an additional impacts to these sites, either in the construction or operational phases.4.2 Habitats

4.2 PHASE 1 HABITAT SURVEY

The following habitats were identified on site during the updated Phase 1 Habitat Survey, (listed alphabetically and not in order of importance):

- Amenity grassland
- Bare ground
- Hard standing
- Introduced shrub
- Mixed plantation woodland
- Species poor hedgerow with trees
- Species poor semi-improved grassland
- Standing water (pond)
- Tall ruderal

The location of each habitat is shown on RT-MME-153311-PH1 in Chapter 7.

Amenity grassland

Small areas of intensively managed amenity grassland were located adjacent to units A and B.

Bare Ground

Exposed sandy soil with little to no vegetative covering was located the drainage channels south of the existing parking provision and within the 'soak away' drainage pools to the south west of the site.

Hard standing

Tarmacked or concreted slabbed areas. Comprising of the existing car parking resources and pedestrian walkways.

Introduced shrub

Small areas of shrub planted borders comprising non-native ornamental species.

Mixed Plantation Woodland

All areas comprised a mixture of deciduous and coniferous tree species of both native and ornamental varieties including: common hazel (*Corylus avellana*), English oak (*Quercus robur*), lime (*Tilia cordata*), silver birch (*Betula pendula*), Himalayan birch (*Betula utilis jacquemontii*), black alder (*Alnus glutinosa*) blackthorn (*Prunus spinosa*), cherry (*Prunus avium*) and assorted maples (*Acer* spp.) and *Pinus* sp. Most trees appeared less than three years of age and were still within tree guards. A small number of more mature trees (5-6 years) were present within the plantation areas. The understory of three areas of plantation woodland to the west and north west of the site consisted of bare ground. The understory of the four areas to the south and south west of the site was dominated by tall ruderals.

Species Poor Hedgerow with Trees

Lengths of hedgerow run along the boundary of the study areas along its southern and western limits. The hedgerows were species poor, with no 30m length examined containing five or more native woody species. The dominant woody species comprised hawthorn (*Crataegus monogyna*), willow (*Salix* sp.) and common alder (*Alnus glutinosa*). Crab apple (*Malus sylvestris*) and sycamore (*Acer* sp.) were also present but infrequent. Both lengths contained a small number of mature oaks (*Quercus robur*) some of which displayed veteran characteristics (i.e. decay holes, physical damage to trunk and crevices in the bark). The hedgerows are defunct (i.e. not stock-proof) and possess numerous sections along their length where the woody vegetation has failed leading to the creation of gaps. These gaps had recently been replanted as part of the previous landscaping scheme and numerous small whips less than three years of age and still within their tree guards were noted. The hedgerows along both the southern and western boundaries vary between 1m-2.5m in width and lack ground features such as ditches and banks which are often associated with hedgerows of greater biodiversity value. The understory of both hedgerows comprises almost entirely of bramble and bracken.

Species Poor Semi-Improved Grassland

The different areas of species poor semi-improved grassland were relatively uniform in their species composition across the site, likely a result of the use of the same seed-mix and management regime for their creation. The most common species were noted as being: Common Bent (*Agrostis capillaris*), black

knapweed (*Centaurea nigra*), false oat (*Arrhenatherum elatius*), broad-leaved dock (*Rumex obtusifolius*), common sorrel (*Rumex acetosa*), ox-eye daisy (*Leucanthemum vulgare*), meadow foxtail (*Alopecurus Pratensis*), Timothy (*Phleum pratense*), meadow fescue (*Festuca pratensis*), ribwort plantain (*Plantago lanceolata*) and self-heal (*Prunella vulgaris*). Evening primrose (*Oenothera biennis*) was also noted as present but occasional.

Standing Water (Pond)

To the west of unit A a small area of standing water has formed in a depression in the landscaping scheme. The pond did not have any aquatic vegetation or vegetation indicative of wetland areas suggesting it is temporal. The water quality appeared poor, being opaque with very few aquatic invertebrates present.

Tall Ruderal

Tall ruderal growth was present across much of the site. The most frequent species noted were: common sorrel (*Rumex acetosa*), creeping thistle (*Cirsium arvense*), globe thistle (*Echinops sphaerocephalus*), white clover (*Trifolium repens*), nettle (*Urtica dioica*), rose-bay willow herb (*Chamaenerion angustifolium*), ragwort (*Senecio jacobaea*), ribwort plantain (*Plantago lanceolata*), white campion (*Silene latifolia*). Infrequent neutral grassland species were noted as being present including false oat grass (*Arrhenatherum elatius*) and meadow foxtail (*Alopecurus pratensis*).

Notable Habitats

Of the habitats listed above the species poor hedgerow with trees, and the standing water are of greatest ecological importance however the pond is not yet sufficiently established to be considered a priority habitat above a local or borough level.

Other Habitats

The plantation woodland, species poor semi-improved grassland and tall ruderal are considered common and widespread habitats in the area and are of lower intrinsic ecological value. However, together, these mosaics of habitats contribute to the structural and ecological diversity of the sites. These habitats also have the potential to support protected/notable species, which is discussed further in Section 4.3.

The remaining habitats on site (bare ground and hardstanding) are of negligible ecological importance and are highly unlikely to support protected species They are not discussed further in this assessment.

4.3 SPECIES

A summary of the desk study data and results from the baseline ecological survey (undertaken as part of the walkover survey) completed at the site in 2020 is provided below.

4.3.1 Amphibians

There is no record of (protected or priority) amphibians occurring within 1km of the site boundary.

All ponds assessed in 2016 as part of the Great Crested Newt Habitat Suitability Index Assessment (Report RT-MME-122297-01), were determined to be “below average” suitability for great crested newts and it was concluded that great crest newts are not a notable consideration in relation to the previous development of units A and B.

Desktop assessment of maps and aerial photography displayed several water bodies (ponds and ditches) within and in close proximity to the study area. A number of these water bodies appeared to be either adjacent to or ecologically linked to terrestrial habitats which could support populations of great crested newts. As such, Habitat Suitability Index (HSI) assessments were conducted on all waterbodies within 250m of the site boundary which were both ecologically connected to the site and where assessment could be undertaken from publicly accessible land.

The HSI assessments were undertaken using the Amphibian and Reptile Groups of the United Kingdom (ARG UK) 2010 methodology and are provided in full in Appendix 1.

HSI assessments were conducted on five ponds (P1, P2, P3, P4 & P5) and one ditch (D1). One pond (P6) was within 250m but was screened out from requiring assessment due to the presence of a significant physical barrier to great crested newt movement between the pond location and the site (the B4438). One

pond was located at the 250m boundary but was not accessible for assessment. The location of all water bodies accessed is provided in Appendix 1.

Ponds P1-P5 and ditch D1 all were determined to have a HSI score of <0.5 and as such can be concluded to all being of poor quality for usage by great crested newts for breeding. Full details of each water body's HSI score is provided in Appendix 1.

Based upon an absence of suitable breeding ponds with 250m, the poor quality of the terrestrial habitat within the study area and a lack of suitable hibernacula/refugia within the study area it is not considered likely that the proposed development could impact upon great crested newts.

4.3.2 Bats

There are numerous records of bats being present within 1km of the study area (see Annex 1). The records are predominantly of common and soprano pipistrelle as well as noctule, but an individual Nathusius' pipistrelle and a serotine were recently recorded (2018) in the area.

Bat surveys conducted in 2016 as part of the previous development (Report RT-MME-122297-04) highlight that the site was utilized by noctules for foraging and that two trees in the hedgerow along the site's western boundary had moderate potential to support roosting bats.

The majority of the site only provides limited feeding opportunity for bats with the exception of the 'Species-Poor Hedgerows with Trees' which provides feeding and limited roosting potential as well as a strong linear feature to allow for the commuting of bats within the wider landscape surrounding the site.

4.3.3 Badgers

There are records of badgers present with 1km of the site boundary (see Annex 1 confidential map). No evidence of active badger setts was found onsite during the walkover survey or within 30m of the site boundary. Badger feeding signs (snuffle holes) and an associated animal track were noted as being present along the western boundary of the study area (see Chapter 7, RT-MME-153311-PH1TN1).

4.3.4 Birds

There are records of several protected bird species within 1km of the site boundary (see Annex 1). The site offers limited feeding potential for birds (spring/summer and overwintering) as well as nesting opportunities within the 'Species-Poor Hedgerows with Trees' for some of the protected, as well as more common, species.

4.3.5 Dormouse

There are no records of dormouse being present within 1km of the site boundary. There are no habitats onsite or adjacent to the study area suitable to support dormouse.

4.3.6 Otter

There are no records of otter being present within 1km of the site boundary. There are no habitats onsite or adjacent to the study area suitable to support otter.

4.3.7 Reptiles

There are no recent records of reptiles being present within 1km of the site boundary. The most recent records for both common lizard and slow worm date from 1986; grass snake in 1982; and adder in 1845.

The reptile presence/absence survey conducted in 2016 as part of the previous development (Report RT-MME-122297-02) recorded no reptiles on site.

There is limited potential for reptile usage in the study area.

4.3.8 Terrestrial Invertebrates

There are several notable invertebrate species known to be present within 1km of the study area. The species poor semi-improved grassland habitat present could support populations of small heath (*Coenonympha pamphilus*) as it contains both a number of fine grass species which form the small heath's larval food-plant and flower species which could support adults. The habitat within the study area also has the potential to support populations of several of the notable Coleopteran and Dipteran species likely to be present within the surrounding area.

4.3.9 Water Vole

There are no records of water vole being present within 1km of the site boundary. There are no habitats onsite or adjacent to the study area suitable to support water vole.

4.3.10 Other Species

Fox footprints and remains of feeding were noted onsite in the bankside of the bare ground area along the northern boundary of the study area (see Chapter 7, RT-MME-153311-PH1, TN2 and TN3). In the same area two active fox earths, or two entrances to a single substantive earth, were located (see Chapter 7, RT-MME-153311-PH1, TN4 and TN5). These earths fall within the area that will be impacted upon by the proposed increase in car parking resource. Foxes are not priority species but as UK mammals are protected from unnecessary harm and suffering under the Animal Welfare Act 2006 (as amended).

4.3.11 Plants

No notable plant species or invasive plant species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was noted as being present within the study area.

4.4 EVALUATION OF IMPORTANCE OF ECOLOGICAL FEATURES

Table 4.2 identifies the important ecological features on site and the geographical frame of reference for which they are important. Only receptors important at the local (site) level or above are included in the table and are therefore considered further in the impact assessment. Receptors deemed to be of negligible importance at the site level by virtue of their absence from site or limited value to biodiversity are not included within the table and are scoped out of further assessment.

Consideration is given if the proposed development (in the absence of avoidance, mitigation or compensation measures) could result in harm to the feature either directly or indirectly during the developments construction and/or operational phases.

Receptor	Nature Conservation Value	Justification for Considered Value
Designated Sites		
None considered likely to be impacted upon	N/A	N/A
Habitats		
Standing Water (pond)	Local/Borough	Standing water (ponds) are identified as Habitats of Principal Importance for Nature Conservation in England (Section 41 of the NERC Act) and are considered both UK and Local BAP habitats. Within the site the standing water (pond) represent an important ecological feature. Its small area (0.01ha), lack of aquatic vegetation, lack of a diverse assemblage of aquatic species and poor water quality prevent this feature being considered of County/Metropolitan importance.
Species Poor Hedgerows with Trees	Local (Site)	Hedgerows' are a Habitat of Principal Importance for Nature Conservation in England (Section 41 of the NERC Act) and are considered both a UK and Local Biodiversity Action Plan (BAP) habitat. The hedgerow was however species-poor and is therefore assessed as being of Local (Site) importance for nature conservation.
Plantation Forest Species Poor Semi-Improved Grassland & tall ruderal	Local (Site)	Although these habitats are common and widespread and of low ecological value, they contribute to the structural diversity of the site and have the potential to support protected/notable species. As such, they are considered to be of Local (Site) importance for nature conservation.
Species		
Bats	Local (Borough)	The desk study and previous survey work suggest the site is only utilized by common bat species for foraging and commuting. The populations of common and soprano pipistrelle as well as noctule that would likely use the site are assessed as being of up to Local (Borough) importance. Bats are protected under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended).
Badgers	Local (Site)	Badgers and their setts are protected under the Protection of Badgers Act (1992). Evidence of badgers utilising the site for foraging and commuting were observed during the 2020 walkover survey.
Invertebrates	Local (Borough)	The presence of populations small heath butterfly on the site is considered possible. The species poor semi-improved grassland within the site is also likely to support a range of other notable invertebrate species. The likely invertebrate assemblage is considered of up to Local (Borough) importance for nature conservation.
Fox	Local (Site)	Foxes are not protected or priority species by as UK mammals are protected from unnecessary harm and suffering under the Animal Welfare Act 2006

Table 4.2: Summary of Nature Conservation Value of Ecological Receptors

5. ASSESSMENT OF POTENTIAL IMPACTS AND MITIGATION MEASURES

5.1 INTRODUCTION

This section describes predicted ecological impacts and resultant effects during both the construction and operational phases of the proposed development. The initial assessment of predicted effects takes into account mitigation by design, i.e. mitigation that forms an inherent part of the proposals but excludes any additional mitigation measures. Any further mitigation is then described, and an assessment of residual effects is presented. The assessment of impacts and effects has been informed by the documentation listed in Table 1.1.

This section is informed by the mitigation hierarchy, as described in Paragraph 175 of the National Planning Policy Framework and British Standard 42020:2013 (Biodiversity). The mitigation hierarchy states that impacts should be avoided where possible, with mitigation or compensation applied when avoidance is not viable.

The activities likely to have an impact on habitats and species can be split into construction phase impacts and operational phase impacts. During the construction phase of the scheme, the main activities on the site will include vegetation clearance, construction activities including ground works, the use of operational plant and machinery and associated vehicle movements. Impacts likely to arise from these activities could include loss, fragmentation and physical damage of habitat, hydrological changes and pollution, direct mortality of species and disturbance (physical disturbance, lighting and air pollution) of sites, habitats and species.

During the operational phase of the scheme, there will be an increase in people and vehicle movements within the site, increases in lighting and illumination and site maintenance activities. Potential impacts from these activities include disturbance (recreational, lighting and noise) and potentially the direct mortality of species.

5.2 MITIGATION BY DESIGN

As described in Section 5.1, any avoidance or mitigation that has been built into the design of the development is taken into account during the initial assessment of potential impacts and effects. Mitigation by design has been developed through consultation between the landscape design team and project ecologists, and includes:

- Retention of established mixed plantation woodland.
- Management of retained species poor semi-improved grassland and tall ruderal to allow succession into semi-improved neutral grasslands.

These measures have been included to avoid or minimise adverse ecological effects in the first instance.

5.3 ASSESSMENT OF CONSTRUCTION PHASE IMPACTS, EFFECTS AND ADDITIONAL MITIGATION MEASURES

5.3.2 Habitats (on-site)

Standing water (pond)

The small area of standing water will be destroyed to accommodate the development. The unavoidable, permanent loss of this habitat of up to Local (Borough) importance is considered to be an **adverse effect, of significance at the Local (Site) scale**. This loss of habitat cannot be avoided or directly mitigated for, however, compensation for this loss can be provided in the form of improvement of the SUDs into areas of standing water of high ecological value. Compensation is discussed in Chapter 6.

Mixed Plantation Woodland, Species Poor Semi-improved grassland

Small areas of plantation woodland and species poor semi-improved grassland will be destroyed to accommodate the development. Considered individually, the loss of these common, widespread habitats, which are of low ecological value and can easily be replaced, is of negligible significance. However, together, these habitats contribute to the structural diversity of the site and contribute to wildlife corridors in the local area, and their loss in combination is considered to be an **adverse effect, significant at the Local (Site) scale**. The loss of these habitats can be mitigated and compensated for through the improved management of the retained species poor semi-improved grassland and tall ruderal to allow succession into semi-improved neutral grasslands, a habitat of higher ecological value.

5.3.3 Protected/Notable Species

Bats

No bat roosts have been identified within the trees located on site, and as such, no direct impacts (i.e. killing, injury or loss of a roost) are anticipated as a result of the proposals.

No linear features which provide suitable bat foraging and commuting habitat will be impacted upon by the development.

Furthermore, subject to the implementation of suitable avoidance measures detailed in the EMS (RT-MME-153311-06), including control of construction phase lighting, adverse impacts associated with accidental illumination of suitable foraging habitat can be avoided, reducing any effects as a result of construction phase lighting to **no significant adverse effect**. The EMS can be secured by a suitably worded planning condition.

Badgers

No badger setts are located onsite or within 30m of the site boundary. Although suitable foraging habitat for badger will be lost to accommodate the proposed development, given the retention of the majority of suitable foraging habitat for this species within the site and the presence of suitable habitat within the surrounding landscape, it is considered unlikely that this habitat loss will not result in a noticeable effect on local populations of badger. The effect is assessed as being **not significant**.

General construction activities within the proposed development site are likely to include ground works, excavations and storage of materials which, left uncovered, could trap or injure badgers moving through the site. Injuries sustained could reduce badger foraging success over a temporary period. Harm to badgers in this manner could result in an **adverse effect, significant at the Local (Site) scale**.

However, this short-term effect is considered unlikely to lead to any significant change in the status of local badger populations and as such is considered to be **not significant**. The implementation of the measures outlined in the EMS (RT-MME-153311-06), which can be secured by planning condition, will ensure harm to badgers is avoided altogether during the construction phase of the proposed development.

Invertebrates

Site clearance during the construction phases of the proposed development will result in the loss of species poor semi-improved grassland, which may support small heath butterflies and other notable coleopteran and dipteran species. However, the majority of suitable habitat on site will be retained and additional areas of suitable habitat are present within the wider area. The temporary loss of habitat has the potential to result in minor shifts in the distribution of notable invertebrate populations, an **adverse effect, significant at the Local (Site) scale**.

New habitats will be created and existing habitats improved as part of the proposed development, including management of the species poor semi improved grassland and tall ruderal areas to deliver succession into semi-improved neutral grassland, compensating for the loss of suitable habitat for the small heath, coleopteran and dipteran species during construction. Compensation measures are discussed further in Chapter 6.

The vegetation clearance required to accommodate the works is also likely to result in the displacement of other invertebrates from the areas adjacent to the new car parking spaces, at least in the short term. However, similar habitat to that temporarily cleared is present in the wider landscape. The temporary loss of habitat may result in minor shifts in the distribution of local terrestrial invertebrate populations, but this **adverse effect** is considered to be **significant at no greater than the Local (Site) scale**.

New habitat creation and improvement of existing habitats as part of the proposed development, will compensating for the loss of suitable habitat for invertebrates during construction. Compensation measures are discussed further in Chapter 6.

Fox

General construction activities within the proposed development may result in harm to foxes in a manner considered an offence under the Animal Welfare Act 2006. The implementation of the measures outlined in the EMS (RT-MME-153311-06), which can be secured by planning condition, will ensure harm to foxes is avoided altogether during the construction phase of the proposed development.

5.4 ASSESSMENT OF OPERATIONAL PHASE IMPACTS, EFFECTS AND ADDITIONAL MITIGATION MEASURES

5.4.1 Habitats (on-site)

All Retained and Created Habitats

Units A and B are already in operation and the proposed development would increase its parking resource for site personnel. However, the completed development could be potentially associated with an increase in vehicular activity and personnel number onsite which could result in increased minor disturbance and degradation of retained or created habitats. In addition, without appropriate long-term management, the retained and created habitats could be subject to harmful succession (standing water) and become overgrown, potentially lowering their biodiversity value. Overall, these impacts could lead to a decline in the good condition of retained and created habitats, an **adverse effect, significant at the Local (Site) scale**.

However, the implementation of the measures detailed in the LEMO will ensure that retained and created habitats are appropriately managed so that their intended biodiversity value is achieved and maintained in the long-term, and **no significant residual effect** on retained and created habitats is anticipated.

5.4.2 Species

Bats

The use of lighting associated with the operational phase of the development may result in an increase in light spill on the planned semi-improved neutral grassland creation directly adjacent. This habitat offers some foraging potential for bat species. The species that would utilise the site most frequently (common and soprano pipistrelle and noctule) are not considered to be highly light sensitive species. It is anticipated that the minor increases in ground level lighting on the areas of habitat directly adjacent to the new proposed new car parking will result in **no significant effect** on the populations of common and less light-sensitive bat species that use the site.

Badgers

A small area of suitable foraging habitat for badger will be lost to accommodate the proposed development. However given the retention an improvement of the majority of suitable foraging habitat for this species within the sites and the presence of suitable habitat within the surrounding landscape, it is considered unlikely that this habitat loss will result in a noticeable effect on local populations of badger. The effect is assessed as being **not significant**.

Invertebrates

The completed development could be potentially associated with an increase in vehicular and human activity and personnel number onsite which could result in increased minor disturbance and degradation of retained or created habitats decreasing their value for supporting populations of small heath butterflies as well as notable Coleopterans and Diptera species. In addition, without appropriate long-term management, the retained and created habitats of greatest value to invertebrates (neutral grassland) could be subject to harmful succession and become overgrown, potentially lowering its biodiversity value. Overall, these impacts could lead to a decline in the good condition of retained and created habitats and a decline in the invertebrate populations these habitats support, an **adverse effect, significant at the Local (Site) scale**.

However, the implementation of the measures detailed in the LEMO will ensure that retained and created habitats are appropriately managed so that their intended biodiversity value is achieved and maintained in the long-term, and **no significant residual effect** on invertebrate populations is anticipated.

6. COMPENSATION AND ENHANCEMENT

6.1 INTRODUCTION

The CIEEM (2019) guidelines describe compensation as:

“...measures taken to make up for residual effects resulting in the loss of, or permanent damage to, ecological features despite mitigation. For example, it may take the form of replacement habitat or improvements to existing habitats. Compensation can be provided either within or outside the project site (defined by the red line of a planning application).”

The guidelines go on to state that:

“Where ecological equivalence can be delivered within the project site this is sometimes incorrectly considered mitigation rather than compensation. However, the correct distinction between mitigation and compensation is that mitigation reduces the extent of effects occurring and compensation addresses effects which are residual, after avoidance and mitigation have been considered. Measures to address impacts and effects that will occur should therefore be referred to as compensation whether the compensation is located within or outside of the project site.”

The CIEEM (2019) guidelines describe enhancement as:

“Enhancement is improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is ‘over and above’ that required to mitigate/compensate for an impact.”

6.2 COMPENSATION AND ENHANCEMENT

A series of habitat creation and improvement proposals have been incorporated into the design of the proposed development, providing both compensation and enhancement. The following habitats are proposed to be created:

- Standing water (pond)
- Semi-improved neutral grassland
- Plantation woodland

This will compensate for the combined loss of plantation woodland, standing water and species poor semi-improved grassland and bare ground during the construction phase of the development. A Biodiversity Impact Assessment (BIA) has been undertaken using the Warwickshire, Coventry & Solihull - Habitat Impact Assessment Calculator, which demonstrates that, subject to the delivery of this compensatory habitat, a biodiversity net-gain of 11.65 Biodiversity Units (BU) can be achieved, addressing the residual adverse effect which were significant at the Local (Site) scale. Refer to report RT-MME-153311-05 for further details.

The provision of new habitats (notably the semi-improved neutral grassland) will address the residual adverse effects of loss of suitable habitat for invertebrates (including Lepidoptera, Coleoptera and Diptera) which were significant at the Local (Site) scale.

6. CONCLUSIONS

6.1 SUMMARY OF ECOLOGICAL IMPACT ASSESSMENT

The tables in this section provide a summary of the Ecological Impact Assessment that has been undertaken for the construction and operational phases of the proposed development, respectively.

CONSTRUCTION PHASE							
Ecological Feature	Scale of Importance	Description of Impact/s <i>[Mitigation by Design]</i>	Likely Effect (accounting for mitigation by design)	Additional Mitigation Proposed and Mechanism to Secure	Residual Effect	Compensation / Enhancement	Overall Effect / Conclusion
Designated sites							
None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitats (on-site)							
Standing Water (Pond)	Local (Borough)	Loss of small area of poor-quality standing water <i>[No mitigation by design.]</i>	Adverse effect, significant at Local (Site) scale.	N/A	Residual adverse effect, significant at Local (Site) scale.	Creation of new area of standing water of higher biodiversity value	The establishment of compensatory / replacement habitats will address the residual adverse effect, ensuring no significant adverse effect in the medium to long term.
Mixed Plantation Woodland, Species Poor Semi-improved grassland & tall ruderal	Local (Site)	Loss of small areas of plantation woodland and species poor semi-improved grassland <i>[Retention of some suitable habitat.]</i>	Adverse effect, significant at Local (Site) scale.	N/A	Residual adverse effect, significant at Local (Site) scale.	Creation of new habitat and improvement or retained habitats incorporated into design of the proposed development, to deliver a net-gain to biodiversity value.	The establishment of compensatory / replacement habitats will address the residual adverse effect, ensuring no significant adverse effect in the medium to long term.

Table 6.1: Summary of Ecological Impact Assessment for Construction Phase (continues)

Ecological Feature	Scale of Importance	Description of Impact/s [<i>Mitigation by Design</i>]	Likely Effect (accounting for mitigation by design)	Additional Mitigation Proposed and Mechanism to Secure	Residual Effect	Compensation / Enhancement	Overall Effect / Conclusion
Protected/Notable Species							
Bats	Local (Borough)	Accidental illumination of suitable foraging [<i>lighting scheme to avoid unnecessary light spillage</i>]	Minor Adverse effect, significant at Local (Site) scale.	Suitable avoidance measures detailed in the EMS secured by planning condition	No significant adverse effect	N/A	N/A
Badger	Local (Site)	Accidental trapping or injury to badgers [<i>No mitigation by design.</i>]	Adverse effect, significant at the Local (Site) scale.	Suitable avoidance measures detailed in the EMS secured by planning condition	No significant adverse effect	N/A	N/A
Invertebrates	Local (Site)	Loss of suitable habitat [<i>Retention of some suitable habitat.</i>]	Adverse effect, significant at the Local (Site) scale.	N/A	Residual adverse effect, significant at Local (Site) scale.	Improvement or retained habitats incorporated into design of the proposed development, to deliver higher quality habitats suitable for invertebrate usage	The establishment of compensatory / replacement habitats will address the residual adverse effect, ensuring no significant adverse effect in the medium to long term.
Fox	Local (Site)	Unnecessary harm and suffering to a mammal species [<i>No mitigation by design.</i>]	adverse effect, significant at the Local (Site) scale.	Suitable avoidance measures detailed in the EMS secured by planning condition	No significant adverse effect	N/A	N/A

Table 6.1 (continued): Summary of Ecological Impact Assessment for Construction Phase

OPERATIONAL PHASE							
Ecological Feature	Scale of Importance	Description of Impact/s <i>[Mitigation by Design]</i>	Likely Effect (accounting for mitigation by design)	Additional Mitigation Proposed and Mechanism to Secure	Residual Effect	Compensation / Enhancement	Overall Effect / Conclusion
Designated Sites							
None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitats (on-site)							
All retained and newly created habitats	Local (Site) – Local (Borough)	Effect of increased disturbance and inappropriate management resulting in minor loss and/or degradation of habitats. <i>[No mitigation by design.]</i>	Adverse effect, significant at Local (Site) scale.	Habitat management measures outlined in LEMO. Secured via planning condition.	No significant residual effect.	N/A	No significant residual effect.
Protected/Notable Species							
Bats	Local/Borough	None	No significant effect	N/A	N/A	N/A	No significant effect.
Badgers	Local (Site)	None	No significant effect	N/A	N/A	N/A	No significant effect.
Invertebrates	Local (Site)	Loss of suitable habitat <i>[Retention of some suitable habitat.]</i>	adverse effect, significant at the Local (Site) scale.	N/A	Residual adverse effect, significant at Local (Site) scale.	Improvement or retained habitats incorporated into design of the proposed development, to deliver higher quality habitats suitable for invertebrate usage	The establishment of compensatory / replacement habitats will address the residual adverse effect, ensuring no significant adverse effect in the medium to long term.
Fox	N/A	none	N/A	N/A	N/A	N/A	N/A

Table 6.2: Summary of Ecological Impact Assessment for Operational Phase

Ecological Impact Assessment

7. DRAWINGS

C153311-04-01: Statutory Nature Conservation Sites & None-Statutory Nature Conservation Sites


C153311-04-02: Phase 1 Habitat map of Site

C153311-Ponds: Great Crested Newt HIS Assessment Locations map

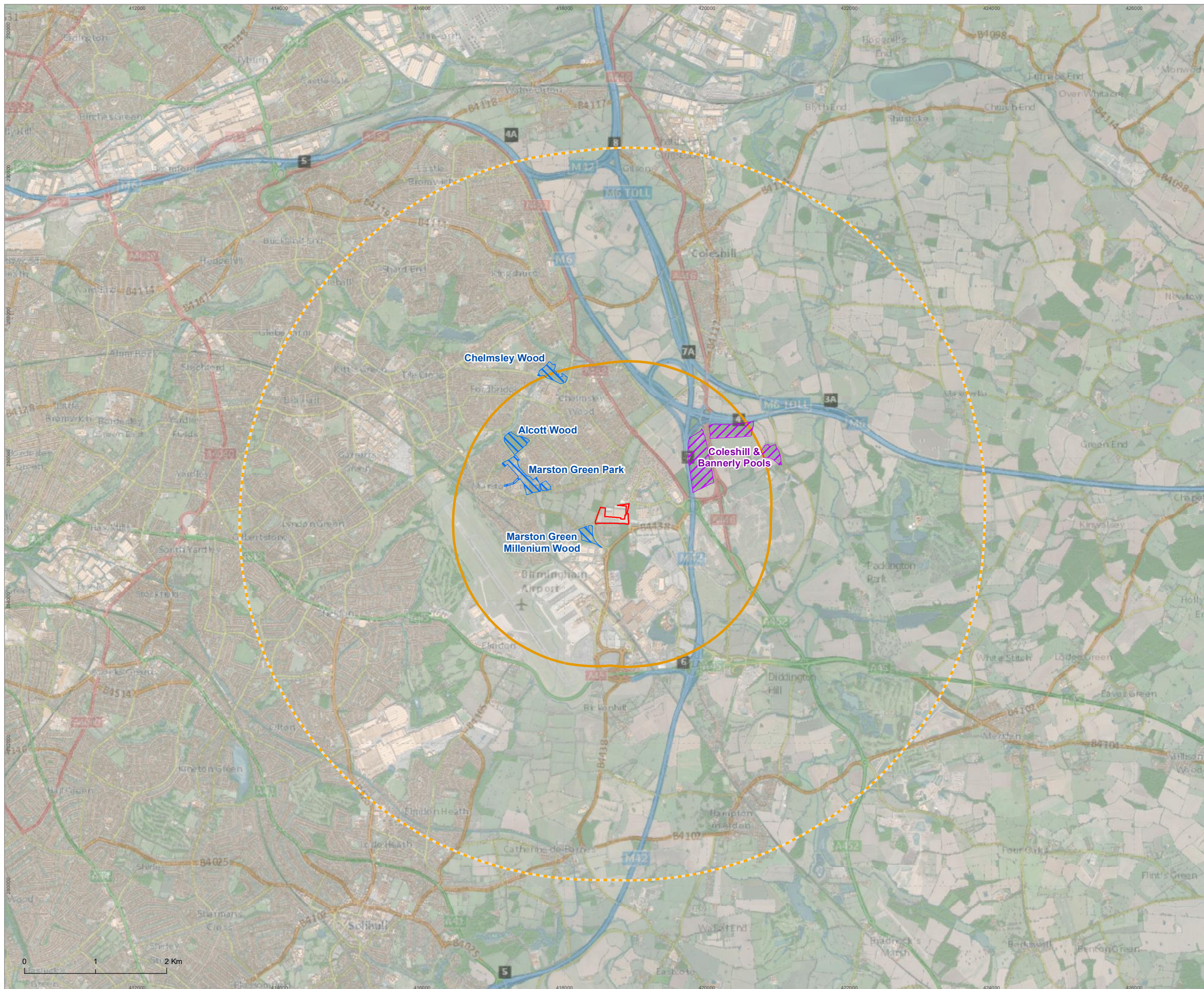
Local Records Centre Summary of Species

Local Records Centre Summary of Species, Badgers (Confidential, supplied separately)

Legend

-  Site boundary
-  Local Nature Reserve (LNR)
-  Site of Special Scientific Interest (SSSI)
-  2 km radius from site boundary
-  5 km radius from site boundary

Note: No records of European statutory sites (Natura 2000) were found within 5 km radius from site.



Project Car Parking DC1 & DC2, Prologis Park, Birmingham Interchange, Blackfirs Lane, Solihull

Drawing European (Natura 2000) & UK Statutory Sites

Client CBRE Ltd

Drawing Number	C153311-04-01	Revision	00
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Scale @ A3	1:50000	Date	October 2020
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Approved By	CW	Drawn By	VO/CD
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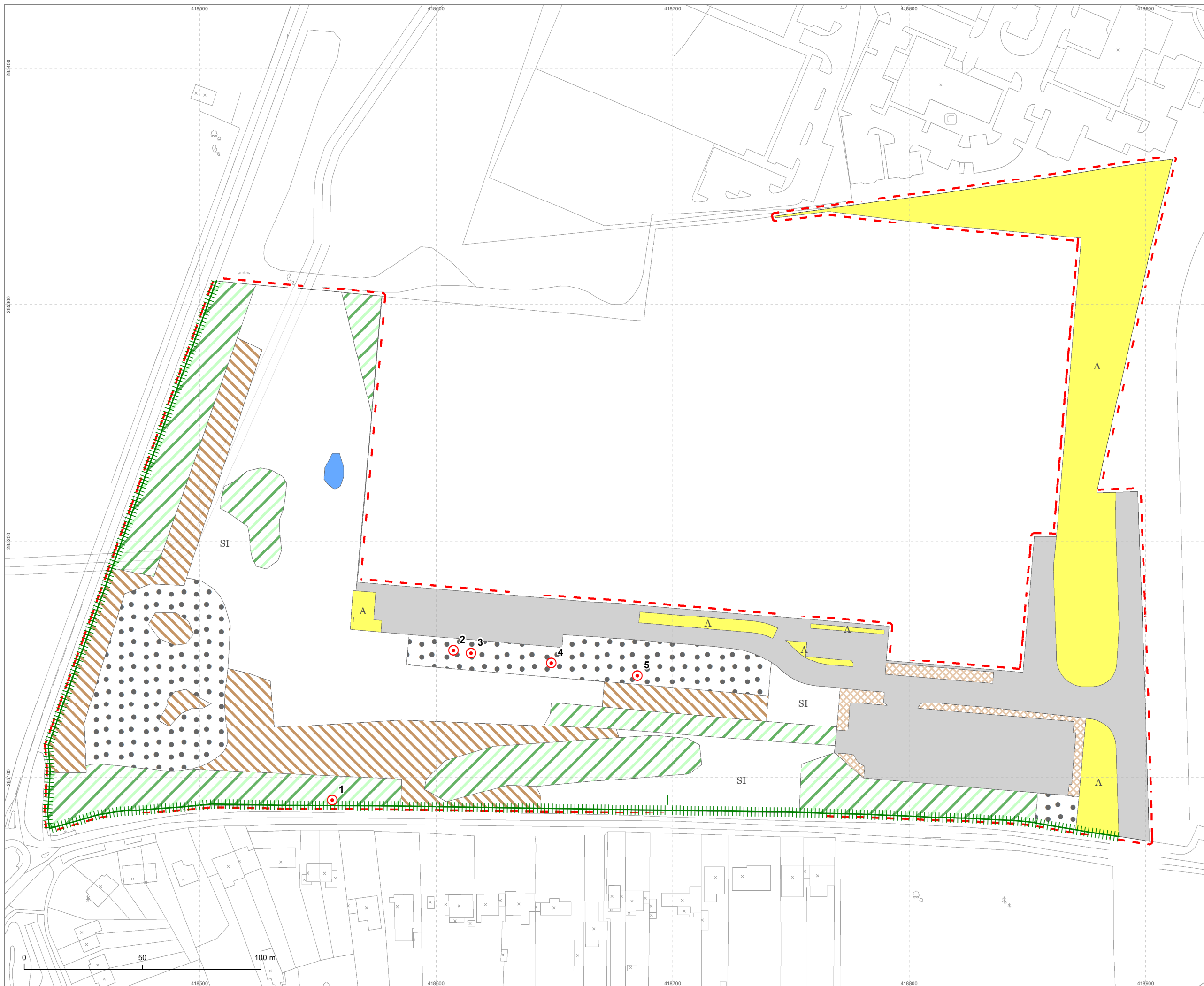


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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Legend

- - - Site boundary
- Species-poor hedgerow with trees
- Amenity grassland
- Bare ground
- Building
- Hardstanding
- Introduced shrub
- Mixed plantation woodland
- Poor semi-improved grassland
- Standing water
- Tall ruderal
- Target note



Project
Prologis Park, Birmingham Interchange

Drawing
Phase 1 Habitat Map

Client
IAC Group c/o CBRE

Drawing Number
C153311-04-02

Revision
00

Scale @ A3
1:1,500

Date
December 2020

Approved By
CW

Drawn By
VO

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C153311-Ponds

Legend

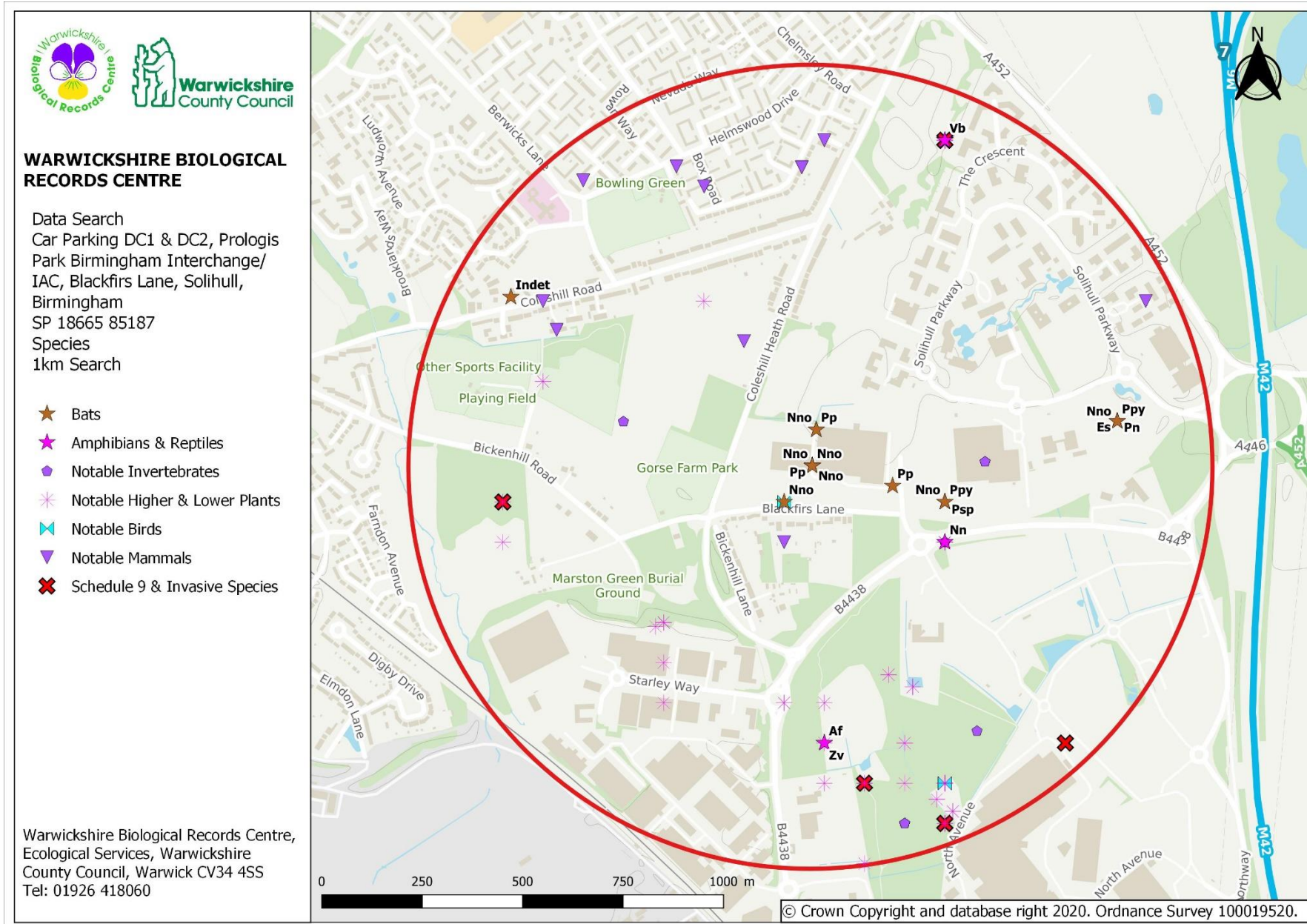
- Site boundary
- 250m from site boundary
- 500m from site boundary
- Terrestrial barrier to GCN movement
- Waterbody subject to HSI assessment
- Waterbody not surveyed

Project		Prologis Park, Birmingham Interchange	
Drawing		Pond HSI Assessment	
Client		IAC Group c/o CBRE	
Drawing Number	Revision	00	
Scale @ A3	Date	September 2020	
Approved By	Drawn By	VO	
		CW	

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APPENDIX

Appendix 1: Habitat Suitability Index Assessment: Methodology & Results



Great Crested Newt Habitat Suitability Index

May 2010

Background

The Habitat Suitability Index (HSI) for the great crested newt was developed by Oldham *et al.* (2000). HSI scoring systems were originally developed by the US Fish and Wildlife Service as a means of evaluating habitat quality and quantity. An HSI is a numerical index, between 0 and 1. Values close to 0 indicate unsuitable habitat, 1 represents optimal habitat. The HSI for the great crested newt incorporates ten suitability indices, all of which are factors known to affect this species. These ten suitability indices are retained in this current Advice Note.

In the HSI system proposed by Oldham *et al.* (2000) one of the suitability indices (SI₁, terrestrial) involves more lengthy measurement and calculation than the others. In using the HSI system with volunteer surveyors in Kent, Lee Brady has substituted a simpler evaluation of terrestrial habitat quality (a four-point scale), for ease of use.

Several other, local, surveys have utilised the HSI, but incorporating their own variations on the original system. In 2007 a workshop was held at the Herpetofauna Workers' Meeting to evaluate the use of the HSI for the great crested newt, with the aims of:

- Identifying components of the system that may need clarification or refinement
- Agreeing on a standard that can readily be used by volunteers and professionals alike.

The outputs of the workshop and subsequent consultation have been used to formulate the current Advice Note. As far as possible a conservative approach has been adopted in modifying the use of the original HSI suitability indices. However, a major departure is the adoption of Lee Brady's four-point evaluation of terrestrial habitat. This differs from the original HSI in that it has been developed with respect to newt presence/absence at a pond, rather than estimating population size.

Use and limitations of the HSI

The HSI for great crested newts is a measure of habitat suitability. **It is not a substitute for newt surveys.** In general, ponds with high HSI scores are more likely to support great crested newts than those with low scores. However, the system is not sufficiently precise to conclude that any particular pond with a high score will support newts, or that any pond with a low score will not do so.

There is a positive correlation between HSI scores and the numbers of great crested newts observed. In general, high HSI scores are likely to be associated with greater numbers of great crested newts. The relationship is not sufficiently strong, however, to allow estimations of the numbers of newts in any particular pond.

HSI scoring can be useful in:

- Evaluating the general suitability of a pond, or ponds, for great crested newts
- Comparing general suitability of ponds across different areas
- Evaluating the suitability of receptor ponds in a proposed mitigation scheme
- Identifying habitat management priorities.

How to collect data and calculate the HSI

The HSI is a geometric mean of ten suitability indices:

$$\text{HSI} = (\text{SI}_1 \times \text{SI}_2 \times \text{SI}_3 \times \text{SI}_4 \times \text{SI}_5 \times \text{SI}_6 \times \text{SI}_7 \times \text{SI}_8 \times \text{SI}_9 \times \text{SI}_{10})^{1/10}$$

- Ten factors are scored for a pond, in the field and from map work (field scores).
- The ten field scores are converted to SI scores, on a scale from 0.01 to 1 (0.01 is used as the lower end of the scale in stead of 0, because multiplying by 0 reduces all other SI scores to 0).
- The ten SI scores are multiplied together.
- The tenth root of this number is calculated ($x^{1/10}$) i.e. x to the power of 0.1.

The calculated HSI for a pond should score between 1 and close to 0 (the calculations above do not allow the HSI to be exactly 0).

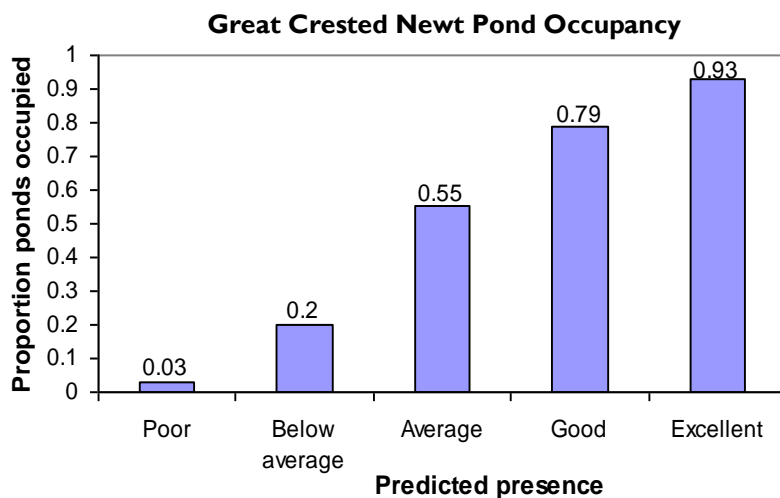
Some of the field scores are categorical, some are numerical. The numerical field scores are converted to SI scores by reading off the values from graphs produced by Oldham *et al.* (2000) reproduced in this Advice Note.

Full details of the scoring system, including descriptions of the criteria used in the categorical scores are given in *Details of suitability indices and definitions of categories* (below). Scores for two of the factors (SI₁ and SI₈) can be gained as desktop/map exercises and so do not have to be completed in the field. The remaining factors should be recorded as field scores, and later converted to suitability indices, in some cases reading SI scores from the graphs provided. A summary of data to collect is given in the appendix *Summary of scoring system*.

Categorisation of HSI scores

Lee Brady has developed a system for using HSI scores to define pond suitability for great crested newts on a categorical scale:

HSI	=	Pond suitability
< 0.5	=	poor
0.5-0.59	=	below average
0.6-0.69	=	average
0.7-0.79	=	good
> 0.8	=	excellent



The graph shows occupancy of ponds by great crested newts in south-east England. 248 ponds were surveyed on three to six occasions, using egg-searching, torching and bottle-trapping. As pond suitability increases from 'poor' to 'excellent', so does the proportion of ponds occupied by great crested newts.

Details of suitability indices and definitions of categories

Factor 1. Geographic location (SI₁)

Sites should be scored according to the zone in which they occur. This scoring can be carried out either in the field, or as part of a desktop exercise.

Zone A, location is optimal, SI = 1

Zone B, location is marginal, SI = 0.5

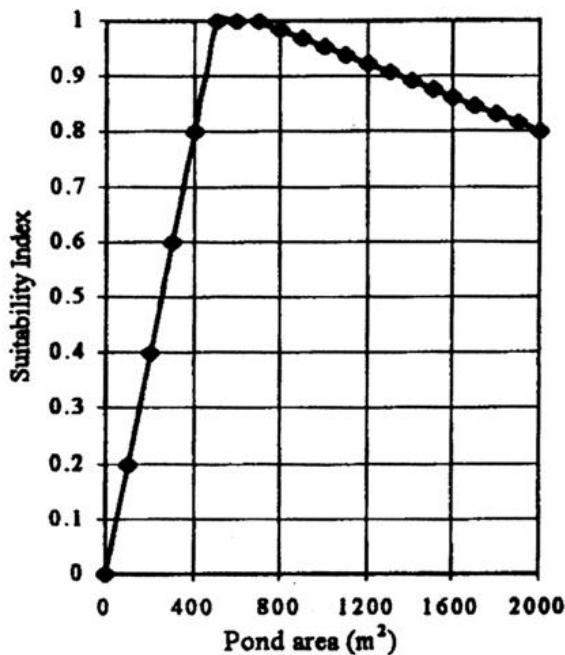
Zone C, location is unsuitable, SI = 0.01.

Some sites will fall on boundary lines between zones. In such cases, select medium-value scores i.e. Zone B.



Factor 2. Pond area

Pond area is the surface area of the pond when water is at its highest level (excluding flooding events). This is usually in the spring. If the pond is being measured at another time of year, the spring time area should still be evident from vegetation types and evidence of a draw down zone around the pond.



Pond area should be measured as accurately as possible. There are several ways of doing this, for example by measuring axes of regularly shaped ponds, either by pacing out in the field, or taking measurements from a map. Irregularly shaped ponds may have to be treated as a series of geometric shapes, calculating the area for each and adding together.

Since it can be difficult reading off SI scores from the graph, pond area should be rounded to the nearest 50 m².

It can be particularly difficult to read off SI scores for very small ponds. For ponds smaller than 50 m² use a score of 0.05.

For ponds larger than 2000 m² omit this factor from the HSI calculation (as there are no data for such large ponds).
i.e. $HSI = (SI_1 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/9}$.

Factor 3. Permanence

Pond permanence should be deduced from local knowledge and personal judgement. A landowner may know how often a pond dries. However, if not, the surveyor should make a judgement based on water level at the time of the survey, and taking seasonality into consideration. For example, a pond that is already dry by late spring is likely to dry out every year, etc.

Category	SI	Criteria
Never dries	0.9	Never dries.
Rarely dries	1.0	Dries no more than two years in ten or only in drought.
Sometimes dries	0.5	Dries between three years in ten to most years.
Dries annually	0.1	Dries annually.

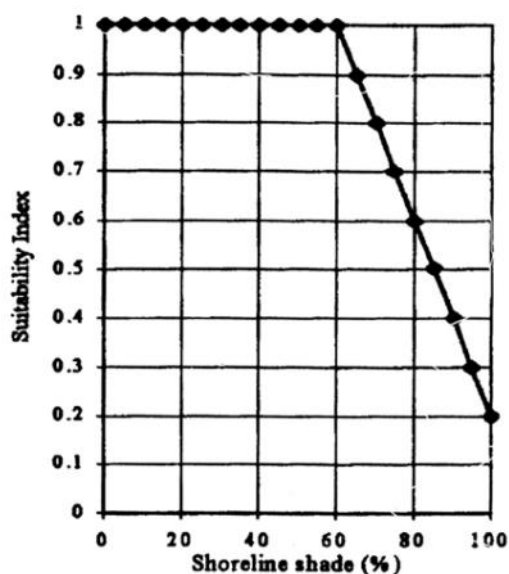
Factor 4. Water quality

The assessment of water quality is subjective and should be based on invertebrate diversity, the presence of submerged water plants and knowledge of the water sources feeding the pond. Water quality should not be confused with water clarity. Sometimes clear water can be devoid of invertebrates, and turbid ponds can support a wealth of invertebrates. There is no quick and simple invertebrate index of water quality. However, some species are indicators of water quality.

Category	SI	Criteria
Good	1.0	Water supports an abundant and diverse invertebrate community. Netting reveals handfuls of diverse invertebrates, including groups such as mayfly larvae and water shrimps.
Moderate	0.67	Moderate invertebrate diversity
Poor	0.33	Low invertebrate diversity (e.g. species such as midge and mosquito larvae). Few submerged plants.
Bad	0.01	Clearly polluted, only pollution-tolerant invertebrates (such as rat-tailed maggots), no submerged plants.

Other cues may also provide information about water quality. For example, ponds subject to agricultural inputs are likely to have poor water quality.

Factor 5. Shade



Estimate percentage pond perimeter shaded, to at least 1 m from the shore. Shading is usually from trees, but can include buildings. Shading should not include emergent pond vegetation. The estimate should be made during the period from May to the end of September.

Factor 6. Waterfowl

This factor is concerned with the impact of waterfowl upon the pond and newts. At high densities, as created when waterfowl are encouraged to use a pond by provision of food, the birds can remove all aquatic vegetation, pollute water and persistently stir sediments. Some waterfowl may also actively hunt adult newts and their larvae. Score as one of three categories.

Category	SI	Criteria
Absent	1	No evidence of waterfowl impact (moorhens may be present).
Minor	0.67	Waterfowl present, but little indication of impact on pond vegetation. Pond still supports submerged plants and banks are not denuded of vegetation.
Major	0.01	Severe impact of waterfowl. Little or no evidence of submerged plants, water turbid, pond banks showing patches where vegetation removed, evidence of provisioning waterfowl.

'Waterfowl' includes most water birds, such as ducks, geese and swans. Moorhens should be excluded because almost every pond has at least one or two.

Factor 7. Fish

Information on fish should be gleaned from local knowledge and the surveyor's own observations. Pond owners will usually be aware of stocking with fish for commercial or aesthetic reasons. However, stickleback (which can be significant predators of great crested newt larvae, when present in large numbers) are unlikely to be deliberately introduced to a pond, but may arrive through other means. Netting is useful in detecting smaller fish, such as sticklebacks, or the fry of larger species.

Category	SI	Criteria
Absent	1	No records of fish stocking and no fish revealed by netting or observed by torchlight.
Possible	0.67	No evidence of fish, but local conditions suggest that they may be present.
Minor	0.33	Small numbers of crucian carp, goldfish or stickleback known to be present.
Major	0.01	Dense populations of fish known to be present.

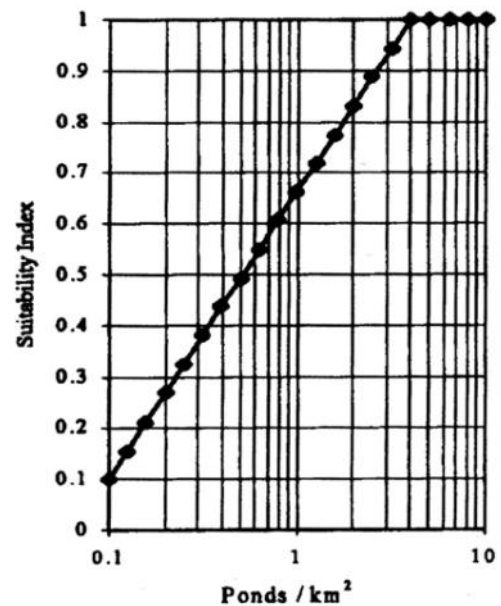
Factor 8. Pond count

This is the number of ponds occurring within 1 km of survey pond. Do not count the survey pond itself. Ponds on the far side of major barriers, such as main roads, should not be counted. Use 1:25,000 scale O.S. data, such as Explorer maps, GIS or web-based mapping sources, such as:

Getamap www.ordnancesurvey.co.uk/oswebsite/getamap/
 Magic www.magic.gov.uk/site_map.html
 Digimap edina.ac.uk/digimap/

Pond counts can be carried out a by a survey coordinator and so do not necessarily have to be performed by surveyors.

Divide the number of ponds by π (3.14) to calculate the density of ponds per km² and read off the SI value from graph.



Factor 9. Terrestrial habitat

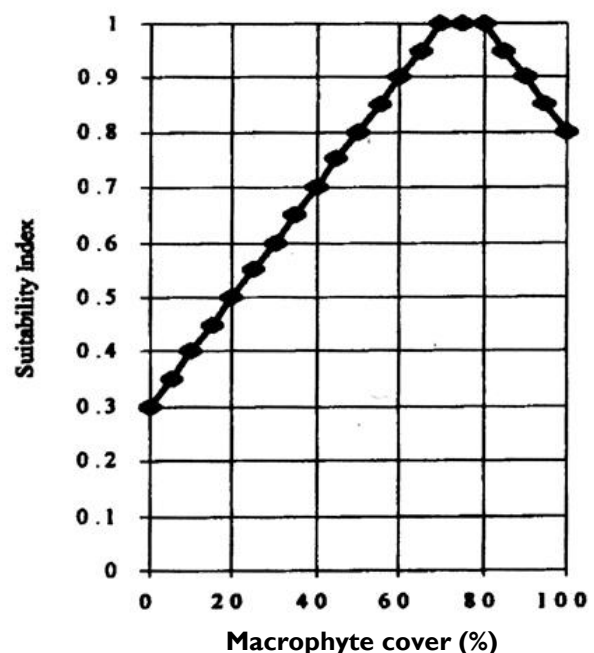
Scoring terrestrial habitat depends on the surveyor’s understanding of newt habitat quality. Good terrestrial habitat offers cover and foraging opportunities and includes meadow, rough grassland with tall sward height, scrub, woodland or mature gardens. Terrestrial habitat should be considered within approximately 250 m from the pond, but only on the near side of any major barriers to dispersal (e.g. main roads or large expanses of bare habitat).

Category	SI	Criteria
Good	1	Habitat that offers good opportunities for foraging and shelter (e.g. most semi-natural environments, such as rough grassland, scrub or woodland, also brownfield sites and low intensity farmland) covers more than 75% of available area.
Moderate	0.67	Habitat offers opportunities for foraging and shelter but may not be extensive (25-75%) of available area.
Poor	0.33	Habitat with poor structure (e.g. amenity grassland, improved pasture and arable) that offers limited opportunities (less than 25% of available area) for foraging and shelter.
None	0.01	No suitable habitat around pond (e.g. centre of arable field or large expanse of bare habitat).

Great crested newts do not have specific terrestrial habitat requirements. However, good quality terrestrial habitat has structure. The presence of hedges, ditches, stone walls, old farm buildings, piles of loose stone or rock, rabbit burrows and small mammal holes all contribute towards ‘good’ terrestrial habitat. Note that it is rare to encounter a pond falling within the terrestrial habitat category of ‘none’.

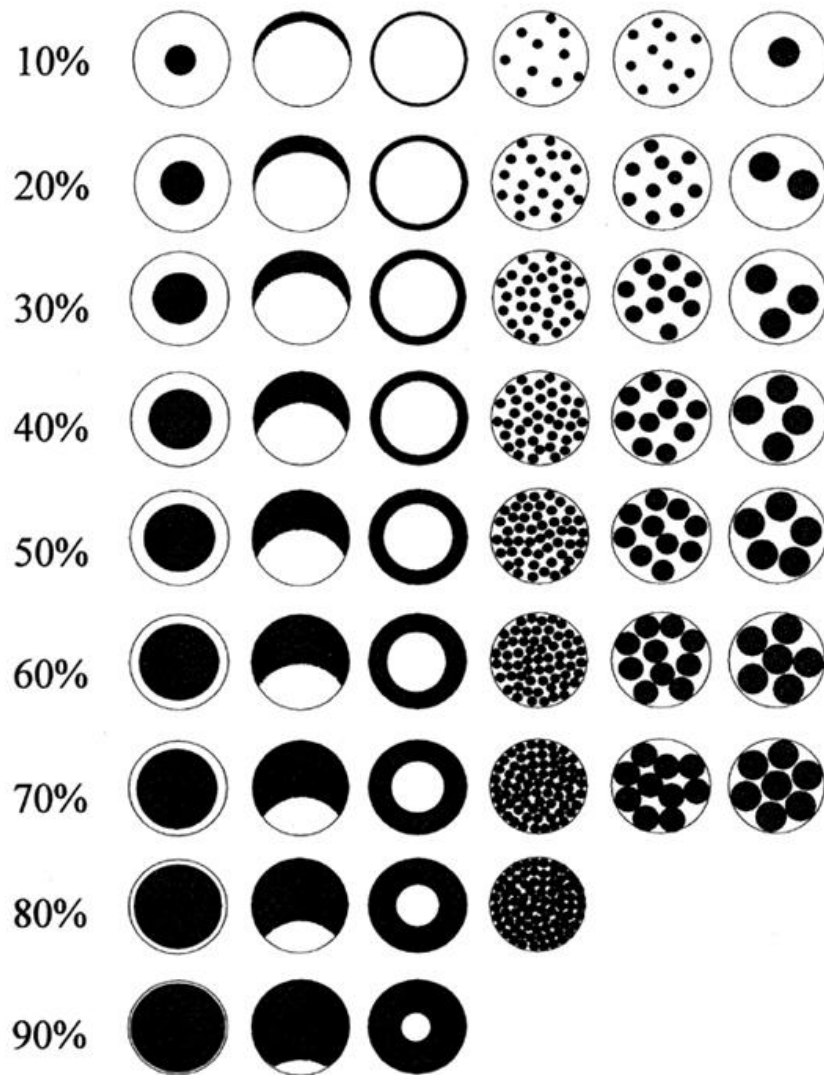
Factor 10. Macrophytes

Estimate the percentage of the pond surface area occupied by macrophyte cover. This includes emergents, floating plants (excluding duckweed) and submerged plants reaching the surface. Make an estimate between March and the end of September. Read off the SI value from graph.



Guide for assessment of macrophyte cover in a pond

The areas of dark shading simulate a variety of vegetation dispersion patterns.



Reference

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

This Advice Note is an output from a workshop held at the Herpetofauna Workers' Meeting in January 2007. ARG UK is grateful to Lee Brady, Rob Oldham, David Sewell and John Baker for leading the workshop and/or contributing to this note, and workshop participants for providing useful suggestions. ARG UK is also grateful to the British Herpetological Society for permission to use graphics from the original paper on HSI, published in the *Herpetological Journal*.

This Advice Note can be downloaded from the ARG UK website www.arguk.org and should be cited as: ARG UK (2010). ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom.

Publication date: May 2010.

ARG UK is the network of volunteer conservation groups concerned with the native amphibians and reptiles of the UK.



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Summary of scoring system

SI₁ Location

Field score	SI
A (optimal)	1
B (marginal)	0.5
C (unsuitable)	0.01

SI₂ Pond area

Field score	SI
Measure pond surface area (m ²) and round to nearest 50 m ²	Read off graph.

SI₃ Pond drying

Field score	SI	Criteria
Never	0.9	Never dries
Rarely	1.0	Dries no more than two years in ten or only in drought.
Sometimes	0.5	Dries between three years in ten to most years
Annually	0.1	Dries annually

SI₄ Water quality

Field score	SI	Criteria
Good	1.0	Abundant and diverse invertebrate community.
Moderate	0.67	Moderate invertebrate diversity
Poor	0.33	Low invertebrate diversity, few submerged plants
Bad	0.01	Clearly polluted, only pollution-tolerant invertebrates, no submerged plants.

SI₅ Shade

Field score	SI
Estimate percentage perimeter shaded to a least 1 m from shore.	Read off graph.

SI₆ Fowl

Field score	SI	Criteria
Absent	1	No evidence of water fowl (although moorhen may be present)
Minor	0.67	Waterfowl present, but little sign of impacts
Major	0.01	Severe impact of waterfowl

SI₇ Fish

Category	SI	Criteria
Absent	1	No records of fish stocking and no fish revealed during survey.
Possible	0.67	No evidence of fish, but local conditions suggest that they may be present.
Minor	0.33	Small numbers of crucian carp, goldfish or stickleback known to be present.
Major	0.01	Dense populations of fish known to be present.

SI₈ Pond count

Field score	SI
Count the number of ponds within 1 km of the survey pond (not separated by major barriers) and divide by 3.14. This can be done from maps rather than in the field.	Read off graph.

SI₉ Terrestrial habitat

Category	SI
Good	1
Moderate	0.67
Poor	0.33
None	0.01

SI₁₀ Macrophytes

Field score	SI
Estimate the percentage of the pond surface area occupied by macrophyte cover (between May and the end of September)	Read off graph.

GCN Surveys - Habitat Suitability Index Tables

Report Ref: RT-MME-153311-04

Site Name: Car Parking DC1 & DC2, Prologis Park Birmingham Interchange, Blackfirs Lane, Solihull

Pond ref	Pond 1	Pond 2	Pond 3	Pond 4	Ditch 1	Pond 5	Pond 6	Pond 7	Pond 8
SI1 - Location	1	1	1	1	1	1	n/a	n/a	n/a
SI2 - Pond area	0.7	0.7	1	0.4	0.4	0.05	n/a	n/a	n/a
SI3 - Pond drying	0.9	0.9	0.9	0.9	0.1	0.1	n/a	n/a	n/a
SI4 - Water quality	0.33	0.33	0.01	0.33	0.33	0.33	n/a	n/a	n/a
SI5 - Shade	0.6	1	0.5	1	0.2	1	n/a	n/a	n/a
SI6 - Fowl	0.67	0.67	0.01	0.01	1	1	n/a	n/a	n/a
SI7 - Fish	0.01	0.01	0.01	0.67	1	1	n/a	n/a	n/a
SI8 - Ponds	1	1	1	1	1	1	n/a	n/a	n/a
SI9 - Terr'l habitat	0.33	0.35	0.33	0.33	0.67	0.33	n/a	n/a	n/a
SI10 - Macrophytes	0.3	0.3	0.3	0.4	0.3	0.3	n/a	n/a	n/a
HSI	0.39	0.41	0.18	0.40	0.47	0.42	n/a	n/a	n/a

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