

Heyford Park - North

Ecological Impact Assessment (EclA)



Client:

Richborough Estates Ltd. and
Lone Star Land

Report Reference:

RSE_5021_R1_V1_ECIA

Issue Date:

December 2021

PROJECT

Client: Richborough Estates Ltd. and Lone Star Land

Project: Heyford Park - North

Reference RSE_5021_R1_V1_ECIA

Report Title Ecological Impact Assessment

DOCUMENT CONTROL

Originated: **Athina Constantinou** Ecologist 12/10/2021
 MSc BSc (Hons)
 ACIEEM

Technical Reviewed: **Beth Jasper** BSc (Hons) Principal Ecologist 01/12/2021

Approved for Issue **Anthony Mellor** BSc Director 17/12/2021
 (Hons) MSc ACIEEM
 AMICE

Revisions:

East Midlands: West Midlands: Yorkshire

Switch board 0115 930 2493: info@rammsanderson.com: www.rammsanderson.com

DISCLOSURE:

The information provided within this report has been prepared and provided as true and in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. It is intended for the sole use of the Client and their agents in accordance with the agreement under which our services were performed. Unauthorised communication, reproduction or usage of this report by any party other than the aforementioned is prohibited. No warranty, express or implied, is made as to the advice in this report or any other service provided by RammSanderson Ecology Ltd. This report has been prepared by an ecological specialist and does not purport to provide legal advice. RammSanderson is a trading name of RammSanderson Ecology Limited, as registered in England & Wales (Company No.: 8999992).



1 EXECUTIVE SUMMARY

1.1 Background

i RammSanderson Ecology Ltd was instructed by Richborough Estates Ltd. and Lone Star Land to carry out an Ecological Impact Assessment (EclA) at land off Camp Road, Upper Heyford, Bicester, Oxfordshire, to assess the likely significant effects of the project on all ecological features. This report will be used to inform a planning proposal for an outline planning application for the erection of up to 230 dwellings, creation of new vehicular access from camp road and all associated works.

ii The site was located to the north of Camp Road. It comprised of ephemeral vegetation, amenity grassland, improved grassland, broadleaved plantation woodland, dense and scattered scrub, broadleaved scattered trees, poor semi-improved grassland, tall ruderal, inundation vegetation, standing water, intact species-poor hedgerow, intact species poor with trees, dry and wet ditch, running water, buildings and bare ground.

1.1.2 Designated Sites

iii No significant impacts upon designated sites is anticipated as a result of the proposals. Furthermore, the site is located within the Impact Risk Zone of Bestmoor SSSI and Ardley Cutting and Quarry SSSI within 5km. The site proposals are not of a type that are likely to impact the designated sites. However, if proposals change and discharge of water or liquid waste of more than 20m³/day to ground (ie to soakaway) or to surface water, such as a stream then this would need to be investigated further. Outflow is proposed from the site to the stream on site. The watercourses on site are not directly linked to any of the designated sites. Furthermore, The Heath DWSC non-statutory site was located 20m east from the site and Trackway Adjacent to Gorse DWSC was located 50m south of the site. Provided that mitigation is followed, it is not considered that site proposals will have an impact on these sites.

1.1.3 Habitats

iv A single Habitat of Principal Importance was recorded on Site (hedgerow). No more than 20m of hedgerow length is proposed to be removed from each hedgerow as part of the site proposals. Therefore, no further hedgerow surveys were considered necessary for this site. Habitats on site that offer ecological value including the broadleaved plantation woodland, ponds and running water are retained as part of the site proposals. Four HPI habitats were located within close proximity to the site with the closest habitat including an Open Mosaic Habitats on Previously Developed Land located adjacent to the north of the site. It is recommended that a Construction Environmental Management Plan (CEMP) is provided to manage impacts on these HPI's from site proposals. Horsetail was located on site and this should be controlled and treated if it is to be impacted by site works.

1.1.4 Great Crested Newt (GCN)

v Four ponds were located on site (P1-P4), with P5 located within 500m. Previous presence/absence GCN surveys were conducted in 2018 by 4 Acre Ecology Limited which confirmed all four ponds having GCN breeding populations. Furthermore, eDNA and H.S.I. surveys were conducted on site in 2021. P2 was identified as having a positive Edna result which indicated GCN presence, the remaining ponds were returned with negative e-DNA results. Ponds P2-P4 were identified as 'Excellent' with P1 identified as 'Good' within the H.S.I. assessment. Habitats on site including scrub, woodland, scattered trees, poor semi-improved grassland, inundation vegetation and marginal vegetation are suitable for terrestrial phase GCN. These ponds are to be retained but development works are to be completed within close proximity to the ponds. Therefore, a district GCN licence application is recommended prior to works commencing on this site.

1.1.5 Bats

- vi Two moderate bat roosting potential trees were present on site and will be retained as part of the site works. A root protection zone is recommended to be installed on these two trees in line with the Preliminary Arboricultural Impact Assessment report from Tyler grange (Ref: '13464_R05_LS_TW'). Two buildings were present on site, of negligible bat roosting potential.
- vii The primary foraging and commuting routes for bats are considered to be the sites hedgerow habitats and woodland which are largely being retained. Loss of a small amount of scrub, improved grassland and ephemeral vegetation is considered to have negligible impact on bat foraging locally (this habitat was assessed as moderate quality). However, to prevent adverse impacts on bat activity within the area, a lighting strategy for the site is recommended to be sympathetic to nocturnal fauna.

1.1.6 Birds

- viii A nesting red kite nest was present on site in 2021. This is a Schedule 1 species. If site works are to be undertaken within the breeding bird season, then a buffer of 250m should be maintained from the red kite nest where work should not be undertaken. If site works are to be undertaken outside of the breeding bird season, then the buffer from the nests could be reduced depending on red kite activity on the nest. Further red kite surveys are recommended on site to be undertaken in the spring, once detailed design is available for the site development, to determine the location and usage of the red kite nests on site prior to site works commencing.
- ix The desk study results produced mostly records of common and widespread species. Therefore, further surveys for breeding birds were deemed disproportionate. As such impacts upon breeding birds are anticipated to be negligible. Any maintenance / pruning works on hedgerows should be completed outside of the bird nesting season (which is considered to be March to September inclusive).

1.1.7 Reptiles

- x The overall site was considered to be value for reptiles. No reptile surveys are required due to the connectivity of the site to wider surrounding suitable reptile habitats. Reptile records were returned within the desk study. The closest reptile record returned from the desk study included a grass snake and a common lizard 79m northeast of the site. Therefore, impacts are likely for foraging and commuting reptiles in the absence of mitigation. A Precautionary Method of Works (PMW) is recommended to be produced and followed during site works.

1.1.8 Water Vole, Otter and White-Clawed Crayfish

- xi A stream and a flowing ditch were located on site. A water vole survey was conducted on site and no water vole signs were identified on site. Current proposals include a discharge to the watercourse of up to 18m³/day. Once detailed drainage design is available, a water vole pre-commencement survey would be recommended on this stream. The stream is unsuitable for otters and white clawed crayfish.

1.1.9 Badgers

- xii No setts or field signs were recorded on Site. However, badgers may access the Site for foraging or commuting to alternative feeding areas. Best practice with regard to badgers should be followed during construction to minimise injury.
- xiii Taken in combination with other developments locally, the loss of foraging habitat is likely to be negligible.

1.1.10 Principal Species

- xiv The Site contains suitable habitat for hedgehog and common toad. Both these species are Species of Principal Importance (NERC Act, 2006). The risk of injury to these species should be minimised during construction following a Precautionary Method of Works (PMW) to make impacts to these species negligible. The site habitats are suitable for terrestrial invertebrates and four invertebrate surveys were conducted. The site was found to be of importance for terrestrial invertebrates and enhancements/habitat creation is recommended to benefit terrestrial invertebrates.

1.1.11 Biodiversity

- xv Extensive landscaping and habitat creation are proposed to replace the habitat to be lost. The biodiversity metric results indicated a habitat net gain of 12.37% and a hedgerow net gain of 38.26%. Therefore, post development there will be a significant positive impact on biodiversity. A River Condition Assessment on the stream and ditches were not conducted on this site due to the development being in the feasibility stage, the stream and ditches on site being retained and the overall habitat net gain on site not being affected by the river assessment, it is not considered necessary for the river assessment to be conducted at this stage of the development. It is recommended that a river condition assessment is conducted once detailed design for the site proposals are available.

1.1.12 Compensation and Enhancements

- xvi Retention and enhancements of the hedgerow habitats, through implementing of additional native planting would benefit local flora and fauna through the improvement of ecological corridors. Retention and enhancement of woodland on site. Retention and enhancement of amenity grassland to create wildflower meadows. Creation of three Sustainable drainage system (SuDS) ponds on site. Creation of mixed scrub areas with native tree planting. Additional enhancements easily achievable within the development are the incorporation of bat and bird nesting boxes, situated within new buildings.

1.1.13 Invasive species

- xvii Horsetail (*Equisetum* sp.) was recorded on the site at the time of the initial survey. This is not a Schedule 9 species but is considered as an invasive species due to it being difficult to control and easy to spread. If this plant is to be impacted as part of the works, it should be carefully excavated and removed/disposed of safely offsite or treated in situ prior to works commencing.

1.1.14 Monitoring

- xviii Monitoring for nesting birds, bats, water voles, red kites and bats are recommended.

1.1.15 Conclusion

- xix The proposals were assessed as having a significant effect on the biodiversity conservation objectives for red kites, water voles and GCN. A mitigation licence for GCN, water vole surveys and red kite surveys are recommended following detailed design in order for the proposed development to be compliant with relevant national and international legislation and policy relating to ecology. Following the licence and mitigation on these species, the effect on these species is likely to be significantly low. The biodiversity net gain metric calculations also resulted to a habitat net gain of above 10% and with a significant hedgerow net gain.
- xx The implementation of enhancement measures should provide a net gain in biodiversity post development.

CONTENTS

PROJECT	2
1 EXECUTIVE SUMMARY	3
1.1 BACKGROUND	3
2 INTRODUCTION AND BACKGROUND	10
2.1 PURPOSE AND SCOPE OF THIS REPORT	10
2.2 ZONE OF INFLUENCE	11
2.3 SITE CONTEXT AND LOCATION	11
3 METHODOLOGY	13
3.1 ECOLOGICAL IMPACT ASSESSMENT	13
3.2 DESK BASED ASSESSMENT	14
3.3 PHASE 1 HABITAT SURVEY	14
3.4 PROTECTED / PRIORITY SPECIES SCOPING ASSESSMENT	14
3.5 BIODIVERSITY IMPACT ASSESSMENT	15
3.6 LIMITATIONS	15
3.7 ACCURATE LIFESPAN OF ECOLOGICAL DATA	15
4 BASELINE CONDITIONS	16
4.1 SURVEYOR COMPETENCY	16
4.2 DESIGNATED SITES	16
4.3 HABITATS	16
4.4 PROTECTED / PRIORITY SPECIES/SPECIES GROUPS	19
5 IMPACTS AND MITIGATION (CUMULATIVE AND/OR IN ISOLATION)	25
5.1 PLANNING APPLICATION SEARCH	25
5.2 HABITATS	25
5.3 STATUTORILY AND NON-STATUTORILY DESIGNATED SITES	26
5.4 FAUNA	26
6 SUMMARY OF POTENTIAL IMPACTS	31
7 COMPENSATION & ENHANCEMENT RECOMMENDATIONS	35
7.2 PROTECTED/PRINCIPAL SPECIES	39
8 MONITORING	42

9	REFERENCES	43
10	LEGISLATION AND PLANNING POLICY	45
10.1	GENERAL & REGIONALLY SPECIFIC POLICIES	45
10.2	BATS AND GREAT CRESTED NEWTS	47
10.3	BIRDS	47
10.4	REPTILES	48
10.5	WATER VOLE	48
10.6	WHITE-CLAWED CRAYFISH	48
10.7	OTTER	48
10.8	BADGERS	49
10.9	HEDGEHOGS AND COMMON TOADS	49
10.10	HEDGEROWS	49
11	APPENDIX 1: SURVEY CONDITIONS	50
12	APPENDIX 2: SPECIES SPECIFIC SURVEY METHODOLOGY	51
12.1	GREAT CRESTED NEWT (GCN) HABITAT SUITABILITY ASSESSMENT (H.S.I)	51
12.2	BATS	52
12.3	RIPARIAN MAMMALS SURVEYS	52
12.4	BADGER SURVEY	53
12.5	TERRESTRIAL INVERTEBRATES	54
13	APPENDIX 3: CLIENT PROPOSALS	55
14	APPENDIX 4: DESK STUDY RESULTS	56
15	APPENDIX 5: PHASE 1 HABITAT SURVEY PLAN	62
16	APPENDIX 6: PHASE 1 HABITAT SURVEY RESULTS	63
17	APPENDIX 7: PHASE 1 SPECIES LIST	76
18	APPENDIX 8: PROTECTED/PRINCIPAL SPECIES AND HABITAT SURVEY RESULTS	83
18.1	HEDGEROWS	83
18.2	GREAT CRESTED NEWTS	83
18.3	BATS	84
19	APPENDIX 9: BAT TREE AND BUILDING PLAN	88
2	APPENDIX 10: BIODIVERSITY IMPACT ASSESSMENT (BIA) CONDITIONS ASSESSMENT	89

FIGURES

FIGURE 1: SITE CONTEXT & LOCATION PLAN	12
FIGURE 2: COMMON SPOTTED ORCHID	17
FIGURE 3: WATERBODY PLAN	20
FIGURE 4: RAT FOOTPRINTS	22
FIGURE 5: SLIP INTO THE WATER	22
FIGURE 6: FORAGING SIGNS ON SITE	23
FIGURE 7: BAT BOX EXAMPLE	39
FIGURE 8: BIRD BOX EXAMPLE	40
FIGURE 9: HIBERNACULA EXAMPLE	40
FIGURE 10: HEDGEHOG HIGHWAY	41
FIGURE 11: BROADLEAVED PLANTATION WOODLAND	63
FIGURE 12: DENSE SCRUB	64
FIGURE 13: SCATTERED SCRUB	64
FIGURE 14: BROAD-LEAVED SCATTERED TREES	65
FIGURE 15: IMPROVED GRASSLAND	65
FIGURE 16: POOR SEMI-IMPROVED GRASSLAND	66
FIGURE 17: TALL RUDERAL VEGETATION ON SITE	67
FIGURE 18: MARGINAL VEGETATION	67
FIGURE 19: INUNDATION VEGETATION	68
FIGURE 20: POND 1	68
FIGURE 21: POND 2	69
FIGURE 22: POND 3	69
FIGURE 23: POND 4	70
FIGURE 24: AMENITY GRASSLAND	70
FIGURE 25: EPHEMERAL VEGETATION	71
FIGURE 26: HEDGEROW 1 (H1)	71
FIGURE 27: HEDGEROW 2 (H2)	72
FIGURE 28: HEDGEROW 3 (H3)	72
FIGURE 29: HEDGEROW 4 (H4)	73
FIGURE 30: HEDGEROW 5 (H5)	73
FIGURE 31: HEDGEROW 6 (H6)	73
FIGURE 32: RUNNING WATER	74
FIGURE 34: BUILDING 2 (B2)	74
FIGURE 35: BARE GROUND ON SITE	75

TABLES

TABLE 1: CONSULTED RESOURCES	14
TABLE 2: PHASE 1 HABITAT TYPES AND THEIR ECOLOGICAL IMPORTANCE	17
TABLE 3: NATURAL ENGLAND RAPID RISK ASSESSMENT	26
TABLE 4: TABLE SUMMARY OF IMPACTS	31
TABLE 5: SURVEY CONDITIONS	50
TABLE 6: HSI SCORING CRITERIA	51
TABLE 7: CRITERIA FOR BAT ROOST POTENTIAL ASSESSMENT OF BUILDINGS AND TREES	52
TABLE 8: STATUTORILY DESIGNATED SITES WITHIN 5KM OF SITE BOUNDARY	56

TABLE 9: NON-STATUTORY DESIGNATED SITES WITHIN 2KM OF SITE BOUNDARY	57
TABLE 10: HABITATS OF PRINCIPAL IMPORTANCE WITHIN 1KM OF THE SITE	58
TABLE 11: SUMMARY OF PROTECTED AND PRIORITY SPECIES RECORDS	58
TABLE 12: PHASE 1 SPECIES LIST	76
TABLE 13: HEGS HEDGEROW ASSESSMENT	83
TABLE 14: HSI ASSESSMENT	83
TABLE 15: EDNA SURVEY RESULTS	83
TABLE 16: BAT BUILDING ASSESSMENT AND GROUND LEVEL TREE ASSESSMENT	84
TABLE 17: BIODIVERSITY IMPACT ASSESSMENT (BIA) CONDITIONS ASSESSMENT	89

2 INTRODUCTION AND BACKGROUND

2.1 Purpose and Scope of this Report

- i RammSanderson Ecology Ltd was commissioned by Richborough Estates Ltd. and Lone Star Land to assess the potential for protected species and habitats to be present on the site of a proposed outline planning application for the erection of up to 230 dwellings, creation of new vehicular access from camp road and all associated works.
- ii A number of previous reports were produced on this site by other consultancies. An Ecology Opportunities and Constraints plan was produced by Tyler Grange Ltd in September 2020 (Ref: '13464_PO5_Ecology Recommendations_KL_JD'). A report was also produced by FPCR Ltd in August 2020. A Great Crested Newt Survey Report was also produced by 4 Acre Ecology Ltd in 2019 (Ref: 'Heyford Park, Oxfordshire: GCN Survey 2019').
- iii To complete an EclA of the proposals, a desk-based assessment, Extended Phase 1 Habitat Survey and protected species assessments were carried out based upon the findings of the Preliminary Ecological Appraisal (PEA). This report is a stand-alone EclA which has been prepared following current guidance (CIEEM, 2018) and can be used to lawfully determine a planning application in line with current planning policy¹. This report does not form part of a wider discipline Environmental Impact Assessment (EIA) of Environmental Statement (ES), nor does it confer the need for any such documentation.
- iv The study area was defined depending on the proposals, desk study and applicable legislation (Section 10) as shown in the enclosed Site Location Plan (Figure 3) and Phase 1 Habitat plan (Appendix 2) plus a buffer zone extended to include the Zone of Influence (see section below) of the proposals (hereafter referred to as the "Site").
- v This ecological impact assessment is based on a review of the development proposals provided by the Client in Drawing: 'The masterplan' (Appendix 3), desk study data (third party information) and surveys of the Site. The aims of this report are to:
 - Classify the habitat types at the site based on standard Phase 1 Habitat survey methodology;
 - Evaluate any potential for protected species to be present;
 - Identify any ecological constraints that may affect the scheme design;
 - Provide recommendations for any further actions that might be required (for example, to monitor badger setts periodically through construction);
 - Identify likely significant effects on ecological receptors;
 - Assess if the proposals are compliant with legislation and policy relating to biodiversity; and
 - Identify opportunities for ecological enhancement to provide net biodiversity gain in line with the National Planning Policy Framework (NPPF, 2019).
- vi This report pertains to these results only; recommendations included within this report are the professional opinion of an experienced ecologist and therefore the view of RammSanderson Ecology Ltd.
- vii The surveys and desk-based assessments undertaken as part of this review and subsequent report including the Ecological Constraints and Opportunities Plan are prepared in accordance with the British Standard for

¹ Office of the Deputy Prime Minister Circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within The Planning System

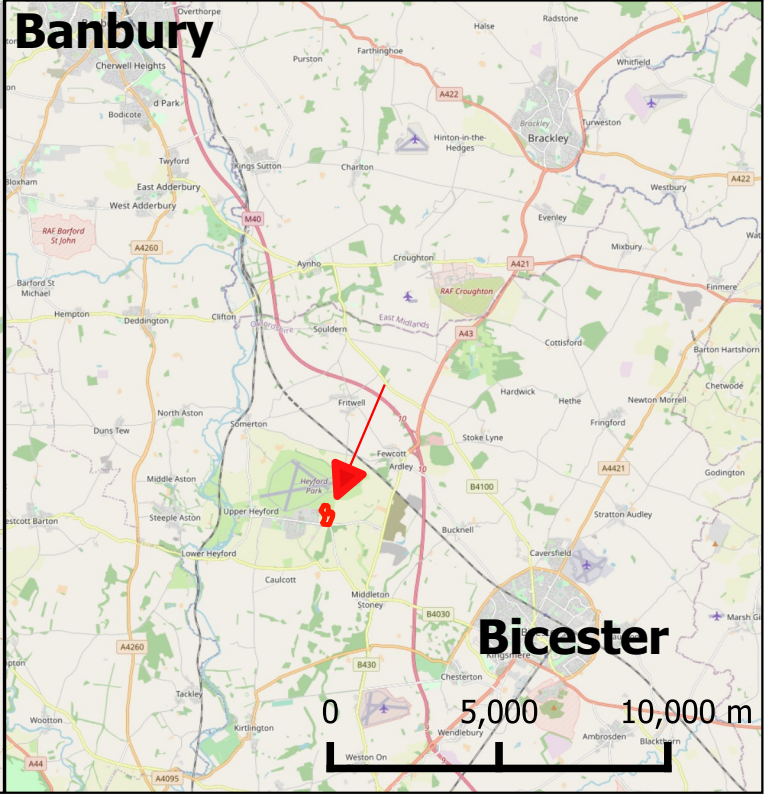
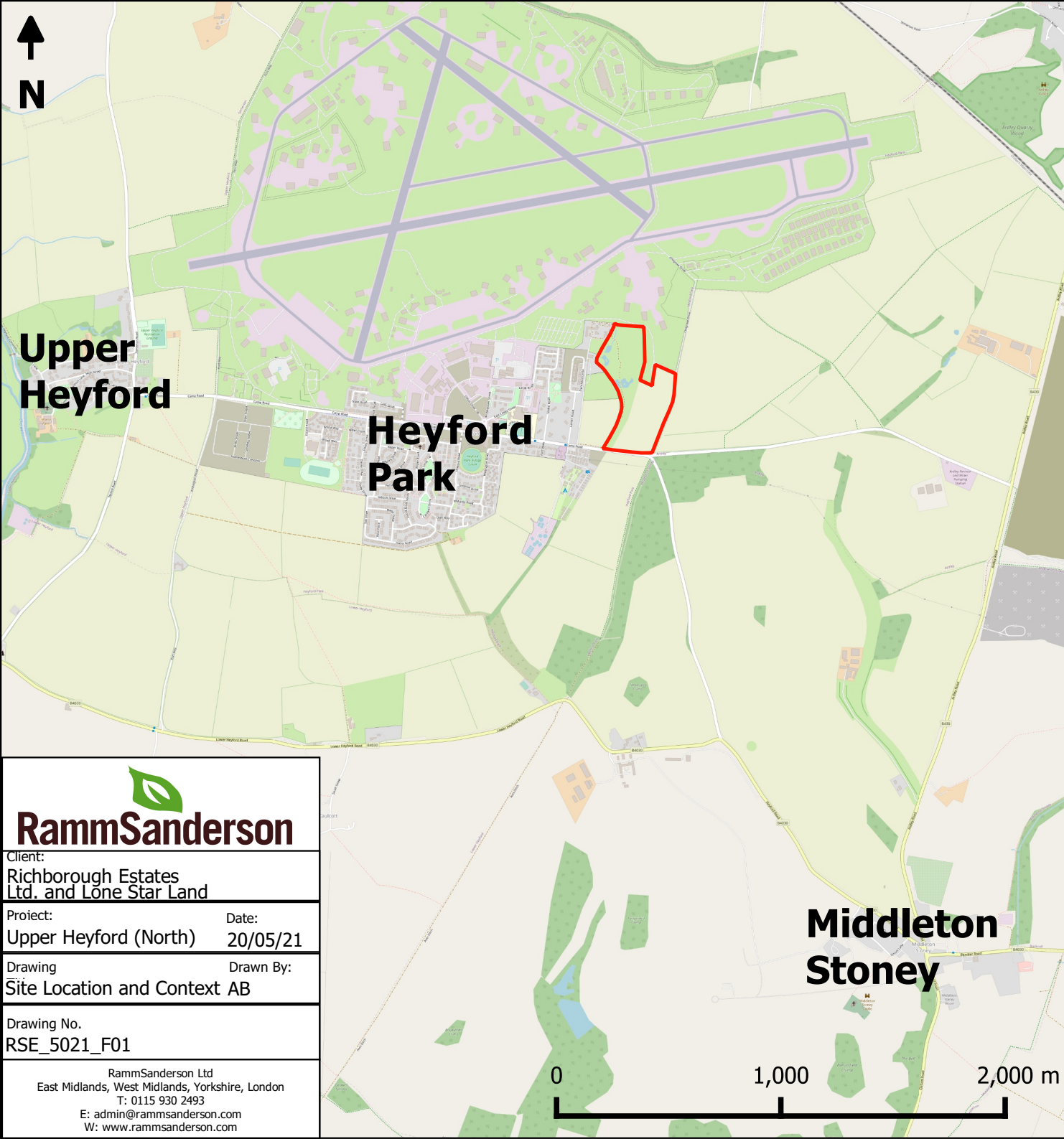
Biodiversity Code of Practice for Planning and Development (BS42020:2013) and follow current guidance (CIEEM, 2018).


2.2 Zone of Influence

- i The Zone of Influence is used to describe the geographic extent of potential impacts of a proposed development. The Zone is determined by the development proposals in relation to individual species ecological requirements indicated in best practice guidelines.
- ii In relation to great crested newts (GCN), the zone of influence is considered to be up to 500m from the site boundaries, as this is the distance that Natural England would require to be considered in relation to GCN licensing.
- iii For badgers, the zone of influence is typically 30-50m from the Site boundary as this is the distance within which a sett can be damaged or disturbed by heavy machinery.
- iv For designated sites, the Zone of Influence can be up to 10km from the site and this is termed the Impact Risk Zone (IRZ). Where sites occur within an IRZ the requirement for a Habitat's Regulations Assessment or Environmental Impact Assessment may be triggered.

2.3 Site Context and Location

- i The site was on land north of Camp Road, Upper Heyford, Bicester, Oxfordshire, OX25 5LX (approximate central OSGR: SP 52106 25962). Agricultural fields are present to the west, south and east of the site. Upper Heyford disused Airfield and industrial estates were located to the north of the site. The site is located to the east of Upper Heyford village within a semi-rural area and was approximately 11.76ha.




RammSanderson

Client:
 Richborough Estates
 Ltd. and Lone Star Land

Project: Upper Heyford (North) Date: 20/05/21

Drawing: Site Location and Context AB Drawn By: AB

Drawing No.
 RSE_5021_F01

RammSanderson Ltd
 East Midlands, West Midlands, Yorkshire, London
 T: 0115 930 2493
 E: admin@rammsanderson.com
 W: www.rammsanderson.com

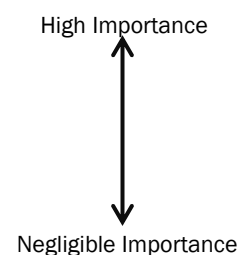
3 METHODOLOGY

3.1 Ecological Impact Assessment

i The ecological impact assessment is based on the standard best practice methodology provided by the Guidelines for Ecological impact Assessment (CIEEM, 2018). The assessment identifies important sites, habitats, species and other ecological features that are of conservation value based on factors such as legal protection, statutory or local site designations such as Sites of Special Scientific Interest (SSSI) or Local Wildlife Sites (LWS) or inclusion on Red Data Book Lists or Local Biodiversity Action Plans.

ii The importance of an ecological feature is considered within a defined geographical context. The following frame of reference is used, or adapted to suit local circumstances:

- International and European
- National
- Regional
- Metropolitan, County, vice-county or other local authority-wide area
- River Basin District
- Estuarine system/Coastal cell
- Local
- Below Local level e.g. on site only



iii Consideration of impacts at all scales is important, and essential if objectives for no net loss of biodiversity and maintenance of healthy ecosystems are to be achieved.

iv In identifying impacts, the review considers the Client's Site proposals and any subsequent recommendations made are proportionate / appropriate to the site and have considered the Mitigation Hierarchy as identified below:

- **Avoid:** Provide advice on how the development may proceed by avoiding impacts to any species or sites by either consideration of site design or identification of an alternative option.
- **Mitigate:** Where avoidance cannot be implemented mitigation proposals are put forward to minimise impacts to species or sites as a result of the proposals. Mitigation put forward is proportionate to the site.
- **Compensate:** Where avoidance cannot be achieved any mitigation strategy will consider the requirements for site compensatory measures.
- **Enhance:** The assessment refers to planning policy guidance (e.g. NPPF) to relate the ecological value of the site and identify appropriate and proportionate ecological enhancement in line with both national and local policy.

v For the purpose of this EclA, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' (explained in 3.1.i.) or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects are considered significant at the range of scales from international to local. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the ecological consequences of the project are understood. In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

vi Note: The following definitions are used for the terms 'impact' and 'effect' throughout this report:

- **Impact** – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.

- **Effect** – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow.

3.2 Desk Based Assessment

- Data regarding statutory and non-statutory designated sites, plus any records of protected or Priority species and habitats was requested from the local ecological records centre and online resources, details of which are provided in Table 1 below.

Table 1: Consulted resources

Consultee/Resource	Data Sought	Search Radius from Boundary
Thames Valley Environmental Records Centre	Non-Statutory Site Designations, protected/Priority species records	1km
www.magic.gov.uk ^{2 3}	Statutory Site Designations	20km
	NERC Act (2006) Habitats	1km

NB: Desk study data is third party controlled data, purchased or consulted for the purposes of this report only. RammSanderson Ecology Ltd cannot vouch for its accuracy and cannot be held liable for any error(s) in these data.

3.3 Phase 1 Habitat Survey

- An extended Phase 1 Habitat Survey of the site was completed to identify habitats present within the site. All habitats within and adjacent to the site boundary were described and mapped following standard Phase 1 Habitat Survey methodology (JNCC, 2016), which categorises habitat type through the identification of individual plant species.
- Nomenclature follows Stace (Stace, 2019) for vascular plant species and the DAFOR scale for relative abundance was used in the field to determine dominant plants within habitats and communities (D = dominant, A = abundant, F = frequent, O = occasional and R = rare).

3.4 Protected / Priority Species Scoping Assessment

- The habitats on site were assessed for their suitability for supporting any legally protected or Priority species that would be affected by the proposed development. This includes invasive non-native plant species such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*).
- The full scope of species assessments and survey methods are detailed in Appendix 2. Any incidental sightings of individual species or field signs such as footprints, latrines or feeding remains discovered during the survey were noted.

² Multi Agency Geographic Information for the Countryside Interactive GIS Map.

³ MAGIC resource was reviewed on the 26/05/2021

3.5 Biodiversity Impact Assessment

3.5.1 Outline Procedure

- i Biodiversity Impact Assessment of proposals was carried out in accordance with guidelines published by DEFRA and via the DEFRA Metric Calculation Tool 3.0. The existing value of individual habitats on site is initially calculated by accurately mapping the proposed development site from information collected during a Biodiversity Scoping Assessment/Phase 1 Habitat Survey and by dividing the land into individual habitat parcels. This part of the study is informed by JNCC Phase 1 habitat and UK habitats classification systems. The distinctiveness, condition, connectivity and strategic significance of these parcels is then assessed and together with the area of each habitat, a value is assigned. A summary of how habitat distinctiveness, condition assessment, connectivity and strategic significance is determined is detailed within DEFRA best practice literature.

3.5.2 Calculation

- ii Once the habitat types have been input into the Biodiversity Impact Assessment calculator, along with their area, distinctiveness, condition, connectivity and strategic significance an overall score in biodiversity units is calculated.

3.5.3 Compensation

- iii Once the biodiversity value of existing on-site habitats has been quantified, the value of indicatively proposed habitats to achieve a net gain as part of development must be calculated. This is calculated using the methodology applied above, taking into account the area/length of indicatively proposed habitats, their distinctiveness, condition, connectivity and strategic significance once this is established. A further two parameters are also taken into consideration at this stage. These are the time it will take to reach this target condition and the difficulty of creating/restoring each habitat type proposed. By using these parameters, the calculation takes into account that the time it takes for a habitat to establish may result in a loss of biodiversity for a period of time and also the risk of failure associated with any habitat creation/restoration.

3.6 Limitations

- i It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no investigation could ensure the complete characterisation and prediction of the natural environment.
- ii Approximately 35% of the bank of pond P3 and 50% of pond P2 were accessible at the time of the survey due to dense vegetation. However, the appropriate number of eDNA samples were undertaken and this was not considered to have an adverse effect on the validity of the eDNA sampling.

3.7 Accurate lifespan of ecological data

- i The majority of ecological data remain valid for only short periods due to the inherently transient nature of the subject. The survey results contained in this report are considered accurate for approximately 2 years, notwithstanding any considerable changes to the site conditions.

4 BASELINE CONDITIONS

4.1 Surveyor Competency

- i The Preliminary Ecological Appraisal (PEA) survey, eDNA and HSI were carried out by Athina Constantinou BSc (Hons) MSc ACIEEM and Anthony Mellor BSc (Hons) MSc ACIEEM AMICE. Anthony is a director in the company and has been a professional ecologist for over ten years. He holds a Class 1 licence for great crested newts and bats (2015-19099-CLS-CLS; 2015-23847-CLS-CLS). Athina has been a professional ecologist for the past five years. The Ground Level Tree Assessment (GLTA) was carried by Athina Constantinou. The water vole survey was completed by Beth Jasper BSc (Hons) and Alex Bull. Beth has been a professional ecologist for the past six years and is appropriately experienced to undertake this survey. The invertebrate surveys were conducted by surveyors at Conops Entomology Ltd. who are appropriately experienced to undertake invertebrate surveys.

4.2 Designated Sites

4.2.1 Statutory Designated Sites and Non-Statutory Designated Sites

- i The Site lies within Impact Risk Zones (IRZ) for Bestmoor SSSI and Ardley Cutting and Quarry SSSI. The proposals are not of a type that is included within the Impact Risk Zones for these designated sites. For discharges the IRZ states:
“Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.”
- ii The nearest statutorily designated site was Ardley Cutting and Quarry SSSI which was 1.6km southeast of the site. Ardley Cutting and Quarry SSSI is designated for limestone grassland, unimproved grassland, marshy grassland, scrub, ancient woodland and wetland habitats. It is also designated for a large population of the internationally protected great crested newt (*Triturus cristatus*). Bestmoor SSSI is designated for semi-improved floodplain meadow and ditches.
- iii Oxford meadows SAC was also located within 15.5km southwest of the site.
- iv The Heath District Wildlife Site Citation (DWSC) is the closest non statutory designated site to the site located 20m east of the site. Trackway Adjacent to Gorse DWSC is located 50m south of the site.

4.3 Habitats⁴

- i The site was approximately 11.76 hectares in area and located to the north of Camp Road, Upper Heyford.
- ii The broadleaved plantation woodland, scattered trees, marginal, inundation vegetation, standing water, running water and hedgerows were of high botanical interest and high habitat value. These habitats as well as the poor semi-improved grassland, scrub, tall ruderal and ephemeral vegetation were largely noted in their potential to support a range of protected / priority faunal species rather than for their botanical value. The scattered trees, woodland, watercourses and hedgerows offered some value as ecological corridors for the dispersal of fauna and flora into the wider countryside. All hedgerows on site are formed of >80% native woody species and are therefore a Habitat of Principal Importance under the NERC Act (2006) (HPI).

⁴ Full Phase 1 survey results are displayed in Appendix 5.

- iii Open Mosaic Habitats on Previously Developed Land HPI was located adjacent to the north of the site. Broadleaved and deciduous woodland HPI was also located 14m southeast of the site with a conifer woodland HPI located 19m south of the site.
- iv Horsetail was recorded on site on the amenity grassland between ponds P3 and P4. This is not a Schedule 9 (Wildlife and Countryside Act, 1981 as amended) species. However, it is considered as an invasive species due to it being difficult to control and easy to spread.
- v Common spotted orchid was identified on site at the time of the first survey. However, it was noted that this had been mowed down during the second survey on site.

Figure 2: Common spotted orchid



Table 2: Phase 1 habitat types and their ecological importance

Habitat	JNCC Code	Area (m ²)	Proportion of Site Area	Length (m)	Ecological Importance & Outcome of Proposal
Broadleaved plantation woodland	A1.1.2	4,627	4%	-	Inherently important & support wide range of species, including nesting birds & possible bat roosts. To be retained and enhanced as part of site proposals.
Dense scrub	A2.1	57	<1%	-	Important for bird nesting. To be retained by site proposals.
Scattered scrub	A2.2	243	<1%	-	Important for bird nesting. To be mostly retained by site proposals with small sections to be removed.
Broadleaved scattered trees	A3.1	4,458	4%	-	Inherently important & support wide range of species, including nesting birds & possible bat roosts. The majority of the trees on site are to be

Habitat	JNCC Code	Area (m ²)	Proportion of Site Area	Length (m)	Ecological Importance & Outcome of Proposal
					retained except from a few trees to be removed to allow for construction of access roads.
Improved Grassland	B4	16,694	14%	-	Not inherently important majority to be cleared to facilitate the proposals, with some areas retained and enhanced.
Poor Semi-improved Grassland	B6	1,479	1%	-	Not inherently important with parts to be cleared to facilitate the proposals.
Tall Ruderal	C3.1	3,587	3%	-	Limited botanical value. Habitats do have some value to faunal species for nesting, foraging, refuge and commuting. To be mostly retained by site proposals with small sections to be removed.
Marginal Vegetation	F2.1	1,873	2%	-	Inherently important & support wide range of species, including nesting birds. To be mostly retained by site proposals with small sections to be removed.
Inundation Vegetation	F2.2	174	<1%	-	Inherently important & support wide range of species, including nesting birds. To be mostly retained by site proposals with small sections to be removed.
Standing Water	G1	4,073	4%	-	Inherently important & support wide range of species, including nesting birds, GCN and bats. To be fully retained.
Running water	G2.1	-	-	500	Inherently important & support wide range of species, including nesting birds. To be fully retained.
Amenity Grassland	J1.2	21,247	18%	-	Not inherently important majority to be retained and enhanced to facilitate the proposals.
Ephemeral, Short Perennial	J1.3	55,441	48	-	Important for invertebrates. To be mostly cleared to facilitate the proposals, with some areas retained and enhanced.
Intact species-poor hedgerow	J2.1.2	-	-	368	May support a range of protected species, primarily nesting birds. To be mostly retained with small sections (less than 20m from each hedgerow) to be removed for access roads as part of the site proposals.
Defunct species poor hedgerow	J2.3.1	-	-	169	May support a range of protected species, primarily nesting birds. To be mostly retained with small sections (less than 20m from each hedgerow) to be removed for access roads as part of the site proposals. Hedgerow is to be enhanced by additional planting.
Intact species poor with trees	J2.3.2	-	-	1,468	May support a range of protected species, primarily nesting birds. Hedgerow H4 is to have 70m removed and H6 is to have 46m to be removed by site proposals. Smaller than 20m

Habitat	JNCC Code	Area (m ²)	Proportion of Site Area	Length (m)	Ecological Importance & Outcome of Proposal
					sections are to be removed from the rest of the hedgerows to allow for access routes.
Dry ditch	J2.6	-	-	269	No ecological value. To be retained.
Buildings	J3.6	100	<1%	-	No ecological value.
Bare Ground	J4	2028	2%	-	No ecological value.

4.4 Protected / Priority Species/Species Groups⁵

- i The presence/likely absence of protected species to be present on site and impacted by the proposals is discussed under the headings below.

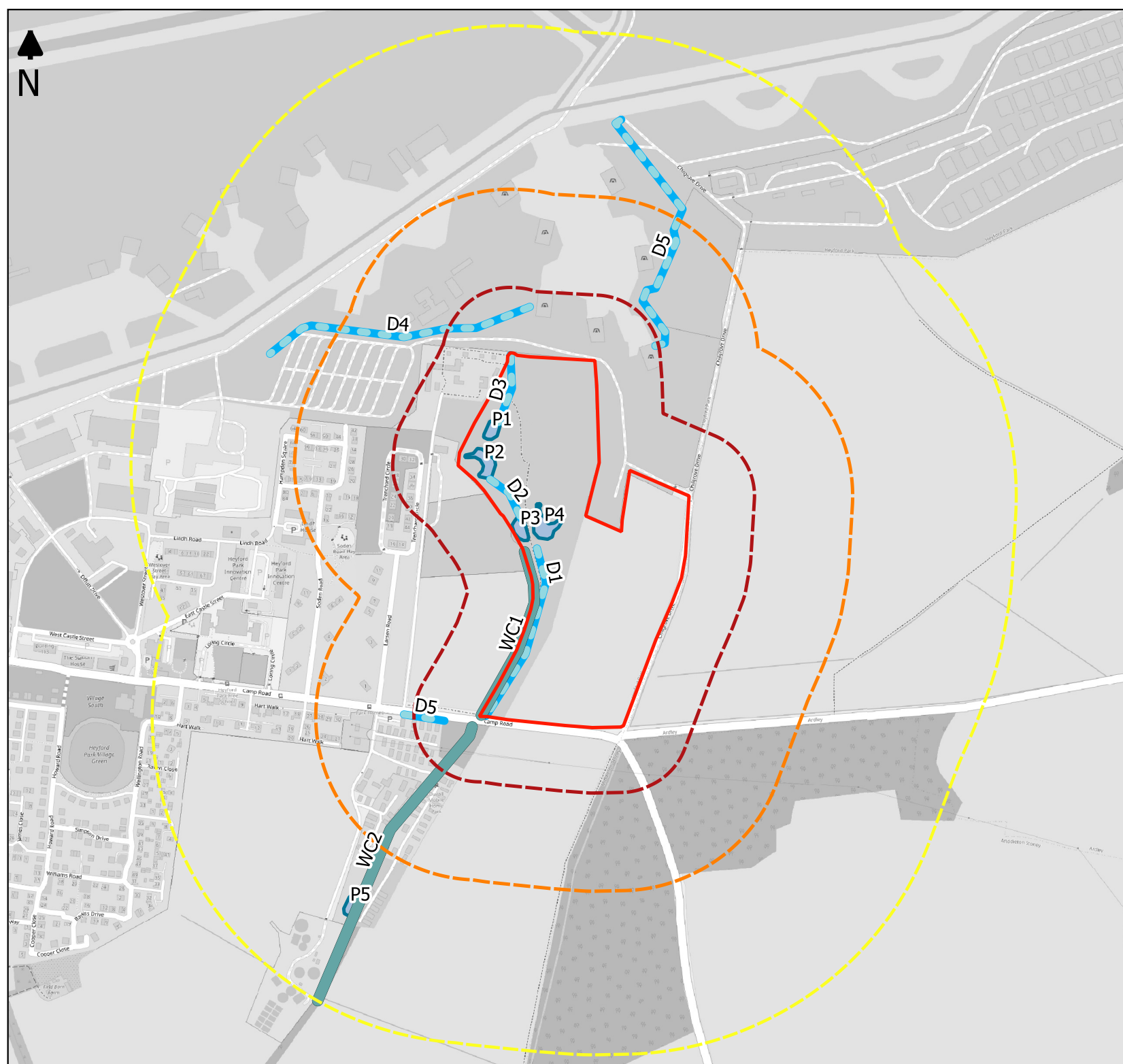
4.4.2 Great Crested Newt (GCN)

- ii Four ponds were located on site (P1-P4), these ponds will not be impacted by the site proposals. A pond (P5) was also located within 500m of the site and was located beyond a barrier to dispersal in the form of a flowing watercourse and a busy road. A Great Crested Newt Survey report was produced in 2018 by 4 Acre Ecology Limited on the land to the west and north of the site (Ref: 'Heyford Park, Oxfordshire: GCN Survey 2019'). As part of this historical report, GCN absence/presence surveys were conducted on ponds P1-P4 on site in 2018. These ponds were identified to support GCN populations at the time of these surveys and were also identified to be GCN receptor sites as part of a mitigation GCN Protected Species License.




4.4.3 Great Crested Newt Habitat Suitability Index (HSI) Assessment and eDNA Survey

- i The four waterbodies on site were assessed for their suitability to support GCN populations and were subject to HSI assessment and e-DNA surveys. Pond P2 returned as a positive GCN status and P1, P3 and P4 returned as a negative GCN status. Pond P1 was categorised as "Good" and P2, P3 and P4 were categorised as "Excellent" during the HSI assessment. Whilst the HSI and eDNA surveys were being conducted on ponds P1-P4 on site, another ecological consultant was undertaking GCN presence/absence surveys within these ponds, likely associated with the ongoing monitoring agreed by the mitigation licence detailed above. The ecologists have not provided the survey results from these presence/absence surveys. The HSI and eDNA assessment results are shown in Appendix 8.
- ii The habitats on site including broadleaved plantation woodland, scattered trees, scrub, tall ruderal, hedgerows and poor semi-improved grassland of long sward were suitable for foraging, refuge seeking and commuting GCN. The score of "excellent" and "good" for the ponds on site increases the likelihood of GCN utilising the site. 254 GCN records were identified within 2km of the site during the desk study, with the closest record located on site.

⁵ Full protected species survey results are in Appendix X.



Key

-  Site Boundary
-  500m buffer
-  250m buffer
-  100m buffer
-  Pond Locations
-  Ditches
-  Watercourses



Client:
Richborough Estates Ltd. and Lone Star Land

Project:
Upper Heyford (North)

Drawing Title:
Waterbody Plan

Drawing No.	Rev:
RSE_5021_F03	V1
Drawn By:	Date:
AC	10/05/2021
Scale:	
1:7,874 @A4	

RammSanderson Ltd
East Midlands, West Midlands, Yorkshire, London
T: 0115 930 2493
E: admin@rammsanderson.com
W: www.rammsanderson.com

4.4.4 Bats

Trees

- iii A number of trees were located on site within the broadleaved plantation woodland, hedgerows and scattered broadleaved trees. Ground Level Tree Assessments (GLTA) were conducted on the trees on site that are likely to be impacted by site proposals. Two trees with moderate bat roosting potential were identified during the survey. Full results of tree assessments are shown in Appendix 8.

Foraging Habitat

- iv The hedgerows, scrub, watercourses, ponds, woodland and trees present on the site provided potential foraging and commuting habitat, as well as providing connectivity to the wider landscape. During the desk study, a brown long eared bat record was identified located 0.63km southwest of the site. No details were available to indicate whether this bat record was of a foraging, commuting or roosting bat. However, this record was an old record from 2001.

Buildings

- v Two buildings were located on site. These buildings were assessed as offering negligible bat roosting potential. Full results are in Appendix 8.

4.4.5 Birds

- vi The ponds, hedgerows, scrub, watercourses, broadleaved plantation woodland and scattered trees located on site are suitable habitat for bird nesting sites and local records of birds of conservation concern (BoCC) were returned. The closest bird record was a red kite located 0.1km northwest from the site. An in use red kite nest was identified within a tree on site at the time of the survey. This tree is to be retained as part of the site proposals. Red kite is a Schedule 1 protected species. Other bird species seen on site at the time of the survey included grey heron (*Ardea cinerea*), blackbird (*Turdus merula*), robin (*Erithacus rubecula*) and great tit (*Parus major*). While BoCC could use the site, the footprint of the works is too restricted to impact more than one or two pairs of any given species.

4.4.6 Reptiles

- vii Common lizard and grass snake records were returned during the desk study. Closest records were of a common lizard and grass snake located 0.33km northeast. The terrestrial habitats on site including watercourses, ponds, hedgerows, scrub, poor semi-improved grassland and tall ruderal vegetation provided opportunities for foraging, refuge and commuting for reptiles. The hedgerows also provided connectivity with the wider countryside.

4.4.7 Water Vole, Otter and White Clawed Crayfish

- viii Records of water vole *Arvicola amphibius* were identified in a waterbody 400m northwest of the site. A stream on site offered suitable commuting and foraging habitat for water voles and mammal holes were identified during the initial habitat survey. Site proposals include a discharge of up to 18m³/day into the stream on site. The water levels on the stream also vary between 5cm and 50cm of depth. A single water vole survey was conducted on site which identified the holes on site to be used by rats. A number of rat footprints were identified on the banks of the stream. Eight entrances to burrows were identified on the banks of the stream at the time of the water vole survey. These were all located approximately 30cm from the ground. Six of the entrances were identified on the western bank with six entrances identified on the eastern bank of the stream. Foraging signs likely to be from a rat or bank vole and a slip into water were also identified on the

banks of the stream. Water voles were not considered likely to be using the burrows on the watercourse on site. Furthermore, otter *Lutra lutra* and white clawed crayfish *Austropotamobius pallipes* are unlikely to be using the stream for commuting, foraging or burrowing.

Figure 4: Rat footprints



Figure 5: Slip into the water



Figure 6: Foraging signs on site



4.4.8 Badgers

- ix No badger setts or field signs were recorded on site. However, the site represents good foraging habitat (grassland) and good sett building areas (under hedgerows, river/ditch banks). No badger records were returned within the desk study. A number of rabbit warrens were located along Hedgerow H4 on site. Therefore, it is considered unlikely that badgers are utilising the site to forage.

4.4.9 Other Priority Fauna Species

- x The habitats on site were suitable for hedgehogs *Erinaceus europaeus* and common toad *Lepus europaeus*. No records of these species were returned within the desk study.
- xi Due to a lack of suitable habitats, the site is not considered likely to support any other legally protected or Priority species.
- xii The habitats on site including ephemeral vegetation, inundation and marginal vegetation, poor semi-improved grassland, waterbodies, scrub, woodland and running water are suitable for terrestrial invertebrates. Invertebrate surveys were conducted, and more details can be seen within the Invertebrate Assessment Report by Conops Entomology Ltd in 2012 within Appendix 11.

4.4.10 Biodiversity

- xiii When assessed against the DEFRA Metric 3.0 for biodiversity, the site contains 49.17 baseline biodiversity units for habitat areas and 15.02 for linear feature (e.g. hedgerows). The most distinctive habitat within the site was the existing ponds, marginal and inundation vegetation, broadleaved plantation woodland and running water.
- xiv A stream and ditches were located on site. A River Condition Assessment on the stream and ditches were not conducted on this site. However, due to the development being in the feasibility stage, the stream and ditches on site being retained and the overall habitat net gain on site not being affected by the river

assessment, it is not considered necessary for the river assessment to be conducted at this stage of the development. It is recommended that a river condition assessment is conducted once detailed design for the site proposals become available.

- xv Following input of habitat data into the DEFRA Metric 3.0, it has been considered there will be quantified net gain in biodiversity of 4.32 habitat units (12.37%) and 88.80 linear units (38.26%) across the site. Whilst the development results in the loss of the majority of the ephemeral vegetation and improved grassland on site, this net gain is primarily due to the extensive habitat creation including the creation of three Sustainable drainage system (SuDS) ponds, the enhancement of grassland on site to create wildlife meadows and the creation of mixed scrub. The existing woodland on site was also due to be enhanced. In addition, the provision of this habitat creation/enhancement also presents the opportunity to create habitat provisions for a variety of species, such as bat, bird, hedgehog highway signs, hedgehog boxes, as well as herpetofauna hibernacula/refugia, as described in Section 7.

5 IMPACTS AND MITIGATION (CUMULATIVE AND/OR IN ISOLATION)

5.1 Planning Application Search

- i A search was conducted of planning applications within the vicinity of the proposed developments, using the Planning Online Register Map Viewer of Cherwell District Council in North Oxfordshire. The search was limited to the five-year period preceding the date of issue of this report (due to the typical five-year lifetime of planning permission). Excluding retention applications (i.e. typically local-scale residential or commercial developments where an impact has already occurred), withdrawn and refused applications, the following applications were identified as having the greatest potential to act in-combination with one or more of the proposed developments:
- Planning Application number: 15/01357/F - Land East Of Larsen Road Upper Heyford – a residential development consisting of the erection of 89 dwellings, creation of new access arrangement from Camp Road, creation of open space, hard and soft landscaping and associated ancillary works and infrastructure;
- ii Mitigation has been proposed in the planning application above. The proposals of this site present the opportunity to secure a number of biodiversity benefits, including additional native tree planting, new roosting opportunities for bats, and more diverse nesting habitats for birds. This application is currently under consultation. A number of other planning application were located within 500m of the site which were older than 5 years from the date of issue of this report. These included mostly residential developments.
- iii This project will result in increases to noise and lighting pollution during the construction phase of these projects. However, mitigation and precautionary measures were recommended therefore impacts on protected species are unlikely to significantly increase from this development.

5.2 Habitats

- i It is recommended that high value habitats such as the broadleaved plantation woodland, scattered broadleaved trees, ponds, inundation vegetation, marginal vegetation and watercourses are being retained on site. The site proposals include retaining the ponds and watercourses as well as retaining the majority of the woodland, marginal vegetation and inundation vegetation.
- i Six hedgerows were located on site which are Habitats of Principal Importance under the NERC Act (2006) (HPI). Small sections of the hedgerows are to be removed on site as part of the site proposals (less than 20m). Larger sections of Hedgerow H4 (70m to be removed) and H6 (46m to be removed) are to be removed by site proposals. Hedgerow assessments (HEGS) were conducted on these two hedgerows with full results shown within Appendix 8. Both of these hedgerows were assessed as a grade 4 – low assessment. Therefore, the hedgerows will need to be replaced with a 2:1 ratio of newly planted hedgerows. A hedgerow of approximately 253m is to be created on site. Therefore enough compensation has been created for the hedgerow sections to be lost.
- ii Four HPI habitats were located within close proximity to the site. It is recommended that a Construction Environmental Management Plan (CEMP) is provided to manage impacts on these HPI's from site proposals.
- iii Horsetail (*Equisetum sp.*) was recorded on the site at the time of the initial survey. This is not a Schedule 9 (Wildlife and Countryside Act, 1981 as amended). However, it is considered as an invasive species due to it being difficult to control and easy to spread. If this plant is to be impacted as part of the works, it should be carefully excavated and removed/disposed of safely offsite.
- iv Common spotted orchid was identified on site at the time of the first survey. However, it was noted that this had been mowed down during the second survey on site. If any of these orchids are observed on site, it is

recommended that these are to be retained. The area with the orchid was not included within the area to be developed on site so this area is unlikely to be impacted by site proposals.

5.3 Statutorily and Non-Statutorily Designated Sites

- i The site lies within the IRZ for Bestmoor SSSI and Ardley Cutting and Quarry SSSI. The site is not directly connected to these two SSSI sites. The site is however, habitats recorded on site are of a similar type to these two designated sites as the site, although not intrinsically linked. Site proposals include a discharge to the watercourse of up to 18m³/day as well as construction of new roads and pipelines to support the residential development. However, these roads and pipelines will not be of significant size and extend to impact these designated sites. Furthermore, site proposals would be more likely to impact these SSSI's if discharge of water or liquid waste is likely to be more than 20m³/day to ground (ie to soakaway) or to surface water, such as a the stream on site, which is not the case for this site. Therefore, site proposals are considered unlikely to impact the qualifying and designating features of these local SSSIs.
- ii Two non-statutory designated sites were located within close proximity to the site. These included The Heath DWSC located 20m east and Trackway Adjacent to Gorse DWSC located 50m south from the site. It is recommended that signs are erected surrounding the development site to encourage recreational use within the circular paths proposed rather than to neighbouring land. Proposals for the site includes adequate public open space and as such it is unlikely that these non-statutory designated sites will be impacted by site proposals.
- iii Oxford meadows SAC was also located within 15.5km southwest of the site. The designated features and habitats on this SAC site are not present on site. Due to distance of this SAC to the site, it is not considered likely that the site proposals will impact this SAC.

5.4 Fauna

5.4.1 Great Crested Newts

- i Four ponds were located on site (P1-P4). Pond (P5) was also located within 500m of the site. This pond was located beyond a barrier to dispersal in the form of a flowing watercourse and a busy road. Historical data indicated that P1-P4 are breeding GCN ponds. These ponds were also identified to be a GCN receptor site as part of a GCN mitigation licence. The recent eDNA surveys also indicated P2 to have a GCN population. Survey of P1, P3 and P4 indicated a negative eDNA result however, it is considered likely that all ponds are occupied by GCN on occasion given their proximity to each other and the known reliance of a network of ponds for this species. Due to the eDNA survey results and the historical data on these ponds, it is considered likely that P1-P4 are GCN breeding ponds. Habitats on site that were suitable terrestrial habitats for foraging and commuting GCN included broadleaved plantation woodland, dense and scattered scrub, broadleaved scattered trees, poor semi-improved grassland, tall ruderal, inundation vegetation, hedgerows and marginal vegetation.
- ii In assessing this loss against the Natural England Rapid risk assessment, the total loss within the 100m intermediate zone will be approximately 0.627ha, the total loss within the 250m intermediate zone will be 0.303ha, and the loss beyond the 250m zone will be approximately 0.079ha of suitable GCN terrestrial habitat.
- iii The table below identifies the Rapid risk assessment components based on the above and confers that risk of an offence is highly likely.

Table 3: Natural England Rapid Risk Assessment

Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	Notional offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	0.5 - 1 ha lost or damaged	0.7
Land 100-250m from any breeding pond(s)	0.1 - 0.5 ha lost or damaged	0.1
Land >250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.001
Individual great crested newts	Significant disturbance of newts	0.8
	Maximum:	0.08
Rapid risk assessment result:	RED: OFFENCE HIGHLY LIKELY	

- iv The risk assessment above purposefully has allocated the 'individual great created newts' component as 'significant disturbance of newts'. This is because construction works are to be undertaken 15m from the nearest pond with breeding GCN. Therefore, it is likely that newts will be significantly impacted by site proposals. It is recommended that a GCN mitigation licence is obtained from Natural England prior to construction works commencing. In this instance, district licencing for GCN is recommended.

5.4.2 Bats

Bat Tree Roosts

- v A ground level tree assessment survey was carried out on the trees on site likely to be impacted by site proposals. A mature pedunculate oak tree and an ash tree were assessed as having moderate potential to support roosting bats as a result of knot holes, a trunk cavity and ivy cover. More details can be seen in Appendix 8. The site proposals include retaining these trees. Therefore, no further bat nocturnal surveys are recommended for these trees. It is recommended that a root protection zone is installed surrounding these trees. If site proposals change and the trees are to be removed then further nocturnal bat surveys will need to be carried out to ascertain its status as a bat roost and determine the need for a Protected Species Licence.

Bat Foraging Habitat

- vi The broadleaved plantation woodland, dense and scattered scrub, broadleaved scattered trees, poor semi-improved grassland, inundation vegetation, standing water, hedgerows, wet ditch and running water provided suitable foraging and commuting resources for bats. Whilst the site is connected to the surrounding environment to the north of the site, this is largely agricultural land, with residential areas adjacent to the west. Furthermore, the ponds, watercourses, hedgerows (except a short section less than 20m on one of the hedgerows) and the majority of the woodland are being retained as part of the development. With these areas being retained and potentially enhanced, foraging opportunities for bats could be enhanced as well as maintaining habitat connectivity through the site and beyond.
- vii A brown long eared bat record was identified located 0.63km southwest of the site during the desk study. This included one brown long eared recorded in 2001. However, no details were available to indicate whether this bat record was of a foraging, commuting or roosting bat. This record had connectivity to the site through

- hedgerows and scattered trees. Due to the record being identified about 20 years ago and developments increasing over the years surrounding this record, it is unlikely that this record is likely to be impacted by site proposals.
- viii In assessing the site against criteria in best practice guidelines (Collins J., eds, 2016) the site was considered to offer moderate quality foraging and commuting habitat for bats. Given the retention of the majority of the suitable bat habitats, it was considered disproportionate to undertake further bat activity surveys as impacts to bat foraging will be negligible post-development if mitigation measures from artificial lighting during operation are adhered to.
- ix Artificial lighting can affect the way that bats use habitats in a number of ways, depending on the species and proximity to a roost. Direct bright lighting of a roost can cause bats to delay emergence from a roost and could even cause them to desert the roost or become entombed within it (BCT and ILP, 2018). The prey items for British bats are flying insects, and many flying insects are attracted to certain types of artificial light sources, especially those that emit light with an ultraviolet component or have a high blue spectral component (BCT and ILP, 2018). Some species of bat recorded are known to be attracted to insects gathered around light sources (such as pipistrelle, noctule, Leisler's and serotine), whereas other species actively avoid lit areas (such as long-eared bats, Myotis species, barbastelle and greater and lesser horseshoe bats). Lighting within the Site could therefore be expected to affect the ways that the bats in the area are able to use the Site. As a result, it is recommended that construction works are to be undertaken in daylight hours only with no night hours work permitted.
- x Sensitive lighting on site should follow the guidance set out in Bats and Lighting in the UK (BCT and ILP, 2018). Therefore, associated site lighting proposals must consider the following:
- Avoid lighting where possible;
 - Install lamps and the lowest permissible density;
 - Lamps should be positioned to direct light to avoid upward spill onto any green corridors that could be used by commuting bats or features with bat roost potential;
 - LED lighting – with no/low UV component is recommended;
 - Lights with a warm colour temperature – 3000K or 2700K have significantly less impact on bats;
 - Light sources that peak higher than 550nm also reduce impacts to bats; and
 - The use of timers and dimmers to avoid lighting areas of the site all night is recommended.

Bat Building Roost

- xi Two buildings were located on site at the time of the survey. These were both assessed as having negligible bat roosting potential. Therefore, further nocturnal bat surveys are not considered necessary.

5.4.3 Birds

- ii The scattered trees, woodland, scrub, inundation vegetation, standing water running water, buildings and hedgerows within the site provide suitable habitat for nesting birds. A red kite record was returned on site from 2014. No details were available on whether this record included a foraging, commuting or a breeding red kite. Red kite is a Schedule 1 protected species. A red kite nest with a red kite individual using the nest was also identified during the initial phase 1 survey. Other bird species seen on site at the time of the survey included grey heron (*Ardea cinerea*), blackbird (*Turdus merula*), robin (*Erithacus rubecula*), dusk species, Canada goose (*Branta Canadensis*) and great tit (*Parus major*). While BoCC could use the site, the majority of the suitable breeding bird habitats are to be retained by site works, with likely no more than one or two pairs of any given species to be impacted. Therefore, breeding bird surveys are considered disproportional for this site.

- iii Any tree management works or vegetation clearance, should take place outside the bird nesting season to ensure compliance with the general protection afforded to wild birds under the Wildlife and Countryside Act 1981 (as amended). If this is unavoidable, the trees, scrub and hedgerows should be carefully checked, by a suitably qualified ecologist, prior to removal. Where active nests are found, working restrictions would be put in place until follow up survey can demonstrate that all chicks have fledged. This will reduce impacts to negligible.
- iv If site works are to be undertaken within the breeding bird season, then a buffer of 250m should be maintained from the red kite nest where work should not be undertaken. If site works are to be undertaken outside of the breeding bird season, then the buffer from the nests could be reduced depending on red kite activity on the nest. Further red kite surveys are recommended on site to be undertaken in the spring, once detailed design is available for the site development, to determine the location and usage of the red kite nests on site prior to site works commencing.

5.4.4 Reptiles

- xii The poor semi-improved grassland with a long sward, hedgerows, the stream, scrub, scattered trees and woodland on site were suitable habitats for commuting, refuge seeking and foraging reptiles. Brash and rubble piles were also located on site and were suitable for hibernating reptiles. The hedgerows on site also provided connectivity with the wider countryside. The closest reptile record returned from the desk study included a grass snake and a common lizard 79m northeast of the site. The majority of these habitats are to be retained as part of the site proposals and the site has connectivity to the wider landscape on the north of the site. Persistence of reptiles on site is likely and this site could form a core area for reptiles locally. However, as there remains the residual risk for reptile to pass through the site, utilising features such as the hedgerow boundaries, a careful works procedure with regard to reptiles is recommended for site vegetation clearance to allow the free dispersal of reptiles whilst clearance is underway.
- xiii The actual need for such clearance will be minimal due to the retention of the hedgerow habitats etc, however, where this is required works should be conducted in temperatures above 11 °C, ideally in the late morning to afternoon, when reptiles are most active. The habitats should first be cut to a height of 15-20cm by a tractor progressing at walking pace only. The area should be left for 24-48hrs and then cut to 5cm using the same method, working in the same direction as the previous cut. This will allow any reptiles present to disperse into the wider environment unharmed. In the extremely unlikely event a reptile is seen during these works, they should be allowed to escape unharmed at their own pace. Only a trained ecologist should attempt to move reptiles by hand. If multiple reptiles are encountered, works should cease, and the methodology be re-evaluated. Following this precautionary methodology reduces the likely impacts upon reptile to negligible.

5.4.5 Water Vole, Otter and White-Clawed Crayfish

- xiv Current proposals include a discharge from the development to the stream on the west boundary of the site. The stream on site was suitable for water voles. A water vole survey was conducted on site and identified a number of burrows likely to be field vole and rat burrows with foraging and footprint signs of rats. The survey was undertaken when water levels on the stream were low. However, the bank vegetation including tall ruderal and scrub as well as the steep banks and the varying levels of water in the stream constitute the water vole habitat on site suboptimal. Once the location of any outfall from the site to the stream has been determined, a water vole pre-commencement survey would be recommended to inform a detailed drainage design. The stream is also suboptimal for otter and white-clawed crayfish due to the varying water levels, steep banks and short width of the watercourse. Therefore, further otter and white clawed crayfish surveys were considered disproportionate.

5.4.6 Badgers and Other Priority Fauna

- xv No badger setts or field signs were recorded on site. However, the site represents good foraging habitat (grassland) and good sett building areas (under hedgerows, river/ditch banks). No badger records were returned within the desk study.
- xvi Given the suitability of the Site for badgers, it is considered that hedgehog and badgers are likely to be utilising the Site for foraging and commuting. To enable this species to move freely across the Site, small 15x15cm gaps could be left at the bottom of residential fencing. Precautionary measures are also recommended to reduce the risk of impacting badgers and hedgehogs, or any other mammals during the works.
- xvii These precautions are:
- Mammal ladders (such as a plank) or earth ramps to be placed in any open excavations at the end of each day;
 - Cap off any open pipes at the end of each day;
 - Cover any open holes, or install mammal ladders or earth ramps in any open excavations at the end of each day to prevent animals from becoming trapped;
 - Keep all fuel and other harmful substances in a locked area;
 - Ensure any spillages are treated with spill kits;
 - Night work should be avoided where possible, and any flood lighting should face away from the Site boundaries; and
 - If any fresh sett digging is observed notify an ecologist immediately and leave a 20m buffer around the area until an assessment can be made.

5.4.7 Terrestrial Invertebrates

- xviii The habitats on site were considered suitable for terrestrial invertebrates. Invertebrate surveys were conducted by Conops Entomology Ltd in 2021. Based on the assessment within this report, the site was considered to be of at least District (low) importance for terrestrial invertebrates owing to the mosaic of habitats on site. Further enhancement and creation of habitats to attract invertebrates on site are contained within the Invertebrate Assessment Report attached within Section 7. The enhancement and habitat creation on site is also based on the recommendations within the invertebrate report. However, a detailed enhancement plan and site habitat management should be included within a Landscape Environmental Management Plan (LEMP) report to be produced once detailed design within site proposals are available. The habitat mosaic including short turf and bare ground recommended to be included in the habitats within the invertebrate report should be included within the LEMP on site.

5.4.8 Biodiversity

- xix The biodiversity net gain metric results included a habitat net gain of more than 10% and a significant hedgerow net gain. Habitats to be enhanced within this site included the hedgerows and woodland with sections of grassland enhanced to create wildflower meadows. Mixed scrub and sustainable drainage system (SuDS) ponds are also to be created on site and additional native planting to be conducted.

6 SUMMARY OF POTENTIAL IMPACTS

Table 4: Table Summary of Impacts

Ecological Feature	Importance (Geographic Frame of Reference)	Potential Effect	Mitigation Proposed	Proposed Mechanism to Secure	Residual Impact
Statutory Designated Sites	County or above	<p>Site located within the IRZ of SSSI's but proposals not of a type that are likely to impact these SSSI's.</p> <p>Oxford meadows SAC was also located within 15.5km southwest of the site but due to the distance between the designated site and the site and the lack of connectivity between the sites, it is not considered to be impacted by site proposals.</p>	N/A	N/A	Not significant
Non-statutory designated sites	County	Impacts on non-statutory designated sites from site proposals.	It is recommended that signs are erected surrounding the development site to direct residents away from these designated sites. It is recommended that the site proposals include adequate public open space within the site as it is currently planned within the site proposals.	N/A	N/A
Habitats including invasive and Priority flora	Negligible	<p>Impacts on HPI habitats on site including hedgerows and impacts on HPI habitats on close proximity to the site.</p> <p>Horsetail on site to be spread during works.</p>	<p>Retention of majority of hedgerows and trees in accordance with root protection areas.</p> <p>Construction Environmental Management Plan (CEMP) recommended to manage impacts on these HPI's from site proposals.</p> <p>Horsetail to be removed and treated.</p>	Planning Condition – details within a CEMP	Not significant
Reptiles	Local	Potential for killing/injury of individual animals during vegetation removal and construction.	Precautionary In relation to legislative protection of animals	Planning Condition – detail within a PMW/CEMP	Not significant – Positive impact in terms of

Ecological Feature	Importance (Geographic Frame of Reference)	Potential Effect	Mitigation Proposed	Proposed Mechanism to Secure	Residual Impact
					connectivity through the site to the North through creation of scrub.
Bats – Roosting	Local	Possible damage/destruction of transitional roost within the two moderate potential trees.	Trees T1 and T2 with moderate bat roosting potential to be retained and root protection zones to be installed around them.	N/A	Not significant
Bats – Foraging/Commuting	Local	Unlikely to be impacted by proposals as the majority of the moderate quality habitat present on site is to be retained.	Replacement of vegetation with native tree species and maintenance of connective features such as hedgerows and tree lines by adhering to root protection zones. Implementation of sensitive bat lighting scheme.	Planning Condition – details within CEMP and LEMP	Not significant - Positive impact in terms of connectivity through the site to the North through addition of another hedgerow, additional tree planting and creation of scrub.
Great crested newts	Local	Four breeding ponds retained on site but impacted by site proposals.	It is recommended that a GCN district licence is obtained prior to construction works commencing.	Planning condition and district licensing agreement	Low impact likely following licence – site to be enhanced for GCN through

Ecological Feature	Importance (Geographic Frame of Reference)	Potential Effect	Mitigation Proposed	Proposed Mechanism to Secure	Residual Impact
					addition of another hedgerow, SuDS ponds, additional tree planting and creation of scrub.
White Clawed Crayfish	N/A	Habitats on site unsuitable for these species.	No	N/A	Not significant
Water vole	N/A	Discharge from development to stream likely to contain water voles.	A single water vole survey conducted during which no water vole signs were identified. Once the location of any outfall from the site to the stream has been determined, a water vole pre-commencement survey would be recommended to inform a detailed drainage design.	Pre-construction survey - CEMP	Minor significance
Badgers	Local	Potential for killing/injury of badgers and hedgehogs commuting and foraging through the site.	Precautionary Method of Works for badgers and hedgehogs.	PMW	Not significant
Breeding birds	Local	Damage or destruction of red kite nest on site. Likely nests of other species on site.	Precaution in relation to legislative protection of birds. If site works are to be undertaken within the breeding bird season, then a buffer of 250m should be maintained from the red kite nest where work should not be undertaken. If site works are to be undertaken outside of the breeding bird season, then the buffer from the nests could be reduced depending on red kite activity on the nest. Further red kite surveys are recommended on site to be undertaken in the spring, once detailed design is available for the site development, to determine the location and usage of the red kite nests on site prior to site works commencing.	Planning Condition -details within a CEMP	Likely high significance

Ecological Feature	Importance (Geographic Frame of Reference)	Potential Effect	Mitigation Proposed	Proposed Mechanism to Secure	Residual Impact
Otter	N/A	Habitats on site unsuitable for these species.	No	N/A	N/A
Invertebrates	District	Habitats on site were suitable for terrestrial invertebrates. Invertebrate surveys were conducted on site by Conops Entomology Ltd. The site is considered to be of District importance for terrestrial invertebrates.	Habitat enhancement and creation within recommendations.	Habitat enhancement and creation within recommendations.	Not significant
Biodiversity	Local	Removal of sections higher quality habitats including tall ruderal, broadleaved scattered trees, ephemeral vegetation and scrub.	<p>Extensive habitat creation including mixed scrub and sustainable drainage system (SuDS) ponds as well as enhancement of grassland to create wildflower meadows and enhancement of woodland. Native tree planting is also recommended.</p> <p>A River Condition Assessment on the stream and ditches were not conducted on this site due to the development being in the feasibility stage, the stream and ditches on site being retained and the overall habitat net gain on site not being affected by the river assessment, it is not considered necessary for the river assessment to be conducted at this stage of the development. It is recommended that a river condition assessment is conducted once detailed design for the site proposals become available.</p>	Planning Condition – details within LEMP and 30-year management plan	Significant positive

7 COMPENSATION & ENHANCEMENT RECOMMENDATIONS

- v It is a requirement of the NPPF (2021) that developments provide a measurable net gain for biodiversity post development.
- vi In addition to current proposals, a significant increase in biodiversity could be obtained from the enhancement of grassland on site into wildflower meadows and the enhancement of woodland on site. The hedgerows on site will be enhanced and new scrub and trees will be planted on site. Temporary ponds acting as sustainable drainage systems will be created on site. The recommendations below also follow the enhancement recommendations provided within the invertebrate report.

1.1.2 Hedgerows

- vii A new hedgerow is to be created on the northeast boundary of the site and the existing hedgerows to be enhanced to create a species-rich hedgerow. The existing hedgerows on site are also to remain on the same condition as they are but enhanced into species rich hedgerows. In order to achieve a species rich hedgerow five species on average per 30m should be present within the hedgerow. A minimum of 5 species should be planted, which may include, field maple (*Acer campestre*), alder (*Alnus glutinosa*), common dogwood (*Cornus sanguinea*), hazel (*Corylus avellane*) and guelder rose (*Viburnum opulus*), Standard trees such as English oak (*Quercus robur*) and wild cherry (*Prunus avium*) can also be planted at 50m intervals.
- viii Ground flora to be planted within the hedgerows. It is recommended that this is planted with a hedgerow flora mix - N9F Hedgerow Mix Flowers - or similar. Wildflower species include yarrow (*Achillea millefolium*) 3%, common agrimony (*Agrimonia eupatoria*) 4%, garlic mustard (*Alliaria petiolate*) 7%, common knapweed (*Centaurea nigra*) 6%, wild foxglove (*Digitalis purpurea*) 3%, meadowsweet (*Filipendula ulmaria*) 4%, hedge bedstraw (*Galium mollugo*) 4%, hedgerow cranesbill (*Geranium pyrenaicum*) 1%, wood avens (*Geum urbanum*) 5%, common st. John's wort (*Hypericum perforatum*) 2%, field scabious (*Knautia arvensis*) 4%, meadow vetchling (*Lathyrus pratensis*) 3%, autumn hawkbit (*Leontodon autumnalis*) 2%, oxeye daisy (*Leucanthemum vulgare*) 5%, musk mallow (*Malva moschata*) 5%, common mallow (*Malva sylvestris*) 4%, selfheal (*Prunella vulgaris*) 5%, white campion (*Silene alba*) 5%, red campion (*Silene dioica*) 7%, bladder campion (*Silene vulgaris*) 2%, hedge woundwort (*Stachys sylvatica*) 6%, upright hedge parsley (*Torilis japonica*) 4%, dark mullein (*Verbascum nigrum*) 3%, tufted vetch (*Vicia cracca*) 5% and wood vetch (*Vicia sylvatica*) 1%. Grass species include common bent (*Agrostis capillaris*) 3%, sweet vernal grass (*Anthoxanthum odoratum*) 2.5%, crested dogstail (*Cynosurus cristatus*) 11%, tufted hairgrass (*Deschampsia cespitosa*) 1.5%, hard fescue (*Festuca Trachyphylla*) 14%, chewing's fescue (*Festuca rubra* ssp. *Commutate*) 12%, slender creeping red fescue (*Festuca rubra* ssp. *Litoralis*) 14%, strong creeping red fescue (*Festuca rubra* ssp. *rubra*) 14%, wood meadow grass (*Poa nemoralis*) 14% and smooth stalked meadow grass (*Poa pratensis*) 14%.
- ix Planting should be undertaken during early winter, providing the ground is not frozen. Planting up gaps can be done in conjunction with coppicing existing plants, to give new plants minimum competition. To further reduce competition and aid establishment of the planted-up sections, the bases of the plants would be kept weed free through spot treatment of herbicide for the first three years.

1.1.3 Amenity Grassland

- x New modified grassland in the form of amenity grassland to be planted throughout the east and northwest of the site surrounding the areas to be developed. Likely to be short-mown, well managed and often disturbed. A condition assessment has been carried out to determine the likely condition of the habitat. If a lawn mix is used which can withstand regular mowing, poor condition can be achieved (the habitat would

pass 3 out of 7 criteria). N14 Flowering Lawn Mixture by Naturescape is recommended due to its ability to tolerate close mowing to a height of around 5cm for the majority of the year. It is recommended that the grassland be sown with flowering lawn mix (Naturescape N14 Flowering Lawn Mixture) as the species in this mixture will all tolerate close mowing to a height of about 5cm for the majority of the year. Species within this mixture include wildflowers yarrow (*Achillea millefolium*) 4%, kidney vetch (*Anthyllis vulneraria*) 4%, lady's bedstraw (*Galium verum*) 12%, Common Cat's ear (*Hypochaeris radicata*) 3%, rough hawkbit (*Leontodon hispidus*) 4%, oxeye daisy (*Leucanthemum vulgare*) 8%, birds foot trefoil (*Lotus corniculatus*) 10%, ribwort plantain (*Plantago lanceolata*) 8%, cowslip (*Primula veris*) 7%, selfheal (*Prunella vulgaris*) 16%, meadow buttercup (*Ranunculus acris*) 12% and common sorrel (*Rumex acetosa*) 12%. Grass species include common bent (*Agrostis capillaris*) 5%, crested dogstail (*Cynosurus cristatus*) 15%, hard fescue (*Festuca Trachyphylla*) 20%, slender creeping red fescue (*Festuca rubra ssp. Litoralis*) 20%, strong creeping red fescue (*Festuca rubra ssp. Rubra*) 20% and smooth stalked meadow grass (*Poa pratensis*) 20%.

1.1.4 Wildflower meadows

- xi Enhancing the grassland areas on site to the west of the site including the improved grassland, semi-improved grassland and amenity grassland by creating wildflower meadows will provide a broad variety of food sources for a diverse range of invertebrates, including lepidopterans and pollinators. This will, in turn provide an ample food source for insectivores such as bats and hedgehogs and will create a foraging corridor on site.
- xii The ground could be prepared for supplementary planting with minimal effort, using a chain harrow. Any existing vegetation should be removed, and the soil should be raked to break it up, producing a fine, firm later of soil. It is recommended that N5 Long Season Meadow Mix (available from Naturescape) is used to allow for a long growing season, producing an aesthetically pleasing meadow of flowers, thus negating the requirement for an extensive mowing regime. Wildflower species and their composition within this mix included yarrow (*Achillea millefolium*) 3%, common knapweed (*Centaurea nigra*) 5%, greater knapweed (*Centaurea scabiosa*) 3%, wild carrot (*Daucus carota*) 5%, viper's bugloss (*Echium vulgare*) 2%, lady's bedstraw (*Galium verum*) 6%, meadow cranesbill (*Geranium pratense*) 2%, common catsear (*Hypochaeris radicata*) 2%, field scabious (*Knautia arvensis*) 3.5%, meadow vetchling (*Lathyrus pratensis*) 2%, rough hawkbit (*Leontodon hispidus*) 2%, oxeye daisy (*Leucanthemum vulgare*) 5%, common toadflax (*Linaria vulgaris*) 1%, birdsfoot trefoil (*Lotus corniculatus*) 4%, musk mallow (*Malva moschata*) 3%, hoary plantain (*Plantago media*) 2.5%, Cowslip (*Primula veris*) 3%, selfheal (*Prunella vulgaris*) 7%, meadow buttercup (*Ranunculus acris*) 5%, bulbous buttercup (*Ranunculus bulbosus*) 5%, yellow rattle (*Rhinanthus minor*) 6%, common sorrel (*Rumex acetosa*) 5%, small scabious (*Scabiosa columbaria*) 3%, red campion (*Silene dioica*) 4%, betony (*Stachys officinalis*) 3%, devilsbit scabious (*Succisa pratensis*) 2%, wild red clover (*Trifolium pratense*) 2.5%, dark mullein (*Verbascum nigrum*) 1.5% and tufted vetch (*Vicia cracca*) 2%. Grass species and their composition within this mix included common bent (*Agrostis capillaris*) 3%, sweet vernal grass (*Anthoxanthum odoratum*) 3%, quaking grass (*Briza media*) 2%, crested dogstail (*Cynosurus cristatus*) 22%, hard fescue (*Festuca Trachyphylla*) 22%, chewing's fescue (*Festuca rubra ssp. commutata*) 22%, slender creeping red fescue (*Festuca rubra ssp. litoralis*) 13%, meadow barley (*Hordeum secalinum*) 1%, smooth stalked meadow grass (*Poa pratensis*) 10% and yellow oatgrass (*Trisetum flavescens*) 2%.
- xiii Seeds should be sowed during autumn or spring, and if there is a dry period, the soil being sowed should be watered. Bare ground can be incorporated within the wildflower meadow comprising approximately 30% of the habitat mosaic and exposed to sun for much of the day including the key period between 10am and 4pm. This can be managed and designed within a Landscape Environmental Management Plan (LEMP) for the site.

- xiv Once established, the grassland will only require mowing in September (with the arisings being left for 48hrs prior to removal to allow the seeds to disperse for the following year).
- xv A condition assessment has been carried out to determine the likely condition of the habitat once created. Moderate condition is considered achievable if the following conditions are met: a seed mix with a variety of grasses and wildflower species is planted; a varied sward height is maintained with at least 20% of the sward at less than 7cm and at least 20% at greater than 7cm in height; cover of bracken is discouraged (acceptable cover is less than 20% total ground cover); scrub is discouraged from encroaching (acceptable cover is less than 5% total ground cover); non-native invasive species are not planted and prevented from growing at all; undesirable species and physical damage (poaching, machinery damage and damaging levels of access) accounts for less than 5% of total area of the other neutral grassland habitat. Undesirable species include creeping thistle, spear thistle, curled dock, broad-leaved dock, common nettle, creeping buttercup, greater plantain, white clover and cow parsley.

1.1.5 Woodland

- xvi A condition assessment has been carried out to determine the likely condition of the woodland to be enhanced. Good condition is considered achievable if the following conditions are met: All three classes of trees present in woodland with trees 4-7cm dbh, saplings and seedlings or advanced coppice regrowth. This can be achieved by adding more mature and semi mature trees within the woodland. Other suggestions include 50% of all survey plots within the woodland parcel to have standing deadwood, large dead branches/ stems and stumps as well as no nutrient enrichment or damaged ground evident within the woodland. It is also recommended that ancient woodland flora indicators are present within this site. This can be achieved by enhancing the understorey of the woodland using a ground flora seed mix such as the N10 Value Woodland Meadow Mixture, which includes heavy shade tolerant species. Wildflower species and their composition within this mixture include common Agrimony (*Agrimonia eupatoria*) 5%, garlic mustard (*Alliaria petiolate*) 8%, ramsons/wild Garlic (*Allium ursinum*) 3%, wild angelica (*Angelica sylvestris*) 5%, nettle leaved bellflower (*Campanula trachelium*) 3%, wild foxglove (*Digitalis purpurea*) 5%, meadowsweet (*Filipendula ulmaria*) 5%, hedge bedstraw (*Galium mollugo*) 5%, herb robert (*Geranium robertianum*) 0.5%, wood avens (*Geum urbanum*) 7%, English Bluebell (*Hyacinthoides non-scripta*) 12%, hairy St. John's Wort (*Hypericum hirsutum*) 3%, wild primrose (*Primula vulgaris*) 1%, selfheal (*Prunella vulgaris*) 8%, red campion (*Silene dioica*) 7.5%, betony (*Stachys officinalis*) 5%, hedge woundwort (*Stachys sylvatica*) 8%, wood sage (*Teucrium scorodonia*) 5% and upright hedge parsley (*Torilis japonica*) 4%. Grass species and their composition within this mixture include common bent (*Agrostis capillaris*) 3%, sweet vernal grass (*Anthoxanthum odoratum*) 3%, crested dogstail (*Cynosurus cristatus*) 11%, tufted hairgrass (*Deschampsia cespitosa*) 5%, hard fescue (*Festuca Trachyphylla*) 14%, slender creeping red fescue (*Festuca rubra ssp. Litoralis*) 14%, strong creeping red fescue (*Festuca rubra ssp. Rubra*) 14%, wood meadowgrass (*Poa nemoralis*) 22% and smooth stalked meadow grass (*Poa pratensis*) 14%.
- xvii Deadwood could also be introduced to the woodland sections on site to enhance the site for invertebrates. It is recommended that the deadwood including trunks of trees and other timber is as large as possible and is left whole or sectioned only as large-volume pieces. Sectioning timber into log piles does not function as an invertebrate feature.

1.1.6 Scrub and Tree Planting

- xviii Newly planted mixed scrub areas are recommended to be created around the site. This can be planted with native species such as apples (*Malus domestica agg.*), blackthorn (*Prunus spinosa*), cherry plum (*Prunus cerasifera*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*), plums (*Prunus domestica agg.*),

rowan (*Sorbus aucuparia*) and willows (*Salix spp.*). These areas of scrub should also be managed sensitively for wildlife, with sections cleared on a rotational basis to produce clearings within this habitat. The bases of the plants should be kept free from weeds within the first three years, and failed stock should be replaced each winter.

xix A condition assessment has been carried out to determine the likely condition of the scrub. Moderate condition is considered achievable if the following conditions are met: a mix of native-only species containing at least three woody species with no one species comprising greater than 75% of the cover; a range of ages is planted across the created area including seedlings, young shrubs and mature shrubs to create a varied age range across the habitat (rotational clearance of this habitat would also aid in producing a varied age range); non-native invasive species are not planted and are prevented from growing and undesirable species (creeping thistle, common nettle, cherry laurel, snowberry, buddleia, cotoneaster sp. and spanish bluebell or hybrids thereof) make up less than 5% ground cover and lastly, the scrub maintains a well-developed edge with scattered scrub/tall grassland between the scrub and adjacent habitats, which is achievable if some scattered scrub is allowed to grow at the edges or grassland is left taller around the edges of the scrub.

xx It is recommended that any trees that are removed will be replaced on a like for like basis, to limit the loss of biodiversity for the development. This will help the development to continue to support species, such as roosting and foraging bats and nesting birds. Also, a number of new trees are recommended to be added between the development edges and the hedgerows on site as well as within the centre of the development. Species such as silver birch (*Betula pendula*), rowan (*Sorbus aucuparia*) and whitebeam (*Sorbus aria*) would make attractive additions to the Site. In particular rowan will provide a valuable source of berries late into the winter months and provide an important food source for native and migratory bird species. Ash and elm should currently be avoided due to the prevalence of 'Ash die-back' and 'Dutch elm disease', as stocks of these species cannot be guaranteed to be free from these afflictions. The planting of fruit trees, such as crab apple (*Malus sylvestris*) and wild cherry (*Prunus avium*) would also provide a valuable foraging resource for terrestrial mammals, such as badgers. The use of native species in tree planting is also encouraged as these can harbour a high diversity of invertebrates. For example, English oak trees have over 400 associated invertebrate species (Kennedy & Southwood, 1984). Other suggested planting of benefit to invertebrates includes:

- Willow (*Salix sp.*);
- Hawthorn (*Crataegus monogyna*);
- Blackthorn (*Prunus spinosa*);
- Hazel (*Corylus avellana*); and
- Birch (*Betula sp.*).

7.1.1 Sustainable drainage systems (SuDS)

- i SuDS are included within the drainage strategy for the site with three basins proposed on the west section of the site. These basins are designed for infiltration and will be dry under 'normal' conditions.
- ii Sustainable drainage systems are the preferred method for managing surface water run-off from a development area. The SuDS are recommended to imitate the natural drainage of a site a series of drainage techniques including the SuDS should be employed to reduce flow rates and volumes, minimise pollution and reduce the impact of the quantity and quality of water outflowing from a development.
- iii It is recommended that the following conditions be met in order to achieve moderate condition: a diverse range of flowering plants are planted within the SUDS features to provide nectar sources for insects; non-

native invasive species are kept to less than 5% total vegetated area however it is suggested that these species are avoided entirely.

- iv Areas of marsh/we ground within the basins could be planted with native marginal plug plant species, such as N7F wetland mix flowers only. This comprises 22 wildflower species including yarrow (*Achillea millefolium*) 2.5%, common knapweed (*Centaurea nigra*) 9%, meadowsweet (*Filipendula ulmaria*) 8%, meadow vetchling (*Lathyrus pratensis*) 3%, oxeye daisy (*Leucanthemum vulgare*) 7%, bird's foot trefoil (*Lotus corniculatus*) 4%, greater bird's foot trefoil (*Lotus pedunculatus*) 4%, ragged robin (*Lychnis flos-cuculi*) 2%, common restharrow (*Ononis repens*) 2%, ribwort plantain (*Plantago lanceolata*) 4%, cowslip (*Primula veris*) 3%, selfheal (*Prunella vulgaris*) 8%, meadow buttercup (*Ranunculus acris*) 9%, yellow rattle (*Rhinanthus minor*) 10%, common sorrel (*Rumex acetosa*) 8%, great burnet (*Sanguisorba officinalis*) 2%, sawwort (*Serratula tinctoria*) 1%, betony (*Stachys officinalis*) 2.5%, scabious devils bit (*Succisa pratensis*) 3.5%, goatsbeard (*Tragopogon pratensis*) 2%, wild red clover (*Trifolium pratense*) 3% and tufted vetch (*Vicia cracca*) 3%.

7.2 Protected/Principal Species

- i Additional enhancements that could easily be met within the development scope include the incorporation of bat and bird nest boxes. Bird and bat boxes could be placed on retained trees within the Site boundaries as well as on newly constructed buildings on site. The tree mounted bat boxes should face south (for additional warmth), and be positioned at least 4 metres from the ground, with the entrances being free of overhanging branches. It is also recommended that bird nest boxes be placed 1.5m below each bat box, to ensure that the birds have somewhere to nest and do not inhabit the bat boxes. Use of boxes such as the Vivara woodstone box provide a long-term nest box solution requiring limited replacement unlike wooden boxes which need regular replacement as a result of weathering. Suitable bat box dimensions are 430mm high X 270mm wide X 140mm deep. The boxes are designed to mimic natural roost sites and to provide a stable environment.

Figure 7: Bat Box Example



© NHBS

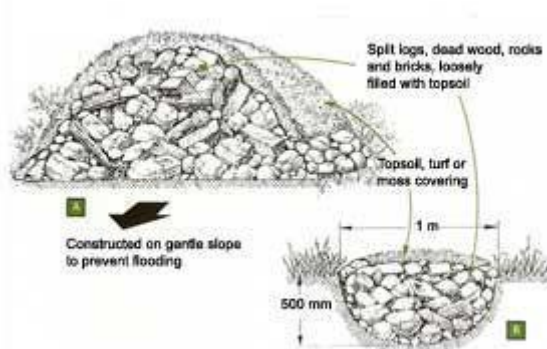
Figure 8: Bird Box Example



© NHBS

- ii Log piles, rocks and dead wood under dense ground cover could also be created across the west section of the Site for herpetofauna hibernacula. These will provide important places for herpetofauna to rest during the day or during cold or dry weather. Hibernacula should be c. 2m² long, a minimum of 0.5m wide and c.1m in height and comprise log or debris piles with a cap composed of topsoil and a turf covering.

Figure 9: Hibernacula Example



© Froglife 2001

- iii Deadwood in sheltered sunny situations can be easily provided through the reworking of any felled on-site material from the woodland and trees on site. Each deadwood piece should ideally be a minimum of 20 cm in diameter, and no less than 1.5 m in length. The reworked tree trunk can be inserted into the ground as posts to replicate standing deadwood or, if of significant size, can be positioned in sunny locations on the edges of grasslands.
- iv Additional enhancements for invertebrates could also be easily met within the development scope by including insect houses on any retained trees on site. These nest boxes will help to provide a variety of niches for a diverse spectrum of invertebrates to inhabit, and therefore help to increase the terrestrial invertebrate species diversity on site.
- v Where any permanent residential fencing is to be constructed, small 15x15cm mammal holes should be installed within these fences. 'Hedgehog Highway' signs (available from the British Hedgehog Preservation Society) could be installed above these holes to prevent them being filled in in the future. This will help to

maintain their permanency and so the connectivity for mammals, such as hedgehogs, to the site and the surrounding landscape. Hedgehog boxes could also be installed under hedgerows.

Figure 10: Hedgehog Highway



© NHBS

8 MONITORING

8.1.1 Great Crested Newts

- i A GCN district licence is recommended for this site. Post licence monitoring GCN presence/absence surveys may be required following the acquisition of the GCN district licence. Monitoring details to be confirmed as part of the GCN district licence.

ii

8.1.2 Red Kite and Breeding Birds

- iii Further red kite surveys are recommended on site to be undertaken in the spring, to inform detailed design for the site development and to determine the location and usage of the red kite nests on site prior to site works commencing.

- iv Bird boxes are recommended to be erected on retained and newly planted trees on site as part of the development. It is recommended that once these are installed on site, they should be cleaned out regularly.

8.1.3 Bats

- v Bat boxes are recommended to be erected on retained and newly planted trees on site as part of the development. It is recommended that once these are installed on site, they should be cleaned out regularly.

9 REFERENCES

- i Amphibian and Reptile Groups of the United Kingdom, 2010. ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index. s.l.:s.n.
- ii Institution of Lighting Professionals and Bat Conservation Trust (2018). Bats and Artificial Lighting in the UK – Bats and the Built Environment Series Guidance Note. 08/18
- iii Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.
- iv BS 42020:2013 Biodiversity – Code of Practice for Planning and Development 2013: The British Standards Institution.
- v Chartered Institute of Ecology and Environmental Management, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Winchester: CIEEM.
- vi Chartered Institute of Ecology and Environmental Management, 2017. Guidelines for Preliminary Ecological Appraisal. 2nd ed. Winchester: CIEEM.
- vii Clements, D. & Tofts, R., 1992. Hedgerow Evaluation and Grading Systems (HEGS). s.l.:s.n.
- viii Collins J eds. 2016. Bat Surveys: Good Practice Guidelines, 3rd Edition. London: Bat Conservation Trust.
- ix Dean, M. et al. (2016). The Water Vole Mitigation Handbook. The Mammal Society, London
- x Department of Communities & Local Government, 2019. National Planning Policy Framework, London: DCLG.
- xi English Nature, 2001. Great Crested Newt Mitigation Guidelines. Peterborough: English Nature.
- xii Freshwater Habitat Trust 2021. Pond Creation Toolkit, <https://freshwaterhabitats.org.uk/projects/million-ponds/pond-creation-toolkit/>. Accessed 6th April 2021.
- xiii Froglife (1999) Reptile Survey: An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation. Froglife Advice Sheet 10. Froglife, Halesworth.
- xiv Gent, A. H., and Gibson, S. D., eds. (2003) Herpetofauna Workers' Manual. Peterborough, Joint Nature Conservation Committee.
- xv Harris S, Cresswell P and Jefferies D (1989) Surveying Badgers, Mammal Society.
- xvi Joint Nature Conservancy Council, 2016. Handbook for Phase 1 habitat survey (revised 2016). Peterborough: JNCC.
- xvii Joint Nature Conservation Committee, 2004. Bat Workers Manual. 2nd ed. Peterborough: s.n.
- xviii Kennedy, C & Southwood, T (1984). The Number of Species of Insects Associated with British Trees: A Re-analysis. *Journal of Animal Ecology*, 53:455-478.
- xix Natural England (2009) Interpretation of 'Disturbance' in relation to badgers occupying a sett, WMLG16. Natural England, Peterborough.
- xx Natural England (2009) Guidance on 'Current Use' in the definition of a Badger Sett, WMLG17. Natural England, Peterborough.
- xxi Neal J, and Cheeseman C, (1996) Badgers, Poyser Natural History.
- xxii Office of the Deputy Prime Minister, 06/2005. Government Circular: Biodiversity and Geological Conservation - Statutory Obligations and their impact within the planning system. London: ODPM.
- xxiii Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great

- xxiv Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.
- xxv Roper T.J., (2010) Badger. Collins New Naturalist.
- xxvi Reading, Chris & Jofré, Gabriela. (2009). Habitat selection and range size of grass snakes *Natrix natrix* in an agricultural landscape in southern England. Amphibia-Reptilia. 30. 379-388.
- xxvii Stace C (2019). New Flora of the British Isles 4th Edition, C&M Floristics
- xxviii Strachan, *et al.* (2011). Water Vole Conservation Handbook. 3rd Ed.
- xxix 4 Acre Ecology limited (2019). Heyford Park, Oxfordshire Great Crested Newt Survey On Behalf of: The Dorchester Group
- xxx Conops Entomology Ltd. (2021). Land at Upper Heyford An Invertebrate Assessment A report for: Ramm Sanderson 01 November 2021. Report number: 37.21
- xxxi Tyler Grange (2021). Land North of Camp Road, Heyford Park: Preliminary Arboricultural Impact Assessment. Report No. 13464_R05_LS_TW.

10 LEGISLATION AND PLANNING POLICY

10.1 General & Regionally Specific Policies

i Articles of British legislation, policy guidance and both Local Biodiversity Action Plans (BAPs) and the NERC Act, 2006 are referred to throughout this report. Their context and application is explained in the relevant sections of this report. The relevant articles of legislation are:

- Environment Act 2021;
- The National Planning Policy Framework (2021);
- ODPM Circular 06/2005 (retained as Technical Guidance on NPPF 2021);
- Local planning policies ESD9, ESD10 and ESD11 (Cherwell District Council North Oxfordshire);
- The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- EC Council Directive on the Conservation of Wild Birds 79/409/EEC;
- National Parks and Access to the Countryside Act 1949;
- The Protection of Badgers Act 1992;
- The Countryside and Rights of Way Act 2000;
- The Hedgerow Regulations 1997;
- The Natural Environment and Rural Communities (NERC) Act 2006;
- Local Biodiversity Action Plan for Oxfordshire

ii Specifically, ESD9 of the Cherwell District Council North Oxfordshire:

“Developers will be required to demonstrate that:

- *During construction of the development there will be no adverse effects on the water quality or quantity of any adjacent or nearby watercourse*
- *During operation of the development any run-off of water into adjacent or surrounding watercourses will meet Environmental Quality Standards (and where necessary oil interceptors, silt traps and Sustainable Drainage Systems will be included)*
- *New development will not significantly alter groundwater flows and that the hydrological regime of the Oxford Meadows SAC is maintained in terms of water quantity and quality*
- *Run-off rates of surface water from the development will be maintained at greenfield rates.”*

iii ESD10 states:

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

- *In considering proposals for development, a net gain in biodiversity will be sought by protecting, managing, enhancing and extending existing resources, and by creating new resources*
- *The protection of trees will be encouraged, with an aim to increase the number of trees in the District*
 - *The reuse of soils will be sought*

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

iv ESD11 states:

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

10.2 Bats and Great Crested Newts

- i Great crested newt and species of British bats are fully protected within UK Law under *Wildlife and Countryside Act 1981* (as amended) through their inclusion in Schedule 5. Under the Act, they are protected from:
- Intentional or reckless killing, injury, taking;
 - Damage to or destruction of or, obstruction of access to any place of shelter, breeding or rest;
 - Disturbance of an animal occupying a structure or place;
 - Possession or control (live or dead animals);
 - Selling, bartering or exchange of these species, or parts of.
- ii This law is reinforced by the UK's transposition of the EU Habitats Regulations under *The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended)*. These Regulations also prohibit:
- the deliberate killing, injuring or taking of great crested newt or bats;
 - the deliberate disturbance of any great crested newt or bat species in such a way as to be significantly likely to affect:
 - their ability to survive, hibernate, migrate, breed, or rear or nurture their young; or
 - the local distribution or abundance of that species.
 - damage or destruction of a breeding site or resting place;
 - the possession or transport of great crested newt or bats or any other part of.
- iii Under certain circumstances a licence may be granted by Natural England to permit activities that would otherwise constitute an offence. In relation to development, a scheme must have full planning permission before a licence application can be made.
- iv In addition, seven British bat species are listed as Species of Principal Importance (SPI) under the Natural Environment and Rural Communities (NERC) Act, 2006. These are barbastelle (*Barbastellus barbastellus*), Bechstein's (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared (*Plecotus auritus*), greater horseshoe (*Rhinolophus ferrumequinum*) and lesser horseshoe (*Rhinolophus hipposideros*).
- v Under the National Planning Policy Framework 2019 the presence of any protected species is a material planning consideration. The Framework states that impacts arising from development proposals must be avoided where possible or adequately mitigated/compensated for and that opportunities for ecological enhancement should be sought.

10.3 Birds

- i The Wildlife and Countryside Act 1981 (as amended) is the Priority legislation affording protection to UK wild birds. Under this legislation all birds, their nests and eggs are protected by law and it is an offence, with certain exceptions, to recklessly or intentionally:
- Kill, injure or take any wild bird;
 - Take, damage or destroy the nest of any wild bird while it is in use or being built;
 - Take or destroy the egg of any wild bird.
- ii For birds listed on Schedule 1 of the Act, it is an offence to disturb any bird while it is building a nest, is at or near a nest with young; or disturb the dependant young of such a bird.
- iii Species listed in Annex 1 of the EU Birds Directive 1994 (e.g. barn owl) are required to have special conservation measures taken to preserve their habitats and sites to be classified as Special Protection Areas (SPAs) where appropriate.

10.4 Reptiles

- i All reptile species are partially protected under Schedule 5 (Sections 9(1) and 9(5)) of the Wildlife and Countryside Act 1981 (as amended). This legislation protects these animals from:
- Reckless or intentional killing and injury;
 - Selling, offering for sale, possessing or transporting for the purpose of the sale or publishing advertisements to buy or sell a protected species.
- ii In addition to the above legislation, UK rare reptiles; sand lizards (*Lacerta agilis*) and smooth snakes (*Coronella austriaca*), are listed under The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended). This makes it an offence to:
- Capture, kill, injure and disturb;
 - Take or destroying eggs;
 - Damage or destroy breeding/resting places;
 - Obstruct access to resting places; and
 - Possess, advertise for sale, sell or transport for sale, live or dead (part or derivative).
- iii Where these animals are confirmed as present on land that is to be affected by development guidance recommends that:
- The animals should be protected from injury or killing during construction operations;
 - Mitigation should be provided to maintain the conservation status of the species locally;
 - Under the National Planning Policy Framework 2019 the presence of any protected species is a material planning consideration. The Framework states that impacts arising from development proposals must be avoided where possible or adequately mitigated/compensated for and that opportunities for ecological enhancement should be sought.

10.5 Water Vole

- i Water voles (*Arvicola amphibius*) are protected under Schedule 5 Section 9 of the Wildlife & Countryside Act 1981 (as amended). It is an offence to intentionally kill, injure or capture a water vole, to intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or to disturb water voles while they are using such a place.

10.6 White-clawed Crayfish

- i White-clawed crayfish (*Austropotamobius pallipes*) are protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) and under the Act it is an offence to intentionally take white-clawed crayfish from the wild and to sell them. This species is also protected under the Habitat Regulations 2010 (as amended), requiring the designation of Special Areas of Conservation to protect important populations of this species.

10.7 Otter

- i The European otter (*Lutra lutra*) is the only native UK otter species. It is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981. This law is reinforced by the UK's transposition of the EU Habitats Regulations under The Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019 (as amended). Together, these Regulations make it an offence to:
- capture, kill, disturb or injure otters (on purpose or by not taking enough care)
 - damage or destroy a breeding or resting place (deliberately or by not taking enough care)
 - obstruct access to their resting or sheltering places (deliberately or by not taking enough care)
 - possess, sell, control or transport live or dead otters, or parts of otters
- ii A convicted offence could get an unlimited fine and up to 6 months in prison.

10.8 Badgers

- i Badgers (*Meles meles*) and their setts are protected by the Protection of Badgers Act 1992. This makes it an offence to:
 - intentionally capture, kill or injure a badger;
 - damage, destroy or block access to their setts;
 - disturb badgers in setts;
 - treat a badger cruelly;
 - deliberately send or intentionally allow a dog into a sett; and
 - bait or dig for badgers.
- ii Case law for this species contains example prosecutions of imprisonment for six months and heavy fines.

10.9 Hedgehogs and Common Toads

- i Under the NERC Act 2006, the hedgehog (*Erinaceus europaeus*) and common toad (*Bufo bufo*) are categorised as a 'Species of Principal Importance' for biodiversity. Furthermore, both are local biodiversity action plan species (LBAP) for Oxfordshire. Listing as SPI reflects concerns that populations have suffered a rapid and sustained decline in the UK. As such, they are a material consideration during planning.

10.10 Hedgerows

- i All native hedgerows (including species-poor ones) are listed under Section 41 of the NERC Act (2006) and are a Local Biodiversity Action Plan (LBAP) habitat. All native hedgerows are considered to be of high conservation value.
- ii The Hedgerow Regulations (1997) classifies a hedgerow as 'important' if it:
 - Satisfies at least 1 of the criteria listed in Part II of Schedule 1
 - Has existed for 30 years or more
- iii Any person wishing to remove a hedgerow is required to submit a hedgerow removal notice to the LPA
- iv Items of Legislation that are pertinent regarding hedgerows include:
 - Hedgerow Regulations 1997
 - The countryside Rights of Way Act 2000
 - Natural Environment and Rural Communities Act (NERC) 2006
 - Planning Policy Statement (PPS) 9: Biodiversity and Geological Conservation
 - The UK Biodiversity Action Plan (UK BAP)
 - The Conservation of Habitats & Species Amendments (EU Exit) Regulations 2019 (as amended)

11 APPENDIX 1: SURVEY CONDITIONS

Table 5: Survey Conditions

Survey type	Date completed	Temperatures (°C)	Times	Wind speed (Beaufort Scale)	Cloud cover (Oktas Scale)	Precipitation
Preliminary Ecological Appraisal, Habitat Suitability Index and eDNA	11.05.2021	10	10:00-17:00	2	8	1
Ground Level Tree Assessment	28.07.2021	14	11:00-14:00	1	5	0
Water vole survey	17.08.2021	17	11:00-13:00	1	5	0
Invertebrate survey 1	05/07/2021	20-21	Not recorded	Not recorded	Not recorded	Not recorded
Invertebrate survey 2	10/08/2021	19-23	Not recorded	Not recorded	Not recorded	Not recorded
Invertebrate survey 3	06/09/2021	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded
Invertebrate survey 4	08/10/2021	13-16	Not recorded	Not recorded	Not recorded	Not recorded

12 APPENDIX 2: SPECIES SPECIFIC SURVEY METHODOLOGY

12.1 Great Crested Newt (GCN) Habitat Suitability Assessment (H.S.I)

- i Waterbodies within 500m of the survey area were evaluated against the GCN HSI criteria (Oldham *et al*, 2000). The HSI provides a measure of the suitability of a water body to support GCN by assigning an overall score of between 0 and 1, which is based on ten key criteria as follows:
- SI1 Geographic location
 - SI2 Pond area
 - SI3 Pond drying
 - SI4 Water quality
 - SI5 Shade
 - SI6 Presence of water-fowl
 - SI7 Presence of fish
 - SI8 Number of local ponds
 - SI9 Terrestrial habitat quality
 - SI10 Plant coverage
- ii In general, ponds with a higher score are more likely to support GCN than those with lower score. Suitability for GCN is determined in accordance with the scale outlined in Table 2 below.

Table 6: HSI Scoring Criteria

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

12.1.1 GCN Environmental (eDNA) Analysis

- iii This technique has been approved by Natural England as an acceptable means of determining GCN presence within a waterbody provided it is undertaken at an appropriate time of year following the prescribed protocols. The technique is based on the principal that should GCN be present then genetic material such as skin cells, eggs and excretion will be present within the water column. The survey involves one visit during the day taking a series of 20 water samples from at least 80% of the pond perimeter decanting into sample bottles containing a primer which is a short section of DNA. The samples are then sent to a lab for analysis, providing a positive or negative result (occasionally samples come back inconclusive where the sample has been corrupted). In the laboratory, a process called Polymerase Chain Reaction (PCR) is undertaken, if present this results in the synthesis of new DNA of the target species (GCN). This amplifies the amount of DNA present within the sample to detectable levels.
- i There are a number of limitations associated with this technique, however provided it is undertaken by trained surveyors following the protocols at an appropriate time of year it is an acceptable means of determining GCN presence/absence.
- ii Should GCN be identified it may still be necessary to undertake a population survey to gain an estimate of the size of any population present. Population estimates would also be required for a mitigation licence

application and to inform the implementation of appropriate and proportional mitigation measures should they be required.

12.2 Bats

- i The overall value of the site and its connectivity to the wider countryside was assessed in relation to bats. The likelihood of bats roosting at the site or moving through the site between local roost sites and foraging/mating/hibernation habitats was considered.
- ii The site, including the trees and boundary trees, were assessed by an ecologist and graded as to their suitability for supporting roosting bats using the Bat Conservation Trust’s *Bat Surveys for Professional Ecologists: Good Survey Guidelines* (Collins, J. Eds. 2016), an extract of which is provided interpreted in Table 7.

Table 7: Criteria for bat roost potential assessment of buildings and trees

Roost Potential	Description	Surveys Required (Buildings)	Surveys Required (Trees)
Confirmed roost	Evidence of roosting bats found during initial daytime inspection.	3 – including 1 dawn as a minimum	3 – including 1 dawn as a minimum
High *	Structures with one or more features suitable for bat roosting, with obvious suitability for larger numbers of bats.	3 – including 1 dawn as a minimum	3 – including 1 dawn as a minimum
Moderate	Structure with one or more potential roost sites that could be used due to size, shelter and protection but unlikely to support a roost of high conservation status.	2- including 1 dawn as a minimum	2- including 1 dawn as a minimum
Low	Structure with one or more potential roosting sites used by individual bats opportunistically. Insufficient space, shelter or protection to be used by large numbers of bats.	1 Survey	Precautionary Mitigation Approach, some instances may require further survey
Negligible	No or negligible features identified that are likely to be used by roosting bats	None	None

** Unless it is a confirmed roost, additional surveys are required of buildings to assess presence / likely absence of a roost. The number of surveys are indicative to give confidence in a negative result, i.e. where no bats are found, confidence in a result can be taken.*

12.3 Riparian Mammals Surveys

- i The watercourses that were highlighted as being suitable for water vole during the screening process were scoped in and subject to further survey for evidence of water voles following guidance provided in the Water

Vole Conservation Handbook (Strachan, *et al.*, 2011). Surveys of watercourses were carried out along all banks and were focussed primarily on searching for the following signs of water voles:

- Latrines – comprising a concentration of droppings in discrete locations, often near nest sites, at range boundaries or often use places to enter and exit the water;
 - Feeding stations – comprising neat piles of chewed lengths of vegetation, usually up to 10 cm in length, on pathways or haul-out locations;
 - Burrows – these are typically found along the water’s edge and on top of the bank (up to 5m from the water’s edge) and are 4-8cm in diameter. Holes on top of the banks often have ‘lawns’ around them (areas of grazed vegetation); and
 - Footprints – located in soft mud or silt.
- ii Given that the suitability of habitat for water voles can change markedly over the course of the breeding season, affecting the distribution and apparent population size, two survey visits should be undertaken in most cases: one in the first half of the season (mid-April- the end of June) and one in the second half of the season (July – September inclusive). These two visits should be undertaken at least two months apart (Dean, *et al.*, 2016).

12.4 Badger Survey

- i The survey followed the advice set out by English Nature (2002) and Harris *et al* (1989) and was undertaken by a surveyor with an extensive level of experience.
- ii The Site was subject to a detailed badger survey involving searching for setts as well as evidence of badger activity. When a sett was identified, its location, along with details of the number of entrances, and consideration of the level of activity, were recorded as detailed below:
- **Main setts:** Normally each group of Badgers has only one main sett, and so by counting all the main setts in an area you can find out how many social groups of badgers are present. Main setts usually have several holes with large spoil heaps, and the sett generally looks well used. There will be obvious paths to and from the sett and between sett entrances. In the British national badger survey the average number of holes for a main sett was twelve, although main setts may be much smaller, even a single hole in exceptional circumstances. Although normally the breeding sett, and in continuous use, it is possible to find a main sett that has become disused due to excessive interference, illegal digging, tree felling or some other reason.
 - **Annexe setts:** These are often close to a main sett, normally less than 150m away, and are connected to the main sett by one or more obvious well-worn paths. Usually they have several holes but may not be in use all the time, even if the main sett is very active. The average number of holes per annexe sett in the British survey was eight.
 - **Subsidiary setts:** These are usually at least 50m from a main sett, and do not have an obvious path connecting with another sett. They are not continuously active. The average number of holes per subsidiary sett in the British survey was four.
 - **Outlying setts:** These often have little spoil outside the holes, have no obvious path connecting them with another sett, and are only used sporadically. When not in use by badgers, they are often taken over by foxes or even rabbits. However, they can still be recognised as badger setts by the shape of the tunnel (not the actual entrance hole), which is at least 25cm in diameter and rounded or a flattened oval shape (i.e. broader than high). Fox and rabbit tunnels are smaller and often taller than broad. The average number of holes per outlying sett in the British survey was two.
- iii Note: These sett definitions form part of a continuum, and setts do not always fit neatly into these categories.
- iv Level of activity of each entrance is described as:
- **Well used** – clear of debris, trampled soil mounds and obviously active, with signs of activity such as presence of prints, dislodged guard hairs around the entrances – these signs indicate a sett is active and in current use.
 - **Partially used** – some associated debris or plants at the entrance. Could be used with minimal excavation and usually with signs of activity within the vicinity, for example, badger pathways.

Depending on the time of year, entrances with these signs could indicate presence of badgers and may be in current use.

- **Disused** – partially or completely blocked entrances. These signs show the sett is not in use.
- v A subjective assessment of the foraging potential of the habitats within the site was also made, based on the availability of potential food sources:
- **Good** foraging habitat: provides Badgers with a variety of foraging opportunities through the year (e.g. pasture, hedgerows, and gardens).
 - **Moderate** foraging habitat: foraging opportunities can be limited by season and management regime (e.g. arable fields, grassland leys, woodland and scrub).
 - **Poor** foraging habitat: areas that provide few foraging opportunities for Badgers (e.g. cereal crops, heathland, moorland, wetlands).
- vi The definition of 'Current Use' as used in the report refers to the presence of current or recent field signs indicating 'current use' by badgers. A sett not considered in 'current use' is when field signs have deteriorated or decayed to such an extent that they no longer indicate that the sett is in 'current use'.
- vii A sett that does not show signs of current use by badgers does not meet the definition of a badger sett under the Protection of Badgers Act (1992) (as amended) and is therefore not protected by this legislation.

12.5 Terrestrial Invertebrates

- i The surveys conducted by Conops Entomology Ltd. followed methodology detailed in their report within Appendix 11.

Do not scale from this drawing.
 This drawing is for planning purposes only. It is not intended to be used for construction purposes. The accuracy of this drawing may be reliant upon survey information provided by third parties. Whilst all reasonable efforts are used to ensure drawings are accurate, edge Placemaking Group Ltd accept no responsibility or liability for any reliance placed on, or use of, this plan by anyone for purposes other than those stated above or for errors arising from third party information.

This drawing and the works depicted are the copyright of edge Placemaking Group Ltd.

PLANNING

- Site boundary (11.68ha)
- Hybrid/mixed application for upto 1,235 dwellings; retail; medical centre; employment; schools; community use buildings; indoor sports provision; energy facilities; 30m high observation tower with zip-wire; changes of use and demolition to existing buildings; open space; sports facilities; green infrastructure; and upgrades to Chilgrove Drive and the junction with Camp Road **(18/00825/HYBRID)**
Status: Outline Approval
- 1 Full application for 89 dwellings **(15/01357/F)**
Status: Undetermined
- 2 Outline application application for up to 31 dwellings **(21/03523/OUT)**
Status: Undetermined
- 1 Proposed vehicular and pedestrian access via Camp Road
- 2 Proposed pedestrian/cycle connection to Camp Road
- 3 Proposed pedestrian/cycle connection to Chilgrove Drive
- 4 Primary tree lined street with foot/cycleway
- 5 Secondary street
- 6 Shared surface
- 7 Linked private drive
- 8 Private drive/lane
- 9 Proposed footpaths/recreational routes
- 10 Central green space to act as focal point with playspace (LAP)
- 11 Playspace (LEAP)
- 12 'Wet corridor' public open space to provide ecological enhancement and recreation benefits
- 13 Attenuation basins
- 14 Existing ponds
- 15 Existing vegetation retained and enhanced as necessary with locally characteristic and native species
- 16 Proposed hedgerow strengthening the field pattern by planting up gappy existing hedges
- 17 Proposed native wet woodland
- 18 Proposed native tree belts around airfield to enhance urban fringe and reduce the visual impact using locally characteristic and native species
- 19 Proposed scattered clusters of native tree planting to give impression of linear tree belt to enhance urban fringe and softening of built form

Rev.	Date	Description
------	------	-------------

Land north of Camp Road
HEYFORD PARK

Illustrative Masterplan

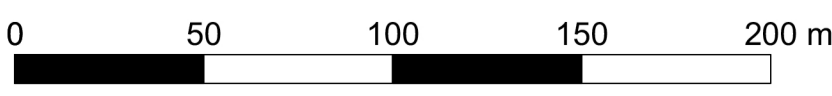
Job ref: 374	Drawing number: PO6	Revision: -
Scale: 1:2,000 @ A3	Date: December 2021	



part of
edge Placemaking Group Ltd
 Company Reg No: 11447550 VAT No: 299072069

Suite 2
 7 Buttermarket
 Thame
 Oxfordshire
 OX9 3EW

01865 522395
 enquiries@edgeUD.co.uk
 www.edgeUD.co.uk



14 APPENDIX 4: DESK STUDY RESULTS

i Six statutorily designated sites were recorded within the search radius, the details of which are summarised in the table below. The site is located within the IRZ of Bestmoor SSSI and Ardley Cutting and Quarry SSSI.

Table 8: Statutorily Designated sites within 5km of Site Boundary

Site Name	Designation	Location	Brief Description
Ardley Cutting and Quarry	SSSI ⁶	1.6km SE	<p>This site is of geological interest for its exposures of Jurassic rocks and has biological interest associated with limestone grassland, unimproved grassland, marshy grassland, scrub, ancient woodland and wetland habitats.</p> <p>The invertebrate fauna is particularly rich along the railway cutting, with large populations of calcareous grassland butterflies like small blue <i>Cupido minimus</i>, brown argus <i>Aricia agestis</i>, dark green fritillary <i>Argynnis aglaja</i>, green hairstreak <i>Callophrys rubi</i> and Duke of Burgundy <i>Hamearis lucina</i>, all of which are uncommon in Oxfordshire. There is also a colony of the nationally rare four-spotted moth <i>Tyta luctuosa</i> whose larvae feed on field bindweed <i>Convolvulus arvensis</i>, as well as the nationally uncommon leaf beetles <i>Cryptocephalus hypochaeridis</i> and <i>C. moraei</i>.</p> <p>The site also supports a large population of the internationally protected great crested newt <i>Triturus cristatus</i>.</p>
Ardley Trackways	SSSI	1.65km NE	Ardley Trackways SSSI is a nationally important site of geological importance.
Bestmoor	SSSI	4.1km NW	<p>This site consists of a semi-improved floodplain meadow adjacent to the middle reaches of the River Cherwell. This site also included ditches.</p> <p>The site contains one of the largest known British populations of narrow-leaved water-dropwort <i>Oenanthe silaifolia</i>. This species has become increasingly rare in Britain. This part of the Upper Cherwell Valley is well known as a feeding ground for wintering wildfowl. Flocks of teal <i>Anas crecca</i>, wigeon <i>Anas penelope</i>, lapwing <i>Vanellus vanellus</i> and golden plover <i>Pluvialis apricaria</i> feed here and snipe are known to breed in small numbers.</p> <p>The invertebrate fauna is poorly known, but research shows the site to have a typical fauna of damp alluvial meadows including the hoverflies <i>Lejogaster metallina</i> and <i>Chrysogaster hirtella</i>. Damselflies seen include the banded demoiselle <i>Calopteryx splendens</i> and blue-tailed damselfly <i>Ischnura elegans</i>.</p>

⁶ SSSI - Sites of Special Scientific Interest

Site Name	Designation	Location	Brief Description
Oxford meadows	SAC ⁷	15.5km SW	Annex I habitats that are a primary reason for selection of this site included lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>). Annex II species that are a primary reason for selection of this site included creeping marshwort <i>Apium repens</i> .
Cassington Meadows SSSI	SSSI	16.3km SW	Cassington Meadows are a cluster of neutral hay meadows, ditches, hedgerows and fen, which are surviving remnants of semi-natural vegetation in an area now characterised by intensive arable farming and gravel extraction. This type of meadow grassland was once widespread in the Thames valley and other parts of lowland Britain but is now a nationally threatened habitat largely restricted to a few areas in Oxfordshire, the Midlands and the Vale of York.
Pixey and Yarnton Meads SSSI	SSSI	15.5km SW	These unimproved floodplain meadows on alluvium over calcareous gravel on the first terrace bordering the River Thames are internationally renowned. The notable plants, green winged orchid <i>Orchis morio</i> , autumn crocus <i>Colchicum autumnale</i> , saw-wort <i>Serratula tinctoria</i> , pepper saxifrage <i>Silaum silaus</i> and meadow rue <i>Thalictrum flavum</i> also occur on site. The watercourses surrounding the Meads have tall emergent vegetation frequented by dragon and damselflies, the most noticeable throughout the summer being the banded demoiselle <i>Calopteryx splendens</i> .

- ii Three non-statutorily designated sites were also identified within the search radius, details of which are provided in the table below.

Table 9: Non-statutory designated sites within 2km of Site Boundary

Site Name	Designation	Location	Brief Description
The Heath	DWSC ⁸	20m E	Designated for broadleaved woodland and scrub.
Trackway Adjacent to Gorse	DWSC	50m S	Designated for species-rich hedgerows.
Upper Heyford Airfield	LWS ⁹	430m N	Designated for species rich calcareous grassland, broadleaved plantation woodland and a large population of great-crested newts recorded in the water tanks on the site.

⁷ SAC - Special Areas of Conservation

⁸ DWSC - District Wildlife Site Citation

⁹ LWS - Local Wildlife Site

- iii There are 23 Habitats of Principle Importance under Section 41 of the NERC Act, 2006 located within a 1km radius of the site. The closest is a parcel of Open Mosaic Habitats on Previously Developed Land adjacent to the north of the site.

Table 10: Habitats of Principal Importance within 1km of the Site

Habitat	Quantity	Closest Habitat - Distance to Site	Closest Habitat - Direction to Site
Open Mosaic Habitats on Previously Developed Land	2	Adjacent to site	North
Broadleaved woodland	4	14m	Southeast
Deciduous woodland	6	14m	Southeast
Conifer woodland	3	19m	South
Lowland calcareous grassland	7	0.4km	North
Mixed mainly broadleaved woodland	1	0.55km	North

- iv Records of previous European Protected Species Licences (EPSL) were discovered within a 5km search area around the site. These included:
 - v Seven records of bat licences on species including common pipistrelle, soprano pipistrelle, brown long eared and natterer’s. The closet record was located 0.53km west of the site and was undertaken on common pipistrelle, soprano pipistrelle, brown long eared and natterer’s from 2013 until 2021 and allowed the destruction of a resting place.
 - vi Four records of great crested newt licences with the closest record located 1.9km east of the site. This was undertaken from 2015 to 2021 and allowed damage of a resting place.
 - vii A record of a European otter licence was located 3.1km west of the site. This included impact on a breeding site between 2017 and 2018.
 - viii Two great crested newt class survey licence returns were located on site on P2 from 2016 and 2014 and on P3 from 2016 and 2014.
 - ix Protected species records were received from Thames Valley Environmental Records Centre. A summary of the records considered most relevant to the site and/or proposed development are provided in the table below.

Table 11: Summary of protected and Priority species records

Species	Scientific Name	Records	Conservation Status
Amphibians			
Great crested newts	<i>Triturus cristatus</i>	254 records, closest to site	EPS ¹⁰ , NERC ¹¹ , WCA (5) ¹²

Mammals

¹⁰ EPS – European Protected Species - protected by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

¹¹ NERC – Species of Principle Importance under Section 41 of the Natural Environment Rural Communities Act (2006) Species of Principal Conservation Importance; UKBAP & LBAP

¹² WCA (5) – Schedule 5 protected species - Wildlife & Countryside Act (1981)

Species	Scientific Name	Records	Conservation Status
Brown long-eared bat	<i>Plecotus auritus</i>	1 record 0.63km WSW	EPS, WCA, NERC
Birds			
Red kite	<i>Milvus milvus</i>	25 records, closest onsite	WCA1 ¹³
Bullfinch	<i>Pyrrhula pyrrhula</i>	3 records, closest 0.74km NW	BoCCAmber ¹⁴ , NERC
Corn bunting	<i>Emberiza calandra</i>	31 records, closest 0.74km NW	BoCCRed, NERC
Dunnock	<i>Prunella modularis</i>	13 records, closest 0.74km NW	BoCCAmber
House martin	<i>Delichon urbicum</i>	9 records, closest 0.74km NW	BoCCAmber
House sparrow	<i>Passer domesticus</i>	15 records, closest 0.74km NW	BoCCRed, NERC
Kestrel	<i>Falco tinnunculus</i>	18 records, closest 0.74km NW	BoCCAmber
Linnet	<i>Linaria cannabina</i>	28 records, closest 0.74km NW	BoCCRed, NERC
Meadow pipit	<i>Anthus pratensis</i>	15 records, closest 0.74km NW	BoCCAmber
Skylark	<i>Alauda arvensis</i>	32 records, closest 0.74km NW	BoCCRed, NERC
Song thrush	<i>Turdus philomelos</i>	9 records, closest 0.74km NW	BoCCRed, NERC
Starling	<i>Sturnus vulgaris</i>	27 records, closest 0.74km NW	BoCCRed, NERC
Yellowhammer	<i>Emberiza citrinella</i>	13 records, closest 0.74km NW	BoCCRed, NERC
Swift	<i>Apus apus</i>	2 records, closest 0.74km NW	BoCCAmber
Black-headed gull	<i>Chroicocephalus ridibundus</i>	3 records, closest 0.88km NW	BoCCAmber
Brambling	<i>Fringilla montifringilla</i>		BoCCGreen, WCA (1)

¹³ WCA (5) – Schedule 5 protected species - Wildlife & Countryside Act (1981)

¹⁴ BoCC - Birds of Conservation Concern - split in to three categories of conservation importance - Red, Amber and Green. Red is the highest conservation priority, with species needing urgent action. Amber is the next most critical group, followed by green

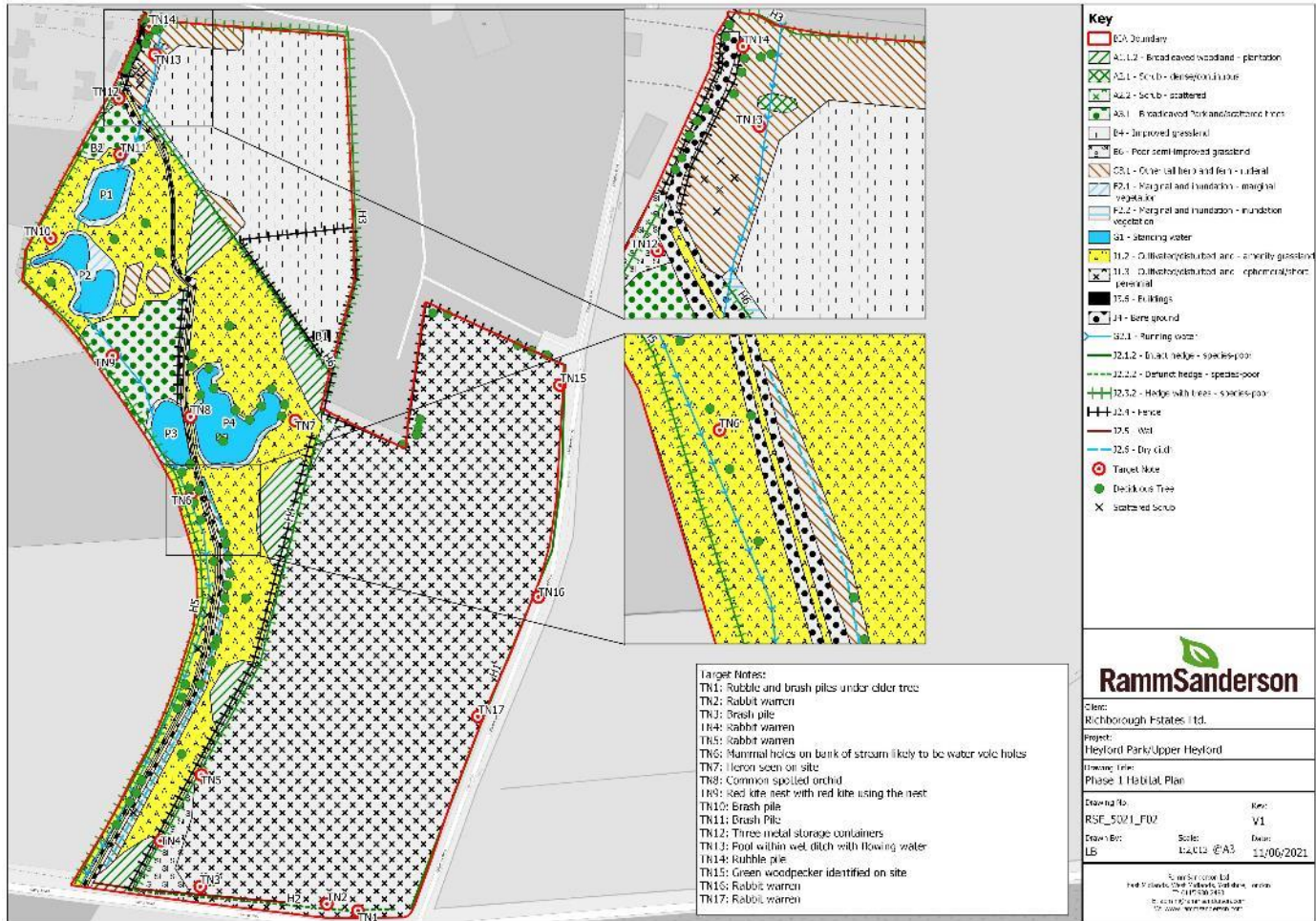
Species	Scientific Name	Records	Conservation Status
Curlew	<i>Numenius arquata</i>	14 records, closest 0.88km NW	BoCCRed, NERC
Fieldfare	<i>Turdus pilaris</i>	2 records, closest 0.88km NW	BoCCRed, WCA (1)
Lesser black-backed gull	<i>Larus fuscus</i>	9 records, closest 0.88km NW	BoCCAmber
Mallard	<i>Anas platyrhynchos</i>	3 records, closest 0.88km NW	BoCCAmber
Grey partridge	<i>Perdix perdix</i>	15 records, closest 0.88km NW	BoCCRed, NERC
Peregrine	<i>Falco peregrinus</i>	1 record 0.88km NW	WCA1
Quail	<i>Coturnix coturnix</i>	2 records, closest 0.88km NW	BoCCAmber, WCA (1)
Mistle thrush	<i>Turdus viscivorus</i>	1 record 0.88km NW	BoCCRed
Spotted flycatcher	<i>Muscicapa striata</i>	1 record 0.88km NW	BoCCRed, NERC
Tawny owl	<i>Strix aluco</i>	1 record 0.88km NW	BoCCAmber
Willow warbler	<i>Phylloscopus trochilus</i>	1 record 0.88km NW	BoCCAmber
Lapwing	<i>Vanellus vanellus</i>	3 records, closest 0.94km NW	BoCCRed, NERC
Cuckoo	<i>Cuculus canorus</i>	2 records, closest 0.94km NW	BoCCRed, NERC
Reed bunting	<i>Emberiza schoeniclus</i>	1 record 0.94km NW	BoCCAmber, NERC
Yellow wagtail	<i>Motacilla flava</i>	3 records, closest 0.94km NW	BoCCRed, NERC
Golden plover	<i>Pluvialis apricaria</i>	1 record 0.99km S	BoCCGreen
Marsh tit	<i>Poecile palustris</i>	1 record 0.99km S	BoCCRed, NERC
Stock dove	<i>Columba oenas</i>	1 record 0.99km S	BoCCAmber
Great black-backed gull	<i>Larus marinus</i>	1 record 1.33km SE	BoCCAmber
Green sandpiper	<i>Tringa ochropus</i>	1 record 1.33km SE	BoCCAmber, WCA (1)
Gadwall	<i>Anas strepera</i>	1 record 1.33km SE	BoCCAmber
Grey wagtail	<i>Motacilla cinerea</i>	3 records, closest 1.33km SE	BoCCRed
Mute Swan	<i>Cygnus olor</i>	1 record 1.33km SE	BoCC4 Amber
Shelduck	<i>Tadorna tadorna</i>	2 records, closest 1.33km SE	BoCCAmber

Species	Scientific Name	Records	Conservation Status
Teal	<i>Anas crecca</i>	1 record 1.33km SE	BoCCAmber
Wigeon	<i>Mareca penelope</i>	1 record 1.33km SE	BoCCAmber
Reptiles			
Common lizard	<i>Zootoca vivipara</i>	86 records, closest 89m NE	Partial protection under WCA, NERC
Grass snake	<i>Natrix natrix</i>	17 records, closest 334m NNE	Partial protection under WCA, NERC
Invertebrates			
Buddleja davidii	<i>Buddleja davidii</i>	1 record 1.33km SE	WCA (9) ¹⁵

x Full species records are available to view upon request.

¹⁵ WCA (9) - Schedule 9 Wildlife and Countryside Act 1981 (as amended)

15 APPENDIX 5: PHASE 1 HABITAT SURVEY PLAN



16 APPENDIX 6: PHASE 1 HABITAT SURVEY RESULTS

16.1.1 Overview

- i The site was dominated by ephemeral vegetation, amenity grassland and improved grassland bounded by hedgerows. Other habitats included broadleaved plantation woodland, dense and scattered scrub, broadleaved scattered trees, poor semi-improved grassland, tall ruderal, inundation vegetation, standing water, intact species-poor hedgerow, intact species poor with trees, dry and wet ditch, running water, buildings and bare ground. Full habitat descriptions and photos are provided below. For a Phase 1 Habitat Survey Plan refer to Appendix 1 and a full species list is provided in Appendix 2.
- ii Habitat types detailed below are listed in order of the JNCC (2016) Handbook. The species list provided in this report reflect only those taxa observed during the survey.

16.1.2 Broadleaved plantation woodland

- iii Small sections of broadleaved plantation woodland were located along the centre of the site. This was dominated by sycamore (*Acer pseudoplatanus*) and common lime (*Tilia europaea*) with hazel (*Corylus avellana*), grey willow (*Salix cinerea*), wild cherry (*Prunus avium*) and ash (*Fraxinus excelsior*) frequently occurring. Rowan (*Sorbus aucuparia*) and crab apple (*Malus sylvestris*) were occasionally occurring, and Scot's pine (*Pinus sylvestris*) was rarely occurring. Understory and ground flora included common ivy (*Hedera helix*), ground ivy (*Glechoma hederacea*), common nettle (*Urtica dioica*), lord and ladies (*Arum alpinum*), silver weed (*Potentilla anserina*), garlic mustard (*Alliaria petiolate*), lesser celandine (*Ficaria verna*) and dandelion (*Taraxacum officinale*).

Figure 11: Broadleaved plantation woodland



16.1.3 Dense Scrub

- iv Dense scrub was located along the north boundary to the site. This was dominated by bramble (*Rubus fruticosus*) with hawthorn (*Crataegus monogyna*) and elder (*Sambucus nigra*) frequently occurring.

Figure 12: Dense scrub



16.1.4 Scattered Scrub

- v Scattered scrub was located along the site boundaries to the site. This was dominated by bramble with tall ruderal species listed below.

Figure 13: Scattered scrub



16.1.5 Broadleaved Scattered Trees

- vi Broadleaved scattered trees were located on site. Sycamore, English oak (*Quercus robur*), crack willow (*Salix fragilis*), wild cherry, ornamental maple, silver birch (*Betula pendula*), leyland cypress (*Cupressus leylandii*), hazel and hornbeam (*Carpinus betulus*) were frequently occurring. Ground flora included cleavers (*Galium aparine*), broadleaved willowherb (*Epilobium montanum*) and common nettle.

Figure 14: Broad-leaved scattered trees



16.1.6 Improved Grassland

- vii Improved grassland was present on the northern section of the site and was of a short sward of >5cm. Dominated by perennial rye grass (*Lolium perenne*) with cleavers, broadleaved dock (*Rumex obtusifolius*), hemlock (*Conium maculatum*), common nettle, creeping thistle (*Cirsium arvense*), common bent (*Agrostis capillaris*) and ground ivy occasionally occurring. Common ragwort (*Jacobaea vulgaris*) was rarely occurring.

Figure 15: Improved Grassland



16.1.7 Poor Semi-Improved Grassland

- viii Poor semi-improved grassland was present within the field boundaries. The sward varied from 1cm to 50cm. This dominated by perennial rye grass (*Lolium perenne*) and Yorkshire fog (*Holcus lanatus*) with dandelion, germander speedwell (*Veronica chamaedrys*), common sedge (*Carex nigra*), prickly sow thistle (*Sonchus asper*), field forget-me-not (*Myosotis arvensis*), common daisy (*Bellis perennis*), common ragwort, creeping thistle (*Cirsium arvense*), selfheal (*Prunella vulgaris*), bryophytes, silverweed, cuckooflower (*Cardamine pratensis*), creeping buttercup and ribwort plantain (*Plantago lanceolata*) frequently occurring. Common reed (*Phragmites australis*), sweet verbal grass (*Anthoxanthum odoratum*) and marsh marigold (*Caltha palustris*) occasional occurring.

Figure 16: Poor semi-improved grassland



16.1.8 Tall Ruderal Vegetation

- ix Tall ruderal was located along the corners to the fields on site. Species were dominated by common nettle with abundant cow parsley, teasel (*Dipsacus fullonum*), spear thistle (*Cirsium vulgare*), garlic mustard, rosebay willowherb and white dead nettle. Common mullein (*Verbascum thapsus*), common reed, common mugwort (*Artemisia vulgaris*), common sedge and hard rush (*Juncus inflexus*) were occasionally occurring.

Figure 17: Tall ruderal vegetation on site



16.1.9 Marginal Vegetation

- x Marginal vegetation was located around the ponds on site on the northwest section of the site. Silver weed, creeping buttercup, hard rush, cuckoo flower, soft rush (*Juncus effusus*), common reed, marsh marigold, creeping thistle and spear thistle were frequently occurring.

Figure 18: Marginal Vegetation



16.1.10 Inundation Vegetation

- xi Inundation vegetation with a small amount of standing water was located along the southern boundary of the north section of the site. Silver weed, soft rush, creeping bent, common nettle, broadleaved willowherb, creeping buttercup, hard rush, cuckoo flower, creeping thistle and spear thistle were frequently occurring.

Figure 19: Inundation Vegetation



16.1.11 Standing water

- xii Four ponds were located on site within the northwest section of the site. Water was flowing into P1 from the ditch to the north. Water was also flowing between all the ponds through ditches. All ponds presented with inflows with P3 having 45% of its bank accessible and P2 having 60% of its bank accessible due to dense vegetation. P1 had a shallow shelf island within the centre of the pond.

Figure 20: Pond 1



Figure 21: Pond 2



Figure 22: Pond 3



Figure 23: Pond 4



16.1.12 Amenity Grassland

- xiii Amenity grassland was located on the west section of the site between the ponds and plantation woodland. This was of short sward of >5cm and regularly managed. This area was frequently used by dog walkers. Perennial rye grass was dominant with spear thistle, ground ivy, selfheal, red clover (*Trifolium pratense*) frequently occurring and silverweed, marsh marigold, common nettle and cuckooflower occasionally occurring. Horsetail (*Equisetum arvense*) was also rarely occurring within this habitat.

Figure 24: Amenity Grassland



16.1.13 Ephemeral vegetation

- xiv Ephemeral vegetation was located within the field on the east of the site. Species included dandelion, germander speedwell (*Veronica chamaedrys*), common sedge, prickly sow thistle (*Sonchus asper*), field forget-me-not, common daisy, common ragwort, creeping thistle, perennial rye grass, Yorkshire fog, sweet verbal grass, selfheal, bryophytes, creeping buttercup and ribwort plantain frequently occurring.

Figure 25: Ephemeral vegetation



16.1.14 Intact Species-Poor Hedgerow

- xv Hedgerow H1 (eastern boundary) was 3m wide and 3m high. H1 included dominant hawthorn and blackthorn with yarrow (*Achillea millefolium*) and common ivy within the ground flora.

Figure 26: Hedgerow 1 (H1)



16.1.15 Defunct Species Poor Hedgerow With Trees

- xvi Hedgerow 2 (H2) was 4m wide and 3m high. This was dominated by hawthorn and blackthorn with field rose (*Rosa arvensis*), honeysuckle (*Lonicera periclymenum*), sycamore, alder, ash and Norway maple (*Acer platanoides*) and spindle (*Euonymus europaeus*) frequently occurring. Ground flora included common hogweed (*Heracleum sphondylium*), common nettle, cow parsley, common sorrel, cowslip (*Primula veris*), ground ivy and white dead nettle.

xvii

Figure 27: Hedgerow 2 (H2)



16.1.16 Intact Species Poor Hedgerows With Trees

- xviii Hedgerow 3 (H3) was 3m wide and 3m high. This included dominant hawthorn and blackthorn with wild cherry, elder, spindle frequently occurring. Ash and elm were rarely occurring. Ground flora included lords and ladies, common nettle, ground ivy, cow parsley, woolly thistle (*Cirsium eriophorum*) and burdock (*Arctium minus*).
- xix Hedgerow 4 (H4) was 2m wide and 3m high. Intact species poor hedge with trees with dominant hawthorn and field maple, honeysuckle, guelder rose and broadleaved willowherb occurring frequently.
- xx Hedgerow 5 (H5) was 2m wide and 3m high. This was dominated by hawthorn and hazel, elder, common nettle, common ivy and frequently occurring. Ash was rarely occurring.
- xxi Hedgerow 6 (H6) was 2m wide and 3m high. This was dominated by hawthorn and blackthorn with guelder rose, rosebay willowherb frequently occurring. Hazel and ash were rarely occurring.

Figure 28: Hedgerow 3 (H3)



Figure 29: Hedgerow 4 (H4)



Figure 30: Hedgerow 5 (H5)



Figure 31: Hedgerow 6 (H6)



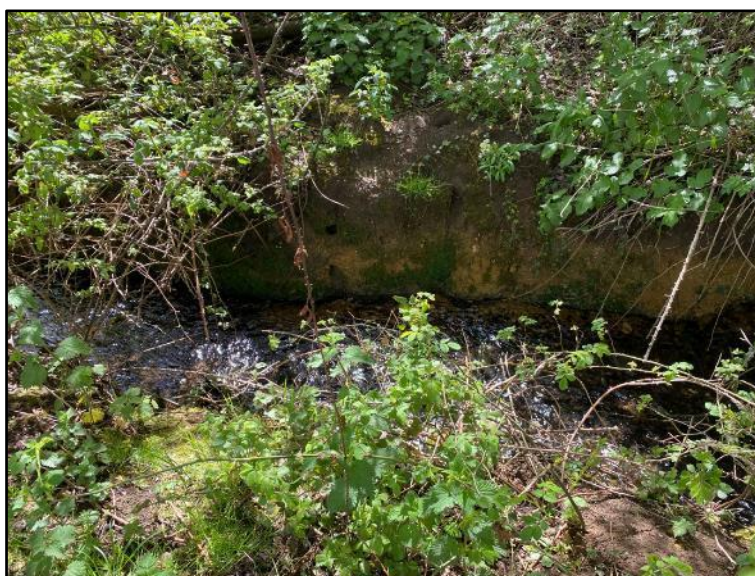
16.1.17 Dry Ditch

- xxii A dry ditch was located on site parallel to the stream. Tall ruderal and scattered scrub were located either side of the ditch. Field rose, dandelion, broadleaved willowherb, common sorrel, bramble, common nettle and soft rush were frequently occurring along the banks of the ditch.

16.1.18 Running Water

- xxiii A ditch with flowing water was located on site flowing from the northwest of the site and through the ponds P1, P2 and P3. This ditch flowed into the stream on site. A stream with water running north to south was located on the western boundary to the site. The stream also included a variation of bank angles including steep 70° banks to 45° banks in places. The stream was a result of the overflow from the ponds on site. This varied in size and was 1m-3m wide and 10cm-50cm deep in places. Scrub and overhanging tree banks were located on the banks.

Figure 32: Running water



16.1.19 Buildings

- xxiv Two buildings were located on site at the time of the survey. B1 was a newly build residential wooden building with a tiled hipped roof. B2 was a wooden treehouse.

Figure 33: Building 2 (B2)



16.1.20 Bare Ground

xxv Bare ground was located on site along the footpath on the west of the site.

Figure 34: Bare ground on site



16.1.21 Non-Native Species

xxvi No Schedule 9 species of the Wildlife and Countryside Act 1981 including Japanese knotweed Himalayan balsam and giant hogweed were observed during the survey. Horsetail was located on site within the poor semi-improved grassland between P3 and P4.

17 APPENDIX 7: PHASE 1 SPECIES LIST

Table 12: Phase 1 Species List

Species	Latin	DAFOR Scale
Broadleaved plantation woodland		
Sycamore	<i>Acer pseudoplatanus</i>	D
Common lime	<i>Tilia europaea</i>	D
Hazel	<i>Corylus avellana</i>	F
Grey willow	<i>Salix cinerea</i>	F
Wild cherry	<i>Prunus avium</i>	F
Ash	<i>Fraxinus excelsior</i>	F
Rowan	<i>Sorbus aucuparia</i>	O
Crab apple	<i>Malus sylvestris</i>	O
Scot's pine	<i>Pinus sylvestris</i>	R
Understory		
Common ivy	<i>Hedera helix</i>	F
Ground ivy	<i>Glechoma hederacea</i>	F
Common nettle	<i>Urtica dioica</i>	F
Lord and ladies	<i>Arum alpinum</i>	F
Silver weed	<i>Potentilla anserina</i>	F
Garlic mustard	<i>Alliaria petiolate</i>	F
Lesser celandine	<i>Ficaria verna</i>	F
Dandelion	<i>Taraxacum officinale</i>	F
Dense Scrub		
Bramble	<i>Rubus fruticosus</i>	D
Hawthorn	<i>Crataegus monogyna</i>	D
Elder	<i>Sambucus nigra</i>	F
Scattered Scrub		
Bramble	<i>Rubus fruticosus</i>	D
Tall ruderal species listed below		
Broadleaved scattered trees		

Sycamore	<i>Acer pseudoplatanus</i>	F
English oak	<i>Quercus robur</i>	F
Crack willow	<i>Salix fragilis</i>	F
Wild cherry	<i>Prunus avium</i>	F
Ornamental maple	<i>Acer palmatum</i>	F
Silver birch	<i>Betula pendula</i>	F
Leyland cypress	<i>Cupressus leylandii</i>	F
Hazel	<i>Corylus avellana</i>	F
Hornbeam	<i>Carpinus betulus</i>	F
Understorey		
Cleavers	<i>Galium aparine</i>	F
Broadleaved willowherb	<i>Epilobium montanum</i>	F
Common nettle	<i>Urtica dioica</i>	F
Improved Grassland		
Perennial rye grass	<i>Lolium perenne</i>	D
Cleavers	<i>Galium aparine</i>	O
Broadleaved dock	<i>Rumex obtusifolius</i>	O
Hemlock	<i>Conium maculatum</i>	O
Common nettle	<i>Urtica dioica</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O
Common bent	<i>Agrostis capillaris</i>	O
Ground ivy	<i>Glechoma hederacea</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	R
Poor semi-improved grassland		
Perennial rye grass	<i>Lolium perenne</i>	D
Yorkshire fog	<i>Holcus lanatus</i>	D
Dandelion	<i>Taraxacum officinale</i>	F
Germander speedwell	<i>Veronica chamaedrys</i>	F
Common sedge	<i>Carex nigra</i>	F
Prickly sow thistle	<i>Sonchus asper</i>	F

Field forget-me-not	<i>Myosotis arvensis</i>	F
Common daisy	<i>Bellis perennis</i>	F
Common ragwort	<i>Jacobaea vulgaris</i>	F
Creeping thistle	<i>Cirsium arvense</i>	F
Selfheal	<i>Prunella vulgaris</i>	F
Bryophytes	-	F
Silverweed	<i>Potentilla anserina</i>	F
Cuckooflower	<i>Cardamine pratensis</i>	F
Creeping buttercup	<i>Ranunculus repens</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Common reed	<i>Phragmites australis</i>	O
Sweet verbal grass	<i>Anthoxanthum odoratum</i>	O
Marsh marigold	<i>Caltha palustris</i>	O
Tall Ruderal		
Common nettle	<i>Urtica dioica</i>	D
Cow parsley	<i>Anthriscus sylvestris</i>	A
Teasel	<i>Dipsacus fullonum</i>	A
Spear thistle	<i>Cirsium vulgare</i>	A
Garlic mustard	<i>Alliaria petiolate</i>	A
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	A
White dead nettle	<i>Lamium album</i>	A
Common mullein	<i>Verbascum thapsus</i>	O
Common reed	<i>Phragmites australis</i>	O
Common mugwort	<i>Artemisia vulgaris</i>	O
Common sedge	<i>Carex nigra</i>	O
Hard rush	<i>Juncus inflexus</i>	O
Marginal vegetation		
Silver weed	<i>Potentilla anserina</i>	F
Creeping buttercup	<i>Ranunculus repens</i>	F
Soft rush	<i>Juncus effusus</i>	F

Cuckooflower	<i>Cardamine pratensis</i>	F
Common reed	<i>Phragmites australis</i>	F
Hard rush	<i>Juncus inflexus</i>	F
Marsh marigold	<i>Caltha palustris</i>	F
Creeping thistle	<i>Cirsium arvense</i>	F
Spear thistle	<i>Cirsium vulgare</i>	F
Inundation vegetation		
Silver weed	<i>Potentilla anserina</i>	F
Creeping bent	<i>Agrostis stolonifera</i>	F
Common nettle	<i>Urtica dioica</i>	F
Creeping buttercup	<i>Cirsium arvense</i>	F
Hard rush	<i>Juncus inflexus</i>	F
Soft rush	<i>Juncus effusus</i>	F
Creeping thistle	<i>Cirsium arvense</i>	F
Spear thistle	<i>Cirsium vulgare</i>	F
Broadleaved willowherb	<i>Epilobium montanum</i>	F
Amenity grassland		
Perennial rye grass	<i>Lolium perenne</i>	D
Spear thistle	<i>Cirsium vulgare</i>	F
Ground ivy	<i>Glechoma hederacea</i>	F
Selfheal	<i>Prunella vulgaris</i>	F
Red clover	<i>Trifolium pratense</i>	F
Silverweed	<i>Potentilla anserina</i>	O
Marsh marigold	<i>Caltha palustris</i>	O
Common nettle	<i>Urtica dioica</i>	O
Cuckooflower	<i>Cardamine pratensis</i>	O
Ephemeral vegetation		
Dandelion	<i>Taraxacum officinale</i>	F
Germander speedwell	<i>Veronica chamaedrys</i>	F
Common sedge	<i>Carex nigra</i>	F

Prickly sow thistle	<i>Sonchus asper</i>	F
Field forget-me-not	<i>Myosotis arvensis</i>	F
Common daisy	<i>Bellis perennis</i>	F
Common ragwort	<i>Jacobaea vulgaris</i>	F
Creeping thistle	<i>Cirsium arvense</i>	F
Perennial rye grass	<i>Lolium perenne</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Sweet verbal grass	<i>Anthoxanthum odoratum</i>	F
Selfheal	<i>Prunella vulgaris</i>	F
Bryophytes	-	F
Creeping buttercup	<i>Cirsium arvense</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Intact Species-Poor Hedgerow		
Hedgerow H1		
Hawthorn	<i>Crataegus monogyna</i>	D
Blackthorn	<i>Prunus spinosa</i>	D
Yarrow	<i>Achillea millefolium</i>	F
Common ivy	<i>Hedera helix</i>	F
Defunct Species Poor Hedgerow With Trees		
Hedgerow H2		
Hawthorn	<i>Crataegus monogyna</i>	D
Blackthorn	<i>Prunus spinosa</i>	D
Field rose	<i>Rosa arvensis</i>	F
Honeysuckle	<i>Lonicera periclymenum</i>	F
Sycamore	<i>Acer pseudoplatanus</i>	F
Alder	<i>Alnus glutinosa</i>	F
Ash	<i>Fraxinus excelsior</i>	F
Norway maple	<i>Acer platanoides</i>	F
Spindle	<i>Euonymus europaeus</i>	F
Ground flora		

Common hogweed	<i>Heracleum sphondylium</i>	F
Common nettle	<i>Urtica dioica</i>	F
Cow parsley	<i>Anthriscus sylvestris</i>	F
Common sorrel	<i>Rumex acetosa</i>	F
Cowslip	<i>Primula veris</i>	F
Ground ivy	<i>Glechoma hederacea</i>	F
White dead nettle	<i>Lamium album</i>	F

Intact Species Poor Hedgerow With Trees

Hedgerow H3

Hawthorn	<i>Crataegus monogyna</i>	D
Blackthorn	<i>Prunus spinosa</i>	D
Wild cherry	<i>Prunus avium</i>	F
Elder	<i>Sambucus nigra</i>	F
Spindle	<i>Euonymus europaeus</i>	F
Ash	<i>Fraxinus excelsior</i>	R
Elm	<i>Ulmus procera</i>	R

Ground flora

Lords and ladies	<i>Arum alpinum</i>	F
Common nettle	<i>Urtica dioica</i>	F
Ground ivy	<i>Glechoma hederacea</i>	F
Cow parsley	<i>Anthriscus sylvestris</i>	F
Woolly thistle	<i>Cirsium eriophorum</i>	F
Burdock	<i>Arctium minus</i>	F

Hedgerow H4

Hawthorn	<i>Crataegus monogyna</i>	D
Field maple	<i>Acer campestre</i>	F
Honeysuckle	<i>Lonicera sp.</i>	F
Guelder rose	<i>Viburnum opulus</i>	F
Ground flora		
Broadleaved willowherb	<i>Epilobium montanum</i>	F

Hedgerow H5

Hawthorn	<i>Crataegus monogyna</i>	D
----------	---------------------------	---

Hazel	<i>Corylus avellana</i>	F
-------	-------------------------	---

Elder	<i>Sambucus nigra</i>	F
-------	-----------------------	---

Ash	<i>Fraxinus excelsior</i>	R
-----	---------------------------	---

Ground flora

Common nettle	<i>Urtica dioica</i>	F
---------------	----------------------	---

Common ivy	<i>Hedera helix</i>	F
------------	---------------------	---

Hedgerow H6

Hawthorn	<i>Crataegus monogyna</i>	D
----------	---------------------------	---

Blackthorn	<i>Prunus spinosa</i>	D
------------	-----------------------	---

Guelder rose	<i>Viburnum opulus</i>	F
--------------	------------------------	---

Hazel	<i>Corylus avellana</i>	R
-------	-------------------------	---

Ash	<i>Fraxinus excelsior</i>	R
-----	---------------------------	---

Ground flora

Rosebay willowherb	<i>Chamaenerion angustifolium</i>	F
--------------------	-----------------------------------	---

Dry Ditch

Field rose	<i>Rosa arvensis</i>	F
------------	----------------------	---

Dandelion	<i>Taraxacum officinale</i>	F
-----------	-----------------------------	---

Broadleaved willowherb	<i>Epilobium montanum</i>	F
------------------------	---------------------------	---

Common sorrel	<i>Rumex acetosa</i>	F
---------------	----------------------	---

Bramble	<i>Rubus fruticosus</i>	F
---------	-------------------------	---

Common nettle	<i>Urtica dioica</i>	F
---------------	----------------------	---

Soft rush	<i>Juncus effusus</i>	F
-----------	-----------------------	---

18 APPENDIX 8: PROTECTED/PRINCIPAL SPECIES AND HABITAT SURVEY RESULTS

18.1 Hedgerows

Table 13: HEGS Hedgerow Assessment

Hedgerow	Length (m)	Important Hedgerow	Structural Score	Connectivity Score	Diversity Score	Associated Features Score	Grade	Value
4	150	No	14	5	4	0	4	Low
6	200	No	14	5	4	0	4	Low

18.2 Great Crested Newts

Table 14: HSI Assessment

Pond	Location	Area (m2)	Drying	Water quality	% shade	Waterfowl	Fish	Ponds within 1km	Terrestrial Habitat	Macrophyte cover (%)	HSI category
1	A	50 - 100	Never dries	Good	0-60	Minor	Possible	5	Good	30	Good
2	A	201 - 300	Never dries	Good	0-60	Minor	Possible	5	Good	75	Excellent
3	A	201 - 300	Never dries	Good	0-60	Minor	Possible	5	Good	45	Excellent
4	A	301 - 400	Never dries	Good	0-60	Minor	Possible	5	Good	70	Excellent


Table 15: EDNA Survey Results



Pond	Sample	Date arrived	Inhibition	Degradation	eDNA Score	GCN Status	Survey Limitations
1	GCN21-2186	27.05.21	No	No	0	Negative	None


2	GCN21-2185	27.05.21	No	No	12	Positive	Yes. 50% of the pond margin accessible due to dense vegetation.
3	GCN21-2187	27.05.21	No	No	0	Negative	Yes. 35% of the pond margin accessible due to dense vegetation.
4	GCN21-2188	27.05.21	No	No	0	Negative	None

18.3 Bats

Table 16: Bat Building Assessment And Ground Level Tree Assessment




Bldg. and Tree ref	Description	Potential Access Points	Evidence	Grading	Photographs
T1	<p>Ash (<i>Fraxinus excelsior</i>) tree located within hedgerow H4 on site. This is a mature tree that is 8m high.</p>	<p>Feature A - Ivy cover located around the trunk of the tree at all directions.</p> <p>Feature B - Knot hole located 4m high on the tree and an approximate height of 7cm and width of 7cm. This hole faces towards the sky.</p> <p>Feature C - Knot hole located 7m high on the tree and an approximate height of 5cm and width of 5cm. This hole faces east.</p>	None	Moderate	

Bldg. and Tree ref	Description	Potential Access Points	Evidence	Grading	Photographs
T2	English oak (<i>Quercus robur</i>) tree located within the broadleaved scattered trees on site. This is a mature tree of a 8m high.	A trunk cavity was present at 6m height on the tree facing east.	None	Moderate	
B1	A wooden single storey building used by alpacas present on the field at the time of the survey. This building had a wooden hipped roof.	None	None	Negligible	

Bldg. and Tree ref	Description	Potential Access Points	Evidence	Grading	Photographs
B2	A wooden tree house used for storage with a thatched roof.	None	None	Negligible	



Key

-  Site Boundary
-  Buildings of Negligible Bat Roosting Potential
-  Trees of Moderate Bat Roosting Potential



RammSanderson

Client: Richborough Estates Ltd. and Lone Star Land		
Project: Upper Heyford - North		
Drawing Title: Bat Tree and Building Plan		
Drawing No. RSE_5021_Appendix 9	Scale@A4: 1:2,840	Rev: V1
Drawn By: AC	Date: 30/10/2021	
RammSanderson Ltd East Midlands, West Midlands, Yorkshire, London T: 0115 930 2493 E: admin@rammsanderson.com W: www.rammsanderson.com		

2 APPENDIX 10: BIODIVERSITY IMPACT ASSESSMENT (BIA) CONDITIONS ASSESSMENT

Table 17: Biodiversity Impact Assessment (BIA) Conditions Assessment

Criteria	Pass/Fail	Further Comments
Heathland and shrub – Bramble scrub (scattered and dense)		
<i>Condition Score: Poor</i>		Condition assessment not appropriate as condition automatically assumed as poor.
Grassland – Modified grassland (improved grassland)		
There must be 6-8 species per m ² . Note - if a grassland has 9 or more species per m ² it should be classified as a moderate distinctiveness grassland habitat type. NB - this criterion is non-negotiable for achieving good condition.	Pass	
Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	Sward height >5cm for the majority of this habitat
Some scattered scrub (including bramble) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Pass	
Physical damage evident in less than 5% of total grassland area, such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities.	Fail	Physical damage from management activities
Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	
Cover of bracken less than 20%.	Pass	
There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and undesirable species make up less than 5% of ground cover.	Fail	Creeping thistle, common nettle and broadleaved dock located on site.
<i>Condition Score: Poor</i>		
Grassland – Modified grassland (poor semi-improved grassland)		
There must be 6-8 species per m ² . Note - if a grassland has 9 or more species per m ² it should be classified as a moderate distinctiveness grassland habitat type. NB - this criterion is non-negotiable for achieving good condition.	Pass	
Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more	Pass	

Criteria	Pass/Fail	Further Comments
than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.		
Some scattered scrub (including bramble) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Fail	Scattered scrub around the grassland
Physical damage evident in less than 5% of total grassland area, such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities.	Fail	Physical damage from management activities
Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	
Cover of bracken less than 20%.	Pass	
There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and undesirable species ¹ make up less than 5% of ground cover.	Pass	
<i>Condition Score: Moderate</i>		
Grassland – Neutral grassland (marginal and inundation vegetation)		
The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.	Pass	
Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Pass	
Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Pass	
Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Pass	
There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species ¹ and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail	Common nettle, creeping thistle and spear thistle located on site.
<i>Condition Score: Moderate</i>		

Criteria	Pass/Fail	Further Comments
Lakes – Ponds (Non-priority habitat) (ponds on site)		
The pond is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution. Turbidity is acceptable if the pond is grazed by livestock.	Pass	
There is semi-natural habitat (i.e. moderate distinctiveness or above) for at least 10 m from the pond edge.	Pass	
Less than 10% of the pond is covered with duckweed or filamentous algae.	Pass	
The pond is not artificially connected to other waterbodies, either via streams, ditches or artificial pipework.	Fail	Ponds all connected with each other via ditches.
Pond water levels should be able to fluctuate naturally throughout the year. No obvious dams, pumps or pipework.	Pass	
There is an absence of non-native plant and animal species.	Fail	Canada geese seen using the pond at the time of the initial survey.
The pond is not artificially stocked with fish. If the pond naturally contains fish, it is a native fish assemblage at low densities.	Fail	Ponds were artificially stocked with fish.
In non-woodland ponds, plants, be they emergent, submerged or floating (excluding duckweeds) ³ , should cover at least 50% of the pond area that is less than 3 m deep.	Pass	
The surface of non-woodland ponds is no more than 50% shaded by woody bankside species.	Pass	
<i>Condition Score: Moderate</i>		
Sparsely vegetated land – Ruderal/Ephemeral (Ephemeral)		
Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single ecotone (i.e. scrub, grassland, herbs) should not account for more than 80% of the total habitat area.	Fail	Vegetation structure not varied
There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife.	Fail	
Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area. NB - To achieve GOOD condition, criterion 3 must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).	Pass	
<i>Condition Score: Poor</i>		

Criteria	Pass/Fail	Further Comments
Sparsely vegetated land – Ruderal/Ephemeral (Ruderal)		
Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single ecotone (i.e. scrub, grassland, herbs) should not account for more than 80% of the total habitat area.	Fail	Vegetation structure not varied
There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife.	Pass	
Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area. NB - To achieve GOOD condition, criterion 3 must be satisfied by a complete absence of invasive non-native species (rather than <5% cover)."	Pass	
<i>Condition Score: Moderate</i>		
Urban – Modified grassland (Amenity grassland)		
There must be 6-8 species per m ² . Note - if a grassland has 9 or more species per m ² it should be classified as a moderate distinctiveness grassland habitat type. NB - this criterion is non-negotiable for achieving good condition.	Fail	
Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Fail	Sward height >5cm for the majority of this habitat
Some scattered scrub (including bramble) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Pass	
Physical damage evident in less than 5% of total grassland area, such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities.	Fail	Physical damage from management activities
Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail	
Cover of bracken less than 20%.	Pass	
There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and undesirable species make up less than 5% of ground cover.	Fail	Spear thistle and common nettle were present within this habitat
<i>Condition Score: Poor</i>		

Criteria	Pass/Fail	Further Comments
Urban – Vacant/derelict land/bare ground (bare ground)		
Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single ecotone (i.e. scrub, grassland, herbs) should not account for more than 80% of the total habitat area.	Fail	
There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife.	Fail	
Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area. NB - To achieve GOOD condition, criterion 3 must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).	Pass	
<i>Condition Score: Poor</i>		
Urban – Developed land; sealed surface (buildings)		
N/A - Other	N/A	N/A
Urban – Street tree		
More than 70% of trees are native species.	Pass	
Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.	Fail	
More than 50% of trees are mature or veteran.	Fail	
There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime so the trees retain >75% of expected canopy for their age range and height.	Pass	
Management regime has encouraged micro habitat sites for birds, mammals and insects e.g. presence of deadwood, cavities or loose bark etc.	Pass	
Trees are immediately adjacent to other vegetation, and tree canopies are oversailing vegetation beneath.	Pass	
<i>Condition Score: Moderate</i>		
Woodland – Other woodland; broadleaved (broadleaved plantation woodland).		
<i>To assess this, 13 indicators are provided for which each indicator is scored good (3 points), moderate (2 points) or poor (1 point). If total score of indicators is between 33 to 39 then it would be of good condition assessment. If the total score was between 26 to 32 it is of moderate condition and if it is between 13 to 25 then it is of poor condition.</i>		
Age distribution of trees	-	2

Criteria	Pass/Fail	Further Comments
Wild, domestic and feral herbivore damage	-	3
Invasive plant species	-	3
Number of native tree species	-	3
Cover of native tree and shrub species	-	3
Open space within woodland	-	2
Woodland regeneration	-	3
Tree health	-	1
Vegetation and ground flora	-	1
Woodland vertical structure	-	1
Veteran trees	-	1
Amount of deadwood	-	1
Woodland disturbance	-	1

Condition Score: Moderate

Woodland – Other woodland; broadleaved (broadleaved scattered trees)

To assess this, 13 indicators are provided for which each indicator is scored good (3 points), moderate (2 points) or poor (1 point). If total score of indicators is between 33 to 39 then it would be of good condition assessment. If the total score was between 26 to 32 it is of moderate condition and if it is between 13 to 25 then it is of poor condition.

Age distribution of trees	-	1
Wild, domestic and feral herbivore damage	-	2
Invasive plant species	-	2
Number of native tree species	-	3
Cover of native tree and shrub species	-	3
Open space within woodland	-	2
Woodland regeneration	-	2
Tree health	-	2
Vegetation and ground flora	-	1
Woodland vertical structure	-	2
Veteran trees	-	2
Amount of deadwood	-	2
Woodland disturbance	-	2

Criteria	Pass/Fail	Further Comments
<i>Condition Score: Moderate</i>		
Rivers and streams – Ditches and Stream		
River assessment on the watercourses on site not undertaken.	-	-
Hedgerow H1 - Native hedgerow (Intact Species-Poor Hedgerow)		
A1: Height >1.5 m average along length	Pass	
A2 Width >1.5 m average along length	Pass	
B1 Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	Pass	
B2 Gaps make up <10% of total length and no canopy gaps >5m	Pass	
C1 >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length is present on one side of the hedge (at least)	Pass	
C2 Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Pass	
D1 >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Pass	
D2 >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Fail	
<i>Condition Score: Good</i>		
Hedgerow H2 - Native hedgerow with trees (Defunct Species Poor With Trees)		
A1 Height >1.5 m average along length	Pass	
A2 Width >1.5 m average along length	Pass	
B1 Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	Fail	
B2 Gaps make up <10% of total length and no canopy gaps >5m	Pass	
C1 >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length is present on one side of the hedge (at least)	Pass	
C2 Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Fail	

Criteria	Pass/Fail	Further Comments
D1 >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Pass	
D2 >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Fail	
E1 At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	Pass	
E2 At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Pass	
<i>Condition Score: Moderate</i>		
Hedgerow H3 - Native hedgerow with trees (Intact Species Poor With Trees)		
A1 Height >1.5 m average along length	Pass	
A2 Width >1.5 m average along length	Pass	
B1 Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	Pass	
B2 Gaps make up <10% of total length and no canopy gaps >5m	Pass	
C1 >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length is present on one side of the hedge (at least)	Fail	
C2 Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Fail	
D1 >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Pass	
D2 >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Pass	
E1 At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	Pass	
E2 At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Pass	

Criteria	Pass/Fail	Further Comments
<i>Condition Score: Good</i>		
Hedgerow H4 - Native hedgerow with trees (Intact Species Poor With Trees)		
A1 Height >1.5 m average along length	Pass	
A2 Width >1.5 m average along length	Pass	
B1 Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	Pass	
B2 Gaps make up <10% of total length and no canopy gaps >5m	Pass	
C1 >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length is present on one side of the hedge (at least)	Fail	
C2 Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Pass	
D1 >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Pass	
D2 >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Pass	
E1 At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	Pass	
E2 At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Pass	
<i>Condition Score: Good</i>		
Hedgerow H5- Native hedgerow with trees (Intact Species Poor With Trees)		
A1 Height >1.5 m average along length	Pass	
A2 Width >1.5 m average along length	Pass	
B1 Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	Pass	
B2 Gaps make up <10% of total length and no canopy gaps >5m	Pass	
C1 >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of	Pass	

Criteria	Pass/Fail	Further Comments
length is present on one side of the hedge (at least)		
C2 Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Fail	
D1 >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Pass	
D2 >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Fail	
E1 At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	Pass	
E2 At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Pass	
<i>Condition Score: Good</i>		

Hedgerow 6

A1 Height >1.5 m average along length	Pass	
A2 Width >1.5 m average along length	Pass	
B1 Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	Pass	
B2 Gaps make up <10% of total length and no canopy gaps >5m	Pass	
C1 >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length is present on one side of the hedge (at least)	Fail	
C2 Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Pass	
D1 >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Pass	
D2 >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Pass	
E1 At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	Pass	
E2 At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for	Pass	

Criteria

Pass/Fail

Further Comments

wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.

Condition Score: Good

**Land at Upper Heyford
An Invertebrate Assessment**

**A report for:
Ramm Sanderson**

01 November 2021

**By:
Conops Entomology Ltd**

Report Number: 37.21





**Land at Upper Heyford
An Invertebrate Assessment**

Report Number: 37.21

By: Andy Jukes BSc (Hons) MCIEEM FRES
andy@conopsentomology.co.uk

Client contact: a.constantinou@rammsanderson.com

All images copyright © A. Jukes

Conops Entomology Ltd
Registered Office:
Sharkley Meadow Farm
58, Churnet Valley Road
Kingsley Holt
Staffordshire Moorlands
Staffordshire
ST10 2BQ

Company registered in England and Wales.
Company No. 07505919.
VAT Reg No. 159133995

Contents

1	Introduction	4
2	Results summary	5
3	Discussion.....	10
4	Assessment summary	12
5	Recommendations	13
6	References	16
7	Appendix	17

1 Introduction

1.1 The scope of this survey is to undertake an invertebrate assessment of an area of land at Upper Heyford, Oxfordshire (referred to hereafter as ‘the site’) prior to proposed development. The assessment appraised the key habitats and/or features of the site through the recording of invertebrates. The data are used to assess the value to invertebrates of those habitats or features in order to evaluate the site for its importance as an invertebrate resource. From the collection of data and subsequent assessment and valuation, suitable recommendations could then be put forward in the event that some or all of those features or key habitats may be impacted by a proposed development.

1.2 The site is located at OS grid reference SP52112594.

1.3 The site comprises grassland, scrub, and waterbodies. Some of the site is grazed.

Methods and timings

1.4 The methods used for the assessment are those recommended in the Natural England guidance document *Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation* (Drake *et al.*, 2007).

- **Sweep netting**

1.5 This method provides the main proportion of the survey element and is the most efficient method for cataloguing a site’s invertebrate resource. Sweep netting involves the use of a long-handled sweep net being swept over vegetation such as stands of grasses or flowers, or along scrub fringes in order to gather invertebrate material.

- **Spot sampling**

1.6 Spot sampling is employed to collect large, conspicuous invertebrates such as bees and wasps from flowering plants, and to supplement the sweep samples. Spot sampling is often the most effective method for recording species from high-fidelity niches.

- **Grubbing**

1.7 Short turf areas are fingertip-searched for any hiding or crawling invertebrates, principally beetles.

- **Pond dipping**

1.8 Pond dipping was undertaken principally over two visits (July and August).

Survey timing

1.9 The site was visited on four occasions:

Visit dates

05 July 2021 – sunny, 20–21°C;

10 August 2021 – sunny, 19–23°C;

06 September 2021 – dry, light cloud; and

08 October 2021 – cloud and sun, 13–16°C.

2 Results summary

2.1 A total of 316 species from the sampled groups were recorded during the surveys.

2.2 A total of 10 species recorded have a national status, though it is recognized by many of the national recording schemes that a number of these no longer warrant their current status and that they may need revising. This total does not include research-only moths.

2.3 The full list of species recorded for the site is provided in Appendix II.

Table 1 Species breakdown

Site	Total no. of species recorded	Total no. of species of importance*	Species of importance (%)
Site	316	10*	3.16

*Note: some species do not warrant nationally significant status.

Table 2 Species of importance

Scientific name	Vernacular name	National/local status	Habitat preferences and species notes	Site notes
<i>Cionus nigritarsis</i>	A weevil	Notable a	On figworts (<i>Scrophularia</i> spp.).	–
<i>Coenonympha pamphilus</i>	Small heath butterfly	NERC Act Section 41	Prefers mixed sward height grasslands with fine-leaved grasses, including fescues (<i>Festuca</i> spp.).	–
<i>Donacia thalassina</i>	A reed beetle	Nationally Scarce	A wetland beetle associated with sedges (<i>Carex</i> spp.).	–
<i>Hylaeus dilatatus</i>	A yellow-faced bee	Red Data Book 3*	Associated with flowery sites with structure. Now longer deserving a nationally significant status.	–
<i>Lasioglossum pauxillum</i>	A mining bee	Notable a*	Associated with open sites with bare ground. Forages from a wide range of flowers particularly yellow composites. Not more common than its status suggests.	–
<i>Lasioglossum puncticolle</i>	A mining bee	Notable b	Associated with open sites with bare ground. Forages from a wide range of flowers, particularly	–

Scientific name	Vernacular name	National/local status	Habitat preferences and species notes	Site notes
			yellow composites.	
<i>Peltodytes caesus</i>	A water beetle	Nationally Scarce	Pools with vegetation.	–
<i>Psacadina verbekei</i>	A snail-killing fly	Notable	On base-rich and acidic sites.	Quite numerous.
<i>Psylliodes luteola</i>	A leaf beetle	Nationally Scarce	Associated with tall swards on various grasses, also possibly trees and scrub.	–
<i>Trachys scrobiculatus</i>	A jewel beetle	Nationally Scarce	Associated with ground ivy (<i>Glechoma hederarcea</i>).	–

*Accepted as being more common than this status suggests; likely to be downgraded.

Results analysis

- 2.4 Tables 3 and 4 have been generated using the Pantheon software package. Pantheon is an analytical tool developed by Natural England and the Centre for Ecology & Hydrology (CEH) to assist invertebrate nature conservation in England. Site data in the form of species lists can be imported into Pantheon, which then analyses the species within the lists, assigning them to habitats and resources. Pantheon also consigns the most up-to-date national status to the species where it is available.
- 2.5 Pantheon is also capable of other outputs such as Specific Assemblage Types (SATs) (see Table 4).
- 2.6 A SAT is characterized by stenotopic species (those that can withstand only a narrow range of environmental conditions). SATs are therefore more tightly defined than ‘habitats’ or ‘resources’ and sit within a parent habitat or Broad Assemblage Type (BAT). More than one SAT can sit within a parent BAT.

Example:

BAT: F2 – grassland and scrub matrix

SAT: F211 – herb-rich dense sward

F212 – dense scrub

- 2.7 The information obtained from Pantheon can then be used to assign quality to sites and their features, assist in management decisions, and facilitate requirement for further surveys, where required and appropriate.
- 2.8 Pantheon was first made publicly accessible in April 2018 and is the primary analytical tool used by entomologists in site evaluation. It is also the tool recognized and preferred by Natural England. For more information on this new resource, see <http://www.brc.ac.uk/pantheon/>.
- 2.9 Not all species of importance are expressed in the following tables, as they do not form part of the Pantheon analysis and/or their specific requirements are not yet fully understood.

Table 3 Site resource-usage table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	No. of species	Species with conservation status (excluding research-only moths)	Conservation status
open habitats	tall sward & scrub	135	4	<i>Trachys scrobiculatus</i> (Nationally Scarce); <i>Psylliodes luteola</i> (Nationally Scarce); <i>Cionus nigritarsis</i> (Notable a); <i>Hylaeus dilatatus</i> (Red Data Book 3*)
open habitats	short sward & bare ground	42	3	<i>Hylaeus dilatatus</i> (Red Data Book 3); <i>Lasioglossum puncticolle</i> (Notable b); <i>Lasioglossum pauxillum</i> (Notable a)
tree-associated	arboreal	34	–	–

Broad biotope	Habitat	No. of species	Species with conservation status (excluding research-only moths)	Conservation status
wetland	marshland	33	2	<i>Donacia thalassina</i> (Nationally Scarce); <i>Peltodytes caesus</i> (Nationally Scarce)
wetland	acid & sedge peats	17	1	<i>Psacadina verbekei</i> (Notable)
tree-associated	shaded woodland floor	12	–	–
tree-associated	decaying wood	7	–	–
wetland	running water	5	–	–
wetland	lake	4	–	–
wetland	wet woodland	4	–	–
tree-associated	wet woodland	4	–	–

*Accepted as being more common than this status suggests; likely to be downgraded.

Table 4 Site SAT table (taken from Webb *et al.*, 2017)

Broad biotope	SAT	SAT code	No. of species	No. of species with conservation status (excluding research-only moths)	Conservation status	Reported condition
open habitats	rich flower resource	F002	19	3	<i>Hylaeus dilatatus</i> (Red Data Book 3*); <i>Lasioglossum puncticolle</i> (Notable a); <i>Lasioglossum puncticolle</i> (Notable b)	Favourable
open habitats	open short sward	F112	8	1	<i>Coenonympha pamphilus</i> (S41)	Unfavourable (8 of 13 species)
open habitats	scrub edge	F001	8	–	–	Unfavourable (8 of 11 species)
wetland	open water on disturbed mineral sediments	W211	4	1	<i>Peltodytes caesus</i> (Nationally Scarce)	Unfavourable (4 of 6 species)
tree-	bark &	A212	3	–	–	Unfavourable (3 of

Broad biotope	SAT	SAT code	No. of species	No. of species with conservation status (excluding research-only moths)	Conservation status	Reported condition
associated	sapwood decay					19 species)
open habitats	bare sand & chalk	F111	2	–	–	Unfavourable (2 of 19 species)
wetland	northern lakes & lochs	W212	1	1	<i>Donacia thalassina</i>	Unfavourable (1 of 3 species)
wetland	reed-fen & pools	W314	1	–	–	Unfavourable (1 of 11 species)

*Accepted as being more common than this status suggests; likely to be downgraded.

3 Discussion

Habitats

- 3.1 The site is represented by a range of habitats broadly covering three broad biotopes: ‘open habitats’, ‘tree-associated’, and ‘wetland’. All three biotopes have a strong presence at the site, but it is the open terrestrial biotope that dominates the site in terms of species associations and physical extent of each habitat with 179 species associated with it. This is supported by the other biotopes; the wetland biotope with 54 species recorded and the tree-associated with 51 species of association.
- 3.2 The habitats that are the most prominent across all areas of the compartment are the tall sward and scrub with a total of 135 species of association recorded. The resource is dominated by flies and, to a lesser extent, beetles, and also solitary bees and wasps. There are four species noted by Pantheon as being of particular value to the habitat.
- 3.3 The short sward and bare-ground habitat that complements the above tall sward and scrub is represented by 42 species. This is a significant total, despite the feature not reaching favourable condition in the SAT table (see Table 4). This is not surprising, given the open structure of the sward that is evident across southern half of the site.
- 3.4 The next most speciose habitat on the site is the arboreal habitat, with 34 species of association. This habitat is noted for its moth species, along with a suite of tree-dwelling beetle and weevils. However, owing to a lack of overall condition of the habitat, there are no species recorded with a nationally significant status. This is supported by the SAT analysis, which does not highlight this assemblage as of value.
- 3.5 However, there is a moderately rich scrub fringe assemblage (SAT code F001), owing mainly to the varied and unmanaged fringes to the hedgerows and scrubby thickets.
- 3.6 The wetland habitats are, in parts, well developed, with the marshland habitat having 33 species of association including two with a nationally significant status. Both of these are associated with ponds or still waterbodies with lush vegetation, including emergent and marginal sedges (*Carex* spp.).
- 3.7 There are other habitats and SATs present, including the decaying wood habitat, but owing to a lack of any significant deadwood at the site, this habitat is poorly developed and expressed only through reasonably common and generalist species.

Species

- 3.8 The survey of the site recorded 316 species and 10 species identified by Pantheon as being of value; however, there are at least two that are more common now than their status suggests, so in time this number would be revised downwards as further status reviews are completed.
- 3.9 The list of species is made up of a broad cross-section of groups from flies (65 species), beetles (80 species), moths (52 species), and bugs (49 species). Bees and wasps (27 species) and butterflies (20 species) make up the species composition of the site.
- 3.10 There are scarce species represented from most of the habitat types, though the open short swards (and patchy bare ground) and lush wetland margins offer the greatest potential for scarce and high-fidelity species at the site. Of note are the reed beetle (*Donacia thalassina*), a Nationally Scarce wetland species that is associated with sedges (*Carex* spp.), and the small heath butterfly (*Coenonympha pamphilus*). This is an NERC Act Section 41 species that has declined by 57% since the 1970s¹.
- 3.11 The snail-killing fly *Psacadina verbekei* (Notable) was found to have a strong population at the site, having been recorded from around the pond edges.

¹ Butterfly Conservation (2021). <https://butterfly-conservation.org/butterflies/small-heath> [Accessed 30 September 2021].

4 Assessment summary

Constraints

- 4.1 The site was not surveyed until early July 2021, and as such, all of the spring and some of the early summer fauna has not been sampled. Consequently, the species lists are incomplete.
- 4.2 Despite this, it is felt that adequate information has been gathered in order to fairly appraise the site's features of potential value.

Site assessment summary

- 4.3 The site has a total of 316 species recorded, including 10 species of importance. This constitutes 3.16% of the total species recorded, which is a low percentage of scarce species, particularly for a site in the southern half of England where there is typically a richer fauna.
- 4.4 The overall number of species recorded is not exceptionally high but is thought to be typical and representative of the size of the sampling area, geographical location, habitats, and grazing pressure. Coupled with this, the diversity of species associated with patchy swards and bare ground, along with lush vegetated ponds, is of some note.
- 4.5 The principal driver for the diversity at the site is the mosaic of different habitat types and features in close proximity to one another, allowing for a wide variety of niches to develop, although many of those niches are not of high value (see Table 4).
- 4.6 Of particular interest, as noted in paragraph 4.4, is the open short sward grassland, and pools with lush margins. These habitats are elevated by their proximity to scrub and other semi-natural habitats, including ruderals and tall flowery grassland.

Site evaluation

- 4.7 The site comprises a moderate invertebrate fauna that includes a number of localized and specialized species of raised conservation value. It also includes a species of butterfly of particular note, owing to its relative scarcity and nationally significant declines.
- 4.8 The valuation of the site takes into consideration the range of species recorded, including the scarce species, the overall assemblages, and the importance of the habitats, and mosaics of features, to the species.
- 4.9 From considering the above summary information and data collected from the surveys, it is suggested that any impact to the site's key features and species should be considered to be of at least **District (low) importance**.
- 4.10 The site is considered to be of District (low) importance and not one of a lower status, owing to the site possessing important features to invertebrates, in particular, the short swards, bare ground, and wetland features. These features are elevated by being part of a mosaic of other habitats, and these juxtapositions are not frequently encountered across the landscape.
- 4.11 The site is not thought to be of County (medium) value, however, owing to the comparatively short list of scarce species recorded, indicating a lack of highly developed niches and features at the site that might suggest significant resources of scarce or threatened invertebrates, these being restricted and/or threatened at a wide geographical scale, such as at the County level.

5 Recommendations

Important note

- 5.1 It should always be the first priority to retain the site and/or the key features *in situ* without a direct impact. However, should the site or parts of the site be impacted through a proposed development, the following provisional recommendations are outlined.
- 5.2 A suitably qualified and experienced invertebrate ecologist should be consulted for further input prior to mitigation/compensation plans being finalized.
- 5.3 As the site and its key species are associated with a range of features, there are a number of options possible to compensate for any losses to the site.
- 5.4 The success of any mitigation for loss of part or all of the site's key features will be dependent on incorporating key features in juxtaposition with one another and creating features that are **abundant, extensive, and optimal**.

Short turf and bare ground

- 5.5 The presence of an open, flowery sward with patches of bare ground is an important feature.
- 5.6 To be successful, the mosaic should be exposed to full sun for much of the day, including the key period between 10:00 and 16:00, and be created on nutrient-poor subsoils to promote a patchy sward dominated by flowering plants.
- 5.7 Bare ground should comprise approximately 30% of the overall habitat mosaic.
- 5.8 A mosaic of fine-leaved grasses and a range of flowering plants are required to fulfil the requirements of the open flowery mosaics. It is likely that a 'one stop' commercially sourced seed mixture may not be suitable, but a bespoke mix will be required.
- 5.9 The bare-ground element should be topographically varied to include horizontal planes and also vertical and/or near-vertical exposures. These exposures can be low (as little as 20 cm) to high cliffs over 1 m in height.

The following plant species should be included as part of the short turf sward:

- common bird's-foot trefoil (*Lotus corniculatus*);
- hawkbits (*Leontodon* spp.);
- other yellow Asteraceae;
- other trefoils (Fabaceae);
- other vetches (*Vicia* spp.);
- red clover (*Trifolium pratense*).

Flowering swards

- 5.10 As the site has numerous pollinators, it will be important to provide as rich a flowering resource as possible for the site's invertebrates. Flowering areas should be sown/planted with an appropriate mix of flowering plants. This mix should benefit the pollen- and nectar-foraging invertebrates and therefore include the following:

- common bird's-foot trefoil (*Lotus corniculatus*);
- common knapweed (*Centaurea nigra*);
- bush vetch (*Vicia cracca*);
- hawkbits (*Leontodon* spp.);
- hawkweeds (*Hieracium* spp.);
- labiates (Lamiaceae);
- meadow vetchling (*Lathyrus pratensis*);

- other trefoils (*Fabaceae*);
 - other vetches (*Vicia* spp.);
 - viper's bugloss (*Echium vulgare*);
 - ox-eye daisy (*Leucanthemum vulgare*);
 - red clover (*Trifolium pratense*); and
 - woundworts (*Stachys* spp.).
- 5.11 The flowering swards should have a high density of flowers. Most standard mixes do not have a high enough proportion of flowering plants that are suitable for invertebrate mitigation, so a bespoke mix or additional ordering of supplementary flower seed or plugs is advised. On-site resources can also be used.
- 5.12 Management of grassland areas should seek to create a structurally diverse sward with areas that are not cut or grazed regularly to ensure tall flowery stands are retained over winter. These areas do not need to be fixed but can rotate around the site every few years.

Scrub fringe

- 5.13 Scrub is an important interface with open flowery habitats and wetland features.
- 5.14 Scrub, or specifically spring blossom, is also an integral part of a healthy and functioning invertebrate site. It is a key provider of pollen and nectar in spring from March to late June before the grassland flowers dominate.
- 5.15 Scrub, or any trees, should not shade out important areas of flowery areas pools. Where scrub is needed to produce an interface, it should be positioned on the northern side of any other important feature.
- 5.16 Where additional scrub planting is required, either in formal areas or in mitigation, only use native species. The following species provide a continuity of flowers from early spring to summer:
- apples (*Malus domestica* agg.);
 - blackthorn (*Prunus spinosa*);
 - cherry plum (*Prunus cerasifera*);
 - field maple (*Acer campestre*);
 - hawthorn (*Crataegus monogyna*);
 - plums (*Prunus domestica* agg.);
 - rowan (*Sorbus aucuparia*); and
 - willows (*Salix* spp.).

Deadwood

- 5.17 The deadwood-nesting bees and wasps recorded from the site are low in number, but this is a resource that could be enhanced easily and effectively. Deadwood in sheltered sunny situations can be easily provided through the reworking of any felled on-site material.
- 5.18 Each piece of deadwood should ideally be a minimum of 20 cm in diameter, and no less than 1.5 m in length. The reworked tree trunk can be inserted into the ground as posts to replicate standing deadwood or, if of significant size, can be positioned in full sun locations on the edges of grasslands.
- 5.19 Deadwood should also be introduced to woodlands. The larger the piece of material, the more significant they will be to invertebrates. **Do not section up timber into log piles to use as invertebrate features.** Trunks of trees and other timber are of greatest value when left whole or sectioned only as large-volume pieces.
- 5.20 Any scrub that is in an undesirable location, i.e. shading out valuable flowery grassland, can be ring-barked and the crown taken away. The resulting trunk will become standing deadwood and utilized by stem-nesting bees and wasps.

Waterbodies

- 5.21 Waterbodies should be retained or created to provide a breeding location for the range of wetland flies and beetles.
- 5.22 The greatest value to any created pond matrix is that they should be varied in profile but all include wide shallow margins that can be colonized or planted with native sedges (*Carex* spp.) and other lush margin plants.

Juxtapositions

- 5.23 The site's value is in part due to the interfaces between each habitat type, in particular scrub fringe against grassland, and in close proximity to pools. Therefore, it is important to ensure that the mitigation offers a complex range of juxtapositions that species can exploit, whether for breeding, shelter, or hunting. This is best achieved by creating a variation of edges between habitat types (interfaces).

6 References

- Anon. (2008)** Acalypterate keys. Unpublished test keys. Dipterists Forum.
- Ball, S. (2005)** *Hoverfly Recording Scheme*. Available at: www.hoverfly.org.uk
- d'Annis Fonseca, E.C.M. (1978)** *Diptera Orthorrhapha Brachycera – Dolichopodidae*. Royal Entomological Society of London, London.
- Drake, C.M. et al. (2007)** *NERR005. Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation*. Natural England, Peterborough.
- Falk, S. (2015)** *Field Guide to the Bees of Great Britain and Ireland*. British Wildlife Publishing, Totnes.
- Hubble, D.S. (2014)** *A Review of the Scarce and Threatened Beetles of Great Britain: the Leaf Beetles and Their Allies. Species Status No. 19*. Natural England Commissioning Reports, Number 161.
- Lott, D. et al. (2007)** *ISIS. Invertebrate Species-Habitat Information System, 2010 Build*. Natural England, Peterborough.
- Richards, O.W. (1980)** *Scolioidea, Vespoidea and Sphecoidea: Hymenoptera, Aculeata*. Royal Entomological Society, London.
- Shirt, D.B. (1987)** *British Red Data Books: 2. Insects*. Nature Conservancy Council, Peterborough.
- Stubbs, A.E. (2002)** *British Hoverflies*. British Entomological and Natural History Society, Reading.
- Stubbs, A.E. and Drake, M. (2001)** *British Soldierflies and Their Allies*. British Entomological and Natural History Society, London.

7 Appendix

Appendix I: Red Data Book definitions

Appendix II: Survey results

Appendix I: Red Data Book definitions

Red Data Book category 1 (RDB 1) – Endangered

Species that are known or believed to occur as only a single population within one 10-km square of the National Grid.

Red Data Book category 2 (RDB 2) – Vulnerable

Species declining throughout their range or in vulnerable habitats.

Red Data Book category 3 (RDB 3) – Rare

Species that are estimated to exist in only 15 or fewer post-1970 10-km squares. This criterion may be relaxed where populations are likely to exist in over 15 10-km squares but occupy small areas of especially vulnerable habitat.

Nationally Notable (Scarce) category A (NS A) – Notable A

Taxa that do not fall within the RDB category but that are nonetheless uncommon in Great Britain and thought to occur in 30 or fewer 10-km squares of the National Grid or, for less well-recorded groups, between eight and 20 vice counties.

Nationally Notable (Scarce) category B (NS B) – Notable B

Taxa that do not fall within the RDB category but that are nonetheless uncommon in Great Britain and thought to occur in 31–100 10-km squares of the National Grid or, for less well-recorded groups, between eight and 20 vice counties.

Nationally Notable (Scarce) (N) – Notable

Species that are estimated to occur within the range of 16–100 10-km squares. The subdividing of this category into Notable A and Notable B has not been attempted for many species in this part of the review.

IUCN categories

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range, have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not

qualify for Critically Endangered, Endangered, or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT

A taxon is Data Deficient (DD) when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. DD is therefore not a category of threat.

GB Rarity Status categories and criteria

Broadly speaking, the Nationally Rare category is equivalent to the Red Data Book, namely: Endangered (RDB1), Vulnerable (RDB2), Rare (RDB3), Insufficiently Known (RDBK), and Extinct, which will not be used in this report.

The Nationally Scarce category is directly equivalent to the combined Nationally Notable A (Na) and Nationally Notable B (Nb) categories used in the assessment of various taxonomic groups, e.g. by Hyman and Parsons (1992) in assessing the status of beetles, but never used in a published format to assess these three families.

Nationally Rare Native species recorded from 15 or fewer hectads of the Ordnance Survey National Grid in Great Britain since 31 December 1989 and where there is reasonable confidence that exhaustive recording would not find them in more than 15 hectads. This category includes species that are probably extinct.

Nationally Scarce Native species that are not regarded as Nationally Rare AND have not been recorded from more than 100 hectads of the Ordnance Survey National Grid in Great Britain since 31 December 1989 and where there is reasonable confidence that exhaustive recording would not find them in more than 100 hectads.

England NERC S.41 Biodiversity Lists – England England NERC S.41 Species ‘of principal importance for the purpose of conserving biodiversity’ covered under section 41 (England) of the NERC Act (2006) and therefore need to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity. 2008 Natural Environment and Rural Communities Act 2006 – Species of Principal Importance in England (section 41) and Wales (section 42).

Appendix II: Survey results

Only species with a national status have been annotated. All others are common or local species.

Scientific name	Taxonomic group	Order	National status
<i>Acalypta parvula</i>	Tingidae	Hemiptera	
<i>Acanthosoma haemorrhoidale</i>	Acanthosomatidae	Hemiptera	
<i>Acidia cognata</i>	Tephritidae	Diptera	
<i>Acronicta rumicis</i>	Noctuidae	Lepidoptera	Section 41 Priority Species – research only
<i>Aelia acuminata</i>	Pentatomidae	Hemiptera	
<i>Aglais io</i>	Nymphalidae	Lepidoptera	
<i>Aglais urticae</i>	Nymphalidae	Lepidoptera	
<i>Agonum viduum</i>	Carabidae	Coleoptera	
<i>Agriphila geniculea</i>	Crambidae	Lepidoptera	
<i>Agriphila straminella</i>	Crambidae	Lepidoptera	
<i>Agriphila tristella</i>	Crambidae	Lepidoptera	
<i>Agrochola circellaris</i>	Noctuidae	Lepidoptera	
<i>Agromyza idaeiana</i>	Agromyzidae	Diptera	
<i>Altica lythri</i>	Chrysomelidae	Coleoptera	
<i>Altica palustris</i>	Chrysomelidae	Coleoptera	
<i>Amara familiaris</i>	Carabidae	Coleoptera	
<i>Amara similata</i>	Carabidae	Coleoptera	
<i>Amblytylus nasutus</i>	Miridae	Hemiptera	
<i>Anasimyia contracta</i>	Syrphidae	Diptera	
<i>Anax imperator</i>	Aeshnidae	Odonata	
<i>Andrena dorsata</i>	Andrenidae	Hymenoptera	
<i>Andrena minutula</i>	Andrenidae	Hymenoptera	
<i>Andrena wilkella</i>	Andrenidae	Hymenoptera	
<i>Anobium punctatum</i>	Anobiidae	Coleoptera	
<i>Anomoia purmunda</i>	Tephritidae	Diptera	
<i>Anoplius nigerrimus</i>	Pompilidae	Hymenoptera	
<i>Anthocoris confusus</i>	Anthocoridae	Hemiptera	
<i>Anthocoris nemorum</i>	Anthocoridae	Hemiptera	
<i>Anthophila fabriciana</i>	Choreutidae	Lepidoptera	
<i>Aphantopus hyperantus</i>	Nymphalidae	Lepidoptera	
<i>Aphria longirostris</i>	Tachinidae	Diptera	
<i>Aphthona euphorbiae</i>	Chrysomelidae	Coleoptera	
<i>Apion frumentarium</i>	Apionidae	Coleoptera	
<i>Aplocera efformata</i>	Geometridae	Lepidoptera	
<i>Apodia bifractella</i>	Gelechiidae	Lepidoptera	
<i>Apolygus lucorum</i>	Miridae	Hemiptera	
<i>Argyresthia goedartella</i>	Argyresthiidae	Lepidoptera	

Scientific name	Taxonomic group	Order	National status
<i>Aricia agestis</i>	Lycaenidae	Lepidoptera	
<i>Athous bicolor</i>	Elateridae	Coleoptera	
<i>Autographa gamma</i>	Noctuidae	Lepidoptera	
<i>Beris vallata</i>	Stratiomyidae	Diptera	
<i>Biston betularia</i>	Geometridae	Lepidoptera	
<i>Bombus pascuorum</i>	Apidae	Hymenoptera	
<i>Bombus pascuorum</i>	Apidae	Hymenoptera	
<i>Caloptilia rufipennella</i>	Gracillariidae	Lepidoptera	
<i>Caloptilia stigmatella</i>	Gracillariidae	Lepidoptera	
<i>Calvia quattuordecimguttata</i>	Coccinellidae	Coleoptera	
<i>Camptogramma bilineata</i>	Geometridae	Lepidoptera	
<i>Capsus ater</i>	Miridae	Hemiptera	
<i>Cartodere bifasciata</i>	Latridiidae	Coleoptera	
<i>Cartodere nodifer</i>	Latridiidae	Coleoptera	
<i>Cassida viridis</i>	Chrysomelidae	Coleoptera	
<i>Celypha lacunana</i>	Tortricidae	Lepidoptera	
<i>Cerceris rybyensis</i>	Crabronidae	Hymenoptera	
<i>Ceutorhynchus obstrictus</i>	Curculionidae	Coleoptera	
<i>Chaetocnema picipes</i>	Chrysomelidae	Coleoptera	
<i>Chiasmia clathrata</i>	Geometridae	Lepidoptera	Section 41 Priority Species – research only
<i>Chilacis typhae</i>	Lygaeidae	Hemiptera	
<i>Chloromyia formosa</i>	Stratiomyidae	Diptera	
<i>Chorthippus brunneus</i>	Acrididae	Orthoptera	
<i>Chorthippus parallelus</i>	Acrididae	Orthoptera	
<i>Chrysolina herbacea</i>	Chrysomelidae	Coleoptera	
<i>Chrysopilus asiliformis</i>	Rhagionidae	Diptera	
<i>Chrysopilus cristatus</i>	Rhagionidae	Diptera	
<i>Chrysoteuchia culmella</i>	Crambidae	Lepidoptera	
<i>Chrysotoxum bicinctum</i>	Syrphidae	Diptera	
<i>Chrysotus gramineus</i>	Dolichopodidae	Diptera	
<i>Chrysotus neglectus</i>	Dolichopodidae	Diptera	
<i>Cicadella viridis</i>	Cicadellidae	Hemiptera	
<i>Cionus nigratarsis</i>	Curculionidae	Coleoptera	Notable a
<i>Cionus scrophulariae</i>	Curculionidae	Coleoptera	
<i>Cionus tuberculosus</i>	Curculionidae	Coleoptera	
<i>Coccinella septempunctata</i>	Coccinellidae	Coleoptera	
<i>Coenagrion puella</i>	Coenagrionidae	Odonata	
<i>Coenonympha pamphilus</i>	Nymphalidae	Lepidoptera	Near Threatened; Section 41 Priority Species
<i>Coleophora glaucicolella</i>	Coleophoridae	Lepidoptera	

Scientific name	Taxonomic group	Order	National status
<i>Colletes hederæ</i>	Colletidae	Hymenoptera	
<i>Conocephalus fuscus</i>	Conocephalidae	Orthoptera	
<i>Cordilura albipes</i>	Scathophagidae	Diptera	
<i>Cordylepherus viridis</i>	Malachiidae	Coleoptera	
<i>Coremacera marginata</i>	Sciomyzidae	Diptera	
<i>Coreus marginatus</i>	Coreidae	Hemiptera	
<i>Coriomeris denticulatus</i>	Coreidae	Hemiptera	
<i>Corticaria gibbosa</i>	Latridiidae	Coleoptera	
<i>Crambus perlella</i>	Crambidae	Lepidoptera	
<i>Crepidodera aurea</i>	Chrysomelidae	Coleoptera	
<i>Crepidodera plutus</i>	Chrysomelidae	Coleoptera	
<i>Cryptocephalus moraei</i>	Chrysomelidae	Coleoptera	
<i>Cyclophora punctaria</i>	Geometridae	Lepidoptera	
<i>Cymus claviculus</i>	Lygaeidae	Hemiptera	
<i>Cymus melanocephalus</i>	Lygaeidae	Hemiptera	
<i>Cyphon ochraceus</i>	Scirtidae	Coleoptera	
<i>Deilephila elpenor</i>	Sphingidae	Lepidoptera	
<i>Demetrius atricapillus</i>	Carabidae	Coleoptera	
<i>Deraeocoris</i> (<i>Knightocapsus</i>) <i>lutescens</i>	Miridae	Hemiptera	
<i>Dicranomyia lutea</i>	Limoniidae	Diptera	
<i>Dicyphus (Dicyphus)</i> <i>epilobii</i>	Miridae	Hemiptera	
<i>Dioctria rufipes</i>	Asilidae	Diptera	
<i>Dolichopus griseipennis</i>	Dolichopodidae	Diptera	
<i>Dolichopus trivialis</i>	Dolichopodidae	Diptera	
<i>Dolichopus unguatus</i>	Dolichopodidae	Diptera	
<i>Dolycoris baccarum</i>	Pentatomidae	Hemiptera	
<i>Donacia thalassina</i>	Chrysomelidae	Coleoptera	Nationally Scarce
<i>Dromius</i> <i>quadrifasciatus</i>	Carabidae	Coleoptera	
<i>Elachista canapennella</i>	Elachistidae	Lepidoptera	
<i>Elasmotherus</i> <i>interstinctus</i>	Acanthosomatidae	Hemiptera	
<i>Empis livida</i>	Empididae	Diptera	
<i>Enochrus</i> <i>melanocephalus</i>	Hydrophilidae	Coleoptera	
<i>Entomognathus brevis</i>	Crabronidae	Hymenoptera	
<i>Epiphyas postvittana</i>	Tortricidae	Lepidoptera	
<i>Epirrhoe alternata</i>	Geometridae	Lepidoptera	
<i>Episyrphus balteatus</i>	Syrphidae	Diptera	
<i>Epitrix pubescens</i>	Chrysomelidae	Coleoptera	
<i>Eriothrix rufomaculata</i>	Tachinidae	Diptera	

Scientific name	Taxonomic group	Order	National status
<i>Eristalis arbustorum</i>	Syrphidae	Diptera	
<i>Eristalis intricarius</i>	Syrphidae	Diptera	
<i>Eristalis tenax</i>	Syrphidae	Diptera	
<i>Eupeodes corollae</i>	Syrphidae	Diptera	
<i>Eupithecia subfuscata</i>	Geometridae	Lepidoptera	
<i>Eurygaster testudinaria</i>	Scutelleridae	Hemiptera	
<i>Galerucella calvariensis</i>	Chrysomelidae	Coleoptera	
<i>Glyphipterix simpliciella</i>	Glyphipterigidae	Lepidoptera	
<i>Gonepteryx rhamni</i>	Pieridae	Lepidoptera	
<i>Halictus rubicundus</i>	Halictidae	Hymenoptera	
<i>Halictus tumulorum</i>	Halictidae	Hymenoptera	
<i>Haliphus flavicollis</i>	Haliplidae	Coleoptera	
<i>Haliphus immaculatus</i>	Haliplidae	Coleoptera	
<i>Halticus luteicollis</i>	Miridae	Hemiptera	
<i>Harmonia axyridis</i>	Coccinellidae	Coleoptera	
<i>Helophilus pendulus</i>	Syrphidae	Diptera	
<i>Himacerus (Anaptus) major</i>	Nabidae	Hemiptera	
<i>Himacerus (Aptus) mirmicoides</i>	Nabidae	Hemiptera	
<i>Himacerus (Himacerus) apterus</i>	Nabidae	Hemiptera	
<i>Hydromya dorsalis</i>	Sciomyzidae	Diptera	
<i>Hygrotus inaequalis</i>	Dytiscidae	Coleoptera	
<i>Hylaeus dilatatus [Genus inferred]</i>	Colletidae	Hymenoptera	
<i>Hypena proboscidalis</i>	Erebidae	Lepidoptera	
<i>Hypera zoilus</i>	Curculionidae	Coleoptera	
<i>Hyphydrus ovatus</i>	Dytiscidae	Coleoptera	
<i>Ilybius fenestratus</i>	Dytiscidae	Coleoptera	
<i>Ilybius quadriguttatus</i>	Dytiscidae	Coleoptera	
<i>Ilyocoris cimicoides</i>	Naucoridae	Hemiptera	
<i>Ischnura elegans</i>	Coenagrionidae	Odonata	
<i>Kleidocerys resedae</i>	Lygaeidae	Hemiptera	
<i>Laccophilus minutus</i>	Dytiscidae	Coleoptera	
<i>Lasioglossum albipes</i>	Halictidae	Hymenoptera	
<i>Lasioglossum calceatum</i>	Halictidae	Hymenoptera	
<i>Lasioglossum leucopus</i>	Halictidae	Hymenoptera	
<i>Lasioglossum leucozonium</i>	Halictidae	Hymenoptera	
<i>Lasioglossum morio</i>	Halictidae	Hymenoptera	
<i>Lasioglossum pauxillum</i>	Halictidae	Hymenoptera	Notable a*
<i>Lasioglossum puncticolle</i>	Halictidae	Hymenoptera	Notable b
<i>Lasioglossum villosulum</i>	Halictidae	Hymenoptera	

Scientific name	Taxonomic group	Order	National status
<i>Lathronympha strigana</i>	Tortricidae	Lepidoptera	
<i>Leptophyes punctatissima</i>	Phaneropteridae	Orthoptera	
<i>Leptopterna dolabrata</i>	Miridae	Hemiptera	
<i>Ligdia adustata</i>	Geometridae	Lepidoptera	
<i>Limnobaris dolorosa</i>	Curculionidae	Coleoptera	
<i>Limonia macrostigma</i>	Limoniidae	Diptera	
<i>Liocoris tripustulatus</i>	Miridae	Hemiptera	
<i>Lonchoptera bifurcata</i>	Lonchopteridae	Diptera	
<i>Longitarsus flavicornis</i>	Chrysomelidae	Coleoptera	
<i>Longitarsus gracilis</i>	Chrysomelidae	Coleoptera	
<i>Longitarsus luridus</i>	Chrysomelidae	Coleoptera	
<i>Longitarsus parvulus</i>	Chrysomelidae	Coleoptera	
<i>Longitarsus pratensis</i>	Chrysomelidae	Coleoptera	
<i>Lycaena phlaeas</i>	Lycaenidae	Lepidoptera	
<i>Lygus rugulipennis</i>	Miridae	Hemiptera	
<i>Malachius bipustulatus</i>	Malachiidae	Coleoptera	
<i>Maniola jurtina</i>	Nymphalidae	Lepidoptera	
<i>Meconema thalassinum</i>	Meconematidae	Orthoptera	
<i>Melanargia galathea</i>	Nymphalidae	Lepidoptera	
<i>Melanostoma mellinum</i>	Syrphidae	Diptera	
<i>Melanostoma scalare</i>	Syrphidae	Diptera	
<i>Meligethes aeneus</i>	Nitidulidae	Coleoptera	
<i>Molophilus obscurus</i>	Limoniidae	Diptera	
<i>Mompha epilobiella</i>	Momphidae	Lepidoptera	
<i>Mordellistena pumila</i>	Mordellidae	Coleoptera	
<i>Myathropa florea</i>	Syrphidae	Diptera	
<i>Myrmica rubra</i>	Formicidae	Hymenoptera	
<i>Nabis (Dolichonabis) limbatus</i>	Nabidae	Hemiptera	
<i>Nanophyes marmoratus</i>	Nanophyidae	Coleoptera	
<i>Neoscia podagrica</i>	Syrphidae	Diptera	
<i>Neocrepidodera transversa</i>	Chrysomelidae	Coleoptera	
<i>Nepa cinerea</i>	Nepidae	Hemiptera	
<i>Nephoterix angustella</i>	Pyralidae	Lepidoptera	
<i>Nomada flavoguttata</i>	Apidae	Hymenoptera	
<i>Nomada panzeri sensu lato</i>	Apidae	Hymenoptera	
<i>Nomada panzeri sensu stricto</i> (post 2018 glabella split)	Apidae	Hymenoptera	
<i>Nomada sheppardana</i>	Apidae	Hymenoptera	
<i>Notiophilus biguttatus</i>	Carabidae	Coleoptera	

Scientific name	Taxonomic group	Order	National status
<i>Notonecta (Notonecta) glauca</i>	Notonectidae	Hemiptera	
<i>Nowickia ferox</i>	Tachinidae	Diptera	
<i>Ochlodes sylvanus</i>	Hesperiidae	Lepidoptera	
<i>Ochsenheimeria urella</i>	Ypsolophidae	Lepidoptera	
<i>Ocypus olens</i>	Staphylinidae	Coleoptera	
<i>Oedemera lurida</i>	Oedemeridae	Coleoptera	
<i>Oedemera nobilis</i>	Oedemeridae	Coleoptera	
<i>Olibrus aeneus</i>	Phalacridae	Coleoptera	
<i>Olibrus liquidus</i>	Phalacridae	Coleoptera	
<i>Opisthograptis luteolata</i>	Geometridae	Lepidoptera	
<i>Opomyza florum</i>	Opomyzidae	Diptera	
<i>Opomyza germinationis</i>	Opomyzidae	Diptera	
<i>Orius (Heterorius) majusculus</i>	Anthocoridae	Hemiptera	
<i>Orius (Orius) laevigatus</i>	Anthocoridae	Hemiptera	
<i>Orthops (Orthops) campestris</i>	Miridae	Hemiptera	
<i>Othius punctulatus</i>	Staphylinidae	Coleoptera	
<i>Oxyporus rufus</i>	Staphylinidae	Coleoptera	
<i>Oxystoma pomonae</i>	Apionidae	Coleoptera	
<i>Pachygaster atra</i>	Stratiomyidae	Diptera	
<i>Palloptera quinquemaculata</i>	Pallopteridae	Diptera	
<i>Palomena prasina</i>	Pentatomidae	Hemiptera	
<i>Paradromius linearis</i>	Carabidae	Coleoptera	
<i>Paragus haemorrhous</i>	Syrphidae	Diptera	
<i>Pararge aegeria</i>	Nymphalidae	Lepidoptera	
<i>Parhelophilus frutetorum</i>	Syrphidae	Diptera	
<i>Parornix devoniella</i>	Gracillariidae	Lepidoptera	
<i>Parydra coarctata</i>	Ephydriidae	Diptera	
<i>Passaloecus singularis</i>	Crabronidae	Hymenoptera	
<i>Peltodytes caesus</i>	Halplidae	Coleoptera	Nationally Scarce
<i>Perapion hydrolapathi</i>	Apionidae	Coleoptera	
<i>Phlogophora meticulosa</i>	Noctuidae	Lepidoptera	
<i>Phyllonorycter corylifoliella</i>	Gracillariidae	Lepidoptera	
<i>Phyllonorycter geniculella</i>	Gracillariidae	Lepidoptera	
<i>Phyllonorycter messaniella</i>	Gracillariidae	Lepidoptera	
<i>Phyllonorycter nicellii</i>	Gracillariidae	Lepidoptera	
<i>Phyllonorycter quercifoliella</i>	Gracillariidae	Lepidoptera	
<i>Phyllonorycter</i>	Gracillariidae	Lepidoptera	

Scientific name	Taxonomic group	Order	National status
<i>ulmifoliella</i>			
<i>Phyllotreta vittula</i>	Chrysomelidae	Coleoptera	
<i>Physocephala rufipes</i>	Conopidae	Diptera	
<i>Phytocoris (Ktenocoris) varipes</i>	Miridae	Hemiptera	
<i>Phytomyza agromyzina</i>	Agromyzidae	Diptera	
<i>Picromerus bidens</i>	Pentatomidae	Hemiptera	
<i>Pieris brassicae</i>	Pieridae	Lepidoptera	
<i>Pieris napi</i>	Pieridae	Lepidoptera	
<i>Pieris rapae</i>	Pieridae	Lepidoptera	
<i>Pinalitus cervinus</i>	Miridae	Hemiptera	
<i>Plagiognathus (Plagiognathus) arbustorum</i>	Miridae	Hemiptera	
<i>Plateumaris sericea</i>	Chrysomelidae	Coleoptera	
<i>Platycheirus clypeatus</i>	Syrphidae	Diptera	
<i>Platycheirus scambus</i>	Syrphidae	Diptera	
<i>Platydracus stercorarius</i>	Staphylinidae	Coleoptera	
<i>Pleuroptya ruralis</i>	Crambidae	Lepidoptera	
<i>Poecilobothrus nobilitatus</i>	Dolichopodidae	Diptera	
<i>Polyommatus icarus</i>	Lycaenidae	Lepidoptera	
<i>Propylea quattuordecimpunctata</i>	Coccinellidae	Coleoptera	
<i>Protapion assimile</i>	Apionidae	Coleoptera	
<i>Protapion fulvipes</i>	Apionidae	Coleoptera	
<i>Psacadina verbekei</i>	Sciomyzidae	Diptera	Notable
<i>Psammotettix confinis</i>	Cicadellidae	Hemiptera	
<i>Psila merdaria</i>	Psilidae	Diptera	
<i>Psylliodes chrysocephala</i>	Chrysomelidae	Coleoptera	
<i>Psylliodes luteola</i>	Chrysomelidae	Coleoptera	Nationally Scarce
<i>Psylliodes picina</i>	Chrysomelidae	Coleoptera	
<i>Psyllobora vigintiduopunctata</i>	Coccinellidae	Coleoptera	
<i>Pyrausta aurata</i>	Crambidae	Lepidoptera	
<i>Pyronia tithonus</i>	Nymphalidae	Lepidoptera	
<i>Pyrrhalta viburni</i>	Chrysomelidae	Coleoptera	
<i>Rhagozycha fulva</i>	Cantharidae	Coleoptera	
<i>Rhaphium antennatum</i>	Dolichopodidae	Diptera	Nationally Scarce
<i>Rhingia campestris</i>	Syrphidae	Diptera	
<i>Rhipidia maculata</i>	Limoniidae	Diptera	
<i>Rhopalus (Rhopalus) subrufus</i>	Rhopalidae	Hemiptera	
<i>Rhyzobius litura</i>	Coccinellidae	Coleoptera	
<i>Roeseliana roeselii</i>	Tettigoniidae	Orthoptera	

Scientific name	Taxonomic group	Order	National status
<i>Scotopteryx chenopodiata</i>	Geometridae	Lepidoptera	Section 41 Priority Species – research only
<i>Scrobipalpa costella</i>	Gelechiidae	Lepidoptera	
<i>Sepedon spegea</i>	Sciomyzidae	Diptera	
<i>Sepedon spinipes</i>	Sciomyzidae	Diptera	
<i>Sepsis fulgens</i>	Sepsidae	Diptera	
<i>Sicus ferrugineus</i>	Conopidae	Diptera	
<i>Sigara (Sigara) dorsalis</i>	Corixidae	Hemiptera	
<i>Sitona lepidus</i>	Curculionidae	Coleoptera	
<i>Sitona lineatus</i>	Curculionidae	Coleoptera	
<i>Sphaerophoria scripta</i>	Syrphidae	Diptera	
<i>Sphecodes geoffrellus</i>	Halictidae	Hymenoptera	
<i>Stenodema (Brachystira) calcarata</i>	Miridae	Hemiptera	
<i>Stenodema (Stenodema) laevigata</i>	Miridae	Hemiptera	
<i>Stenotus binotatus</i>	Miridae	Hemiptera	
<i>Stenus aceris</i>	Staphylinidae	Coleoptera	
<i>Stenus bimaculatus</i>	Staphylinidae	Coleoptera	
<i>Stictopleurus punctatonervosus</i>	Rhopalidae	Hemiptera	
<i>Stigmella ruficapitella</i>	Nepticulidae	Lepidoptera	
<i>Stigmella salicis</i>	Nepticulidae	Lepidoptera	
<i>Stygnocoris fuliginus</i>	Lygaeidae	Hemiptera	
<i>Subcoccinella vigintiquattuorpunctata</i>	Coccinellidae	Coleoptera	
<i>Suillia variegata</i>	Heleomyzidae	Diptera	
<i>Sybistroma obscurellum</i>	Dolichopodidae	Diptera	
<i>Syntormon filiger</i>	Dolichopodidae	Diptera	Nationally Scarce
<i>Syntormon pallipes</i>	Dolichopodidae	Diptera	
<i>Syritta pipiens</i>	Syrphidae	Diptera	
<i>Syromastus rhombeus</i>	Coreidae	Hemiptera	
<i>Syrphus ribesii</i>	Syrphidae	Diptera	
<i>Tachyporus nitidulus</i>	Staphylinidae	Coleoptera	
<i>Tephritis formosa</i>	Tephritidae	Diptera	
<i>Thecophora atra</i>	Conopidae	Diptera	
<i>Thymelicus lineola</i>	Hesperiidae	Lepidoptera	
<i>Thymelicus sylvestris</i>	Hesperiidae	Lepidoptera	
<i>Timandra comae</i>	Geometridae	Lepidoptera	Section 41 Priority Species – research only
<i>Tingis (Tingis) cardui</i>	Tingidae	Hemiptera	
<i>Tiphia femorata</i>	Tiphiidae	Hymenoptera	
<i>Tipula maxima</i>	Tipulidae	Diptera	
<i>Tischeria ekebladella</i>	Tischeriidae	Lepidoptera	

Scientific name	Taxonomic group	Order	National status
<i>Trachys scrobiculatus</i>	Buprestidae	Coleoptera	Nationally Scarce
<i>Tricyphona immaculata</i>	Pediciidae	Diptera	
<i>Trypoxylon attenuatum</i>	Crabronidae	Hymenoptera	
<i>Tyria jacobaeae</i>	Erebidae	Lepidoptera	Section 41 Priority Species – research only
<i>Tytthaspis sedecimpunctata</i>	Coccinellidae	Coleoptera	
<i>Vanessa atalanta</i>	Nymphalidae	Lepidoptera	
<i>Vanessa cardui</i>	Nymphalidae	Lepidoptera	
<i>Volucella inanis</i>	Syrphidae	Diptera	
<i>Volucella pellucens</i>	Syrphidae	Diptera	
<i>Watsonalla binaria</i>	Drepanidae	Lepidoptera	Section 41 Priority Species – research only
<i>Xanthia togata</i>	Noctuidae	Lepidoptera	
<i>Xantholinus longiventris</i>	Staphylinidae	Coleoptera	
<i>Xanthorhoe spadicearia</i>	Geometridae	Lepidoptera	
<i>Xylota segnis</i>	Syrphidae	Diptera	
<i>Ypsolopha ustella</i>	Ypsolophidae	Lepidoptera	

*Widely accepted as being much more common than this status suggests; likely to be downgraded.