ECOLOGICAL BASELINE REPORT

NUNEHAM SOLAR, NUNEHAM COURTENAY, OXFORDSHIRE

carried out by

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

commissioned by

PEGASUS PLANNING GROUP

on behalf of

RENEWABLE ENERGY SYSTEMS

MARCH 2024

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CONTENTS

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1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by Pegasus Planning Group on behalf of Renewable Energy Systems to carry out an ecological assessment at Nuneham Solar, Nuneham Courtenay, Oxfordshire, OX44 9EF, hereafter referred to as 'the Site'.

1.1.2 This report presents the on-Site conditions for ecology and biodiversity using baseline information collected as part of a desk study and survey work by Clarkson and Woods Ltd between May 2022 and January 2024. These were as follows:

- Extended Phase 1 Habitat Survey and update UK Habitat Classification Survey (19th May 2022; 3rd January 2024)
- Great crested newt eDNA survey (June 2022)
- Breeding bird assessment (May to July 2022)

1.1.3 The report has been prepared in order to inform and accompany the Ecology and Nature Conservation chapter (Chapter 7) of an Environmental Statement (ES) prepared for the proposed construction, operation, management and decommissioning of a grid connected solar farm.

1.1.4 Unless the client indicates to the contrary, information on the presence of species collected during the surveys will be passed to the county biological records centre in order to augment their records for the area. This is in line with the CIEEM code of professional conduct[1].

1.1.5 If no action or development of the Site takes place within twelve months of the date of this report, then the findings of the surveys should be reviewed. An update of the surveys and/or the ES assessment may be required.

1.2 Site Description Summary

1.2.1 The Site was located approximately 0.5km south of the city of Oxford and directly east of the river Thames. The Site consisted largely of arable farmland, with a number of the fields bounded by a network of hedgerows and ditches. Habitats within the Site at the time of the survey also included discrete areas of Other Neutral Grassland and planted broadleaved woodland.

1.2.2 The approximate centre of the Site was at Ordnance Survey Grid Reference SP 544 000, and the location of the site is shown in Figure 1.

1.2.3 The development Site is approximately 57.5 hectares (ha) in size. An aerial photo of the Site and surrounding area is provided in Figure 2.

[1] Code of Professional Conduct. CIEEM, January 2019.

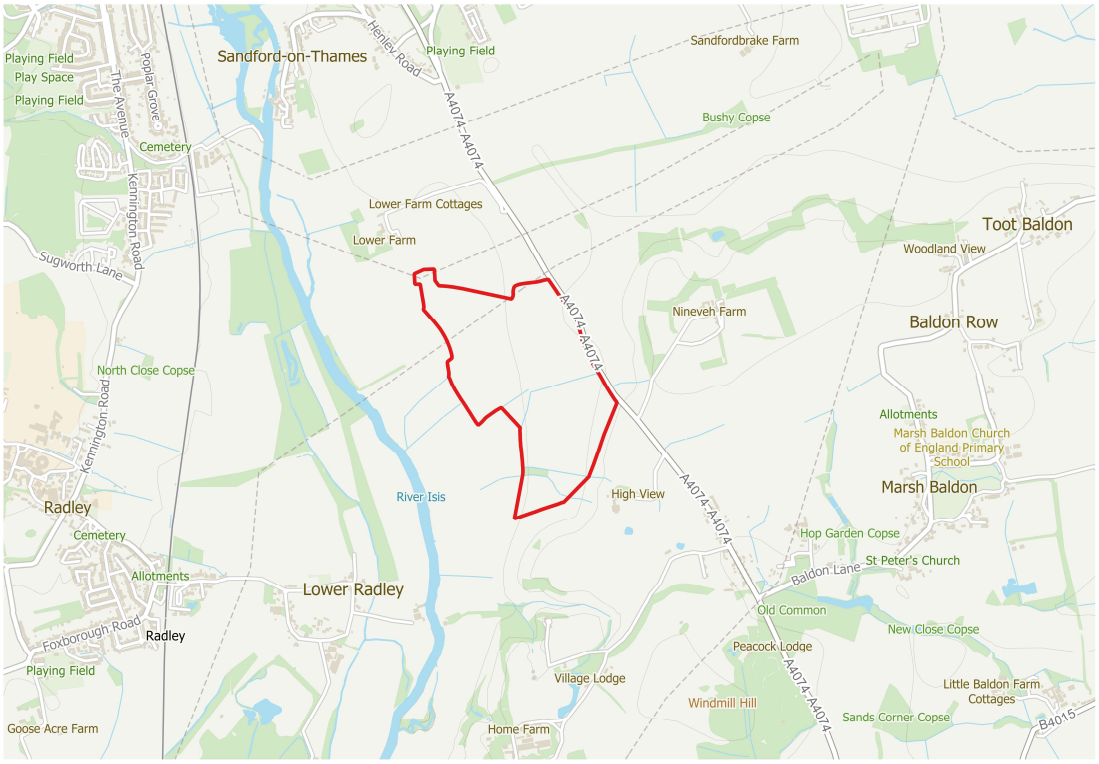

Figure 1: Map Showing Location of Site (©2024 Ordnance Survey)

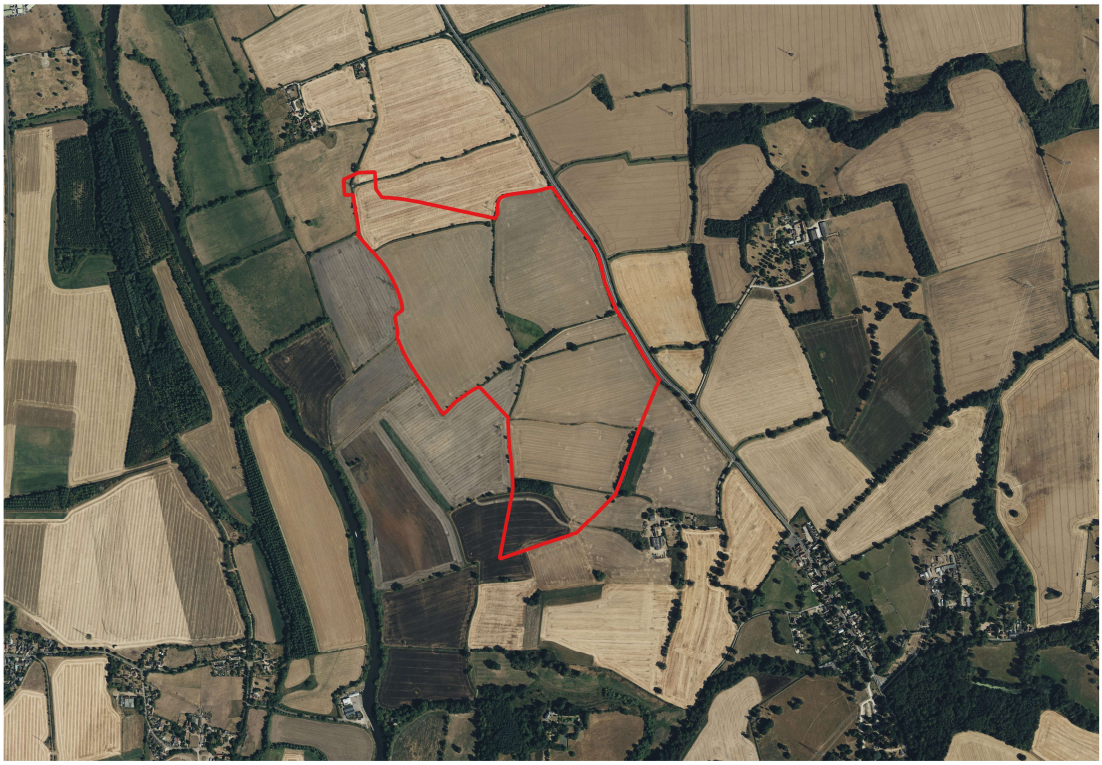

Figure 2: Aerial Photograph of Site Boundary (©2024 Bing Maps)

1.3 Quality Assurance

1.3.1 All ecologists employed by Clarkson and Woods are members or pending members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct[2] when undertaking ecological work.

1.3.2 This report has been prepared in accordance with the relevant British Standard: BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development[3]. It has been prepared by an experienced ecologist who is a member of CIEEM.

[2] CIEEM (2013). *Code of Professional Conduct*. www.cieem.net/professional-conduct.
[3] The British Standards Institution (2013*). BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*. BSI Standards Ltd.

2 BASELINE CONDITIONS

2.1 Introduction

2.1.1 This section sets out the results of the Desk Study and ecological field surveys along with an evaluation of their relative importance in order to inform the Environmental Statement. The methodologies associated with the baseline assessment are summarised under each ecological feature's sub-heading below.

2.1.2 The specific surveys carried out were chosen based on the likelihood, in our considered opinion, of each protected species or Species of Conservation Concern being present on or within the vicinity of the Site. This is informed by the Site's geographic location and the habitat types present on and around the Site. For this Site, species-specific baseline surveys were limited to great crested newts and breeding birds.

2.1.3 Details of the legislative protection afforded to those protected species which have been identified as occurring or potentially occurring on the Site are given in Appendix A. Species of Conservation Concern are defined as those appearing in any of the following; Priority Habitats and Species under Section 41 of the Natural Environment and Rural Communities Act (2006); red or amber-listed birds within the British Trust for Ornithology's Birds of Conservation Concern (2021); and any specific local conservation priority species such as those listed in Red Data Books.

2.2 Evaluation Methodology

2.2.1 Each recorded ecological feature, whether it is a species, a habitat or a site designated for nature conservation, is described in turn in this section to provide the pre-development baseline conditions on Site. Subsequently, an evaluation of each feature's 'ecological importance' is made. The evaluation of ecological importance is informed by the criteria provided within the CIEEM Guidelines for Ecological Impact Assessment (2018)[4].

2.2.2 With due consideration to the criteria, each feature is classified on a geographical scale of ascending importance as follows; Negligible, Site, Local, District, County, National and International. The chosen geographic level of importance is considered that which best represents the scale at which the loss of the Site's area or population of the feature would have the greatest impact. Where sufficient survey information is not available to determine the importance of a species or habitat present on the Site, the importance of the receptor is marked as 'uncertain' and based upon the professional judgement of the author together with available relevant desk study information.

2.2.3 Once importance has been determined for each feature, those of Local importance or above will be considered to be Important Ecological Features (IEFs). Non-IEFs will typically not be considered further within the ES. However, where a feature does not qualify as an IEF but is afforded specific legal protection or coverage under a particular legislation or planning policy it will also be assessed in order to ensure the legal and policy compliance of the proposed development.

2.3 Desk Study

Methodology

2.3.1 Statutory designated sites for nature conservation were identified using the Natural England/DEFRA web-based MAGIC map database (www.MAGIC.gov.uk). International-level sites such as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) within 10km from the Site were searched for. National-level sites such as National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs) within 2km of the Site were searched for.

2.3.2 The Thames Valley Environmental Records Centre (TVERC) was consulted for records of protected species and species of conservation concern within 2km of the Site. TVERC was also asked to provide details of locally designated and non-statutory sites for nature conservation within 2km of the Site.

[4] *CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management. www.cieem.net

2.3.3 Clarkson and Woods' own database of ecological records derived from past survey work was also consulted for further locally-relevant data.

2.3.4 The Natural England/DEFRA web-based MAGIC map database was also consulted for records of European Protected Species (EPS) licences issued for mitigation projects concerning EPS within 1km of the Site.

2.3.5 Ordnance Survey maps (1:25,000) and aerial images of the Site were examined online (bing.com/maps and maps.google.co.uk) to allow a better understanding of the context of the Site and its connections to potentially important habitats, known species records and protected sites.

Limitations

2.3.6 The data presented within this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods Ltd. should be contacted.

2.3.7 It should be noted that the data obtained from within the search area will not constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed development site that have not been identified within the desk study.

Desk Study Findings

Designated Sites

Statutory Designated Sites

2.3.8 No internationally designated sites were found within 5km of the Site. No nationally designated sites were found within 2km of the Site.

Local and Non-statutory Designated Sites

2.3.9 Fifteen local or non-statutory designated sites for nature conservation were identified within the desk study and are summarised in Table 1 below. These comprise six Local Wildlife Sites (LWSs), one Proposed Local Wildlife Site Extensions, three Oxford Conservation Target Area (CTAs) and five Oxford City Wildlife Site (OCWS).

2.3.10 The location of these in relation to the Site is shown in Figure 2.

Table 1: Summary of Local and Non-statutory Designated Sites for Nature Conservation

Site Name	Size, Distance and Direction from Site	Reason for Designation	Importance
Lower Farm Bottom Meadow Local Wildlife Site (LWS)	0.175km west	Unimproved lowland hay meadow in the River Thames floodplain, isolated by arable land. Very good example of species-rich grassland.	County
Thames at Cherwell and Oxford Conservation Target Area (CTA)	0.175km west	River meadowlands, containing low meadows and wet grassland/fen/swamp/reedbed.	County
Nuneham Arboretum LWS	0.48km south	Unimproved grassland, woodland, parkland and ponds supporting protected and notable fauna	County
Radley Gravel Pits, including Radley Gravel Pits Extension North and Extension South Proposed Local Wildlife Site Extensions (pLWS)	1.3km south west	Former gravel workings, parts of which have partially been restored with an emphasis on wildlife, and other parts left to recolonise naturally. Comprises water bodies, reedbeds, fen, wet woodland and open mosaic habitat on previously developed land. Supports a range of protected and notable flora and fauna.	County

Thames Radley to Abingdon CTA	1.3km south west	Meadowlands and floodplains, containing a range of associated habitats including wetland, fen, wet woodland, and developing grassland and woodland. Important area for nesting lapwing.	County
Radley Little Wood LWS	1.45km west	Ancient woodland, with a diverse associated ground flora and notable invertebrate assemblage.	County
Radley Large Wood LWS	1.5km north west	Ancient woodland, with a rich woodland ground flora and butterfly interest	County
Fiddlers Elbow Marsh Oxford City Wildlife Site (OCWS)	1.5km north west	Island between two wide channels of the River Thames. Comprises reedbeds with tall herbs and willow, which in turn supports a variety of associated breeding birds	County
Oxford Heights West CTA	1.58km west	Wooded estates and farmland comprising an important range of habitats, including fen, woodlands, heathland, lowland meadow, acid and limestone grasslands.	County
Minchery Farm OCWS	1.6km north	Abandoned meadow with woodland, marshy grassland and swamp communities.	County
Littlemore Brook OCWS	1.6km north	Minor tributary of the Thames which support water vole	County
Littlemore and Northfield Brooks OCWS	1.8km north	Minor tributaries of the Thames which support water vole. Largely wooded with willows, with some open areas.	County
Sandford Brake LWS	1.8km north east	Unmanaged woodland characteristic of ancient woodland, supporting a diversity of associated flora	County
Kennington Memorial Field LWS	1.8km north east	Pasture grassland containing elements of species-rich lowland meadow and lowland calcareous grassland, with some scrub patches. Supports a high diversity of bird and invertebrate species.	County
Spindleberry Park OCWS	1.9km north	Public park at the southern edge of Oxford. Woodland and marginal vegetation along a brook. Supports water vole and has invertebrate interest.	County

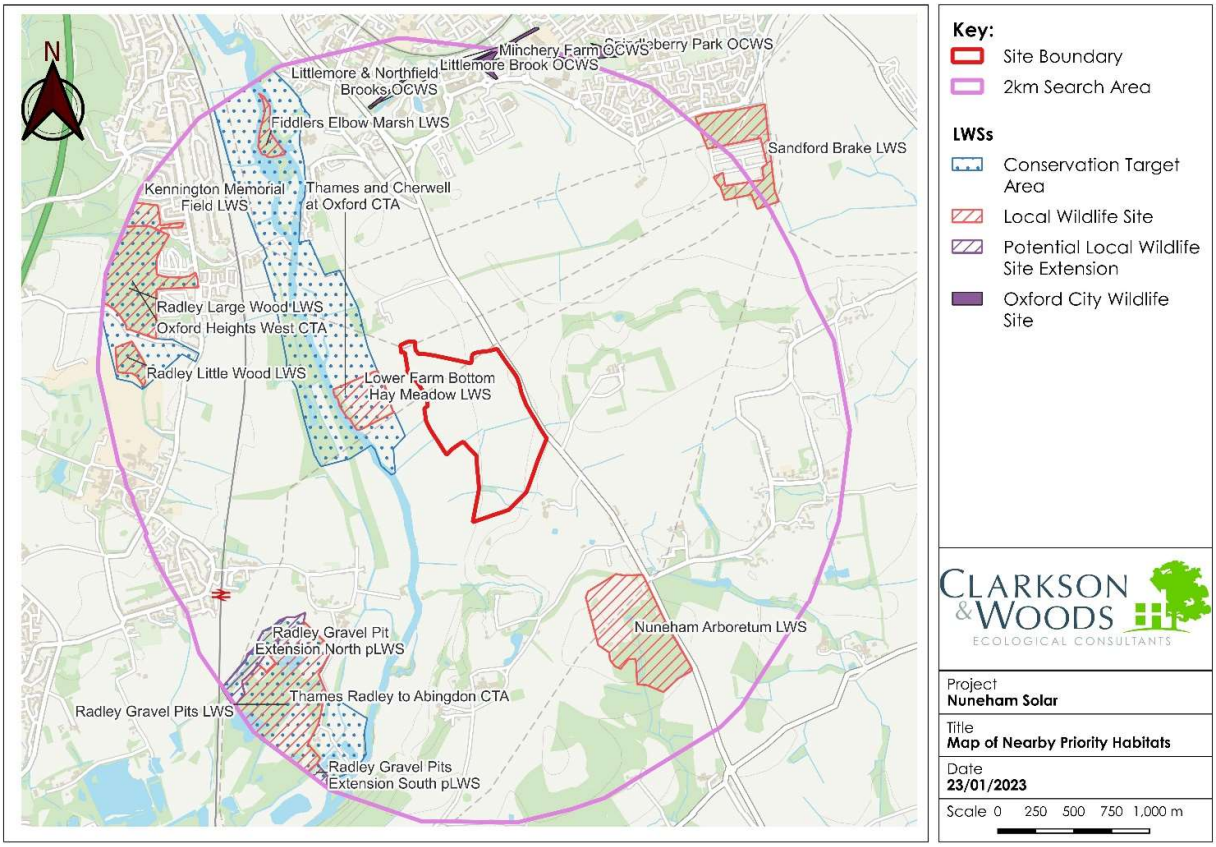

Figure 2: Map of Locally Designated Sites within 1km of the Site.

Priority Habitats

2.3.11 A search of priority habitats using the DEFRA MAGIC Map application did not identify any within the boundary of the Site. However, this inventory is not exhaustive, and it is noted that hedgerows are listed as a Habitat of Principal Importance (HPI) in England and were recorded on Site during the survey.

2.3.12 Several parcels of woodland and grassland within 1km of the Site boundaries are however listed on the Priority Habitat dataset. The location of these Priority Habitats in relation to the Site are shown on Figure 3 below.

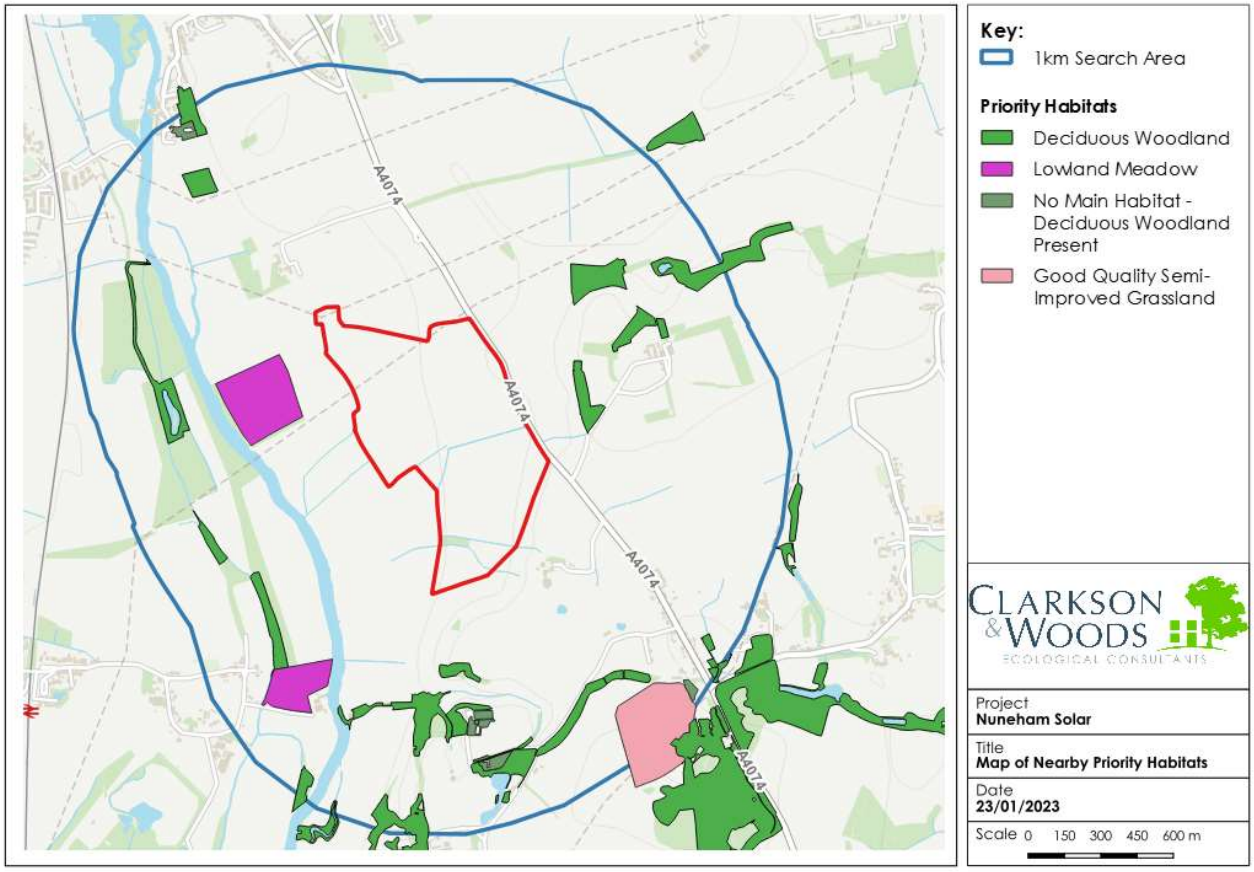

Figure 3: Map of Nearby Priority Habitats.

Evaluation of Designated Sites

2.3.13 The following two sites are considered to be associated with wetlands downstream of the Site with some hydrological connection to the Site via drains and the River Thames. Thames at Cherwell and Oxford CTA; and Thames Radley to Abingdon CTA .

2.3.14 All other sites are considered to be of sufficient distance from the Site that no direct or indirect impacts are likely to occur as a result of the development proposals. These sites are therefore considered to be outside of the zone of influence and will not be taken forward within this assessment.

2.4 Habitat Survey

Habitat Survey Methodology

2.4.1 A habitat survey was carried out based on standard field methodology set out in the Handbook for Phase 1 Habitat Survey (2010 edition)[5] with habitats being classified under the UKHab[6] classification system. The survey was completed by Giles Sutton MCIEEM CEnv. The survey was conducted on the 19th May 2022. An update survey was completed by Peter Timms MCIEEM, on the 3rd January 2024.

2.4.2 Giles has 20 years' experience undertaking ecological surveys and has a BSc in relevant subjects. Giles holds a Natural England WML A34 Level 2 bat survey licence, is registered to use Natural England's Bat Mitigation Class Licence WML-CL21 (Bat Low Impact), is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and is a Chartered Environmentalist.

[5] Nature Conservancy Council. (1990 - 2010 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee
[6] UK Habitat Classification – Habitat Definitions – Version 1 – May 2018

2.4.3 Peter has 11 years' experience undertaking ecological surveys and has a BSc and MSc in relevant subjects. Peter has been assessed under the Clarkson and Woods QA processes as competent to complete the survey. Peter holds a Natural England class licence (Level 1) for the survey of bats (Registration Number: 2016-22469-CLS-CLS) and a class licence (Level 1) for the survey of Great Crested Newts (2015-19739-CLS-CLS).

2.4.4 Botanical names follow Stace (1997)[7] for higher plants and Edwards (1999)8 for bryophytes.

2.4.5 The results of the habitat are included in map form on Figure 4. Photographs of the Site are provided in Appendix B at the end of this report.

Habitat Assessment Limitations

2.4.6 The update survey was undertaken in January 2024, which is a sub-optimum time for recording botanical species. However, the initial survey was conducted in May 2022. This is within the optimal time for a Phase 1 habitat survey (April to October inclusive). As such, it was possible to adequately classify and assess the nature conservation value of all habitats with confidence. It must be noted that Phase 1 and UKHab assessments are not intended to confirm the presence or absence of all plant species on Site. Instead, they provide a comprehensive assessment of habitat types and dominant species at the time of the survey. Therefore, an exhaustive species list was not collected but species characteristics of the recorded habitats were recorded.

Arable – Cropland

Desk Study Information

2.4.7 Some arable field margins are a Priority Habitat as defined in the NPPF [i.e. they are Habitat of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC Act)]. The definition of the Priority Habitat as given by the JNCC reads: "Arable field margins are herbaceous strips or blocks around arable fields that are managed specifically to provide benefits for wildlife."

2.4.8 None of the arable margins at this Site fit this description.

Field Survey Results

2.4.9 The majority of the Site consisted of arable farmland being utilised for monoculture cereal or oil seed rape crops (see Photograph 2, Appendix B), which accounted for approximately 56.3ha of the 57.5ha of the total area of the site. There were no arable margins, and grass margins associated with the hedgerows were all very narrow (typically <1m width – see Photograph 6, Appendix B).

2.4.10 The narrow grass margins were typically vegetated with coarse grasses, ruderals and a small number of herbs, with typical species including cock's-foot *Dactylis glomerata*, false oat grass *Arrhenatherum elatius*, Yorkshire fog *Holcus lanatus* nettle *Urtica dioica*, hogweed Heracleum sphondylium, white dead nettle *Lamium album* and hedge mustard *Sisymbrium officinale*.

2.4.11 Due to the intensive agricultural management of these areas, very little other flora was present within the fields themselves besides the monoculture crops, with the exception of a small number of persistent and widespread weed species including scentless mayweed *Tripleurospermum inodorum*, curled dock *Rumex crispus* and prickly sow thistle *Sonchus asper*, which were occasionally encountered.

Evaluation

2.4.12 This habitat has limited ecological value and is considered to be of Site importance. However, it may support protected or notable species (discussed separately below).

Other Neutral Grassland

Desk Study Information

2.4.13 None.

[7] Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press
[8] Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff

Field Survey Results

2.4.14 An approximate 6m wide strip of moderately species-rich grassland was present along the eastern boundary of the site, beyond which lay the A4074 road corridor (see Photograph 4, Appendix B). This was separated from the adjacent arable fields by a recently planted hedgerow.

2.4.15 This area of grassland was of higher botanical interest than the rest of the arable land, and had value for a range of species, including reptiles and invertebrates.

2.4.16 Species present along this strip of grassland included red fescue *Festuca rubra*, ribwort plantain *Plantago lanceolata*, bristly oxtongue *Helminthotheca echioides*, teasel *Dipsacus fullonum*, hawkbit *Leontodon hispidus*, flea bane *Pulicaria dysenterica*, common knapweed *Centaurea nigra*, false oat grass, Yorkshire fog, rough meadow grass *Poa trivialis*, spear thistle *Cirsium vulgare*, creeping buttercup *Ranunculus repens*, tormentil *Potentilla erecta*, false brome *Brachypodium sylvaticum*, and tufted hair grass *Deschampsia cespitosa*.

Evaluation

2.4.17 Although of higher botanical interest than other habitats at the Site, this was relatively small in extent (0.54ha) and is considered to be of **Site** importance.

Modified Grassland

Desk Study Information

2.4.18 None

Field Survey Results

2.4.19 The Site boundary contained a small (circa 0.013 ha) portion of a species-poor agricultural grassland field, dominated by a restricted range of competitive grass and herbaceous species. The field appeared to be heavily grazed by sheep. The sward was dominated by perennial ryegrass *Lolium perenne*, with cock's-foot also frequent, and some rough meadow grass and red fescue present. Herbaceous species were restricted to white clover *Trifolium repens*, creeping thistle *Cirsium arvense*, creeping buttercup *Ranunculus repens* and ribwort plantain.

Evaluation

2.4.20 This habitat is considered to be of **Site** importance.

Other Woodland; Broadleaved

Desk Study Information

2.4.21 None.

Field Survey Results

2.4.22 A circa 0.4ha block of planted broadleaved woodland was present in the south of the Site (see Photograph 1, Appendix B). This was relatively young and was entirely fenced for use as a pheasant rearing pen, and there was little in the way of associated woodland ground flora or structural diversity. There was noted to be a high proportion of fallen dead wood which is likely to attract a range of associated wildlife species.

2.4.23 The tree stock present was mainly ash *Fraxinus excelsior*, with oak *Quercus robur*, sycamore *Acer pseudoplatanus*, and silver birch *Betula pendula* also present. All were of uniform structure at a height of between 12-15m with very little understory. Ground flora was limited to nettle, herb-Robert *Geranium robertianum*, lords-and-ladies *Arum maculatum* and occasional bramble *Rubus fruticosus*.

Evaluation

2.4.24 This woodland habitat is considered to be of **Local** importance.

Hedgerows

Desk Study Information

2.4.25 Species-rich and species-poor hedgerows are both Habitats of Principal Importance in England (HPI) under S41 of the NERC Act, also known as Priority Habitats.

Field Survey Results

2.4.26 A network of hedgerows was present within and bounding the Site. The hedgerows typically comprised native species and most were outgrown and defunct (not stock proof). Several hedgerows were associated with seasonally wet ditches at the base, further increasing their ecological value. Mature trees were noted within almost half of the hedgerows on Site.

2.4.27 Hedgerows provide foraging and sheltering habitat for a range of species and increase habitat connectivity within the Site.

2.4.28 Descriptions of all hedgerows within the Site are provided in Table 2 below, and they are mapped and labelled on Figure 4.

Table 2: Description of Hedgerows at the Site

Boundary No.	Description
B1	A species-poor, recently planted hedgerow, less than 2 years old and comprising planted whips <1m in height. Whip species present included hawthorn, blackthorn, oak and dogwood *Cornus sanguinea.* Seasonally wet ditch present on south side of ditch.
B2	A species-poor gappy and defunct hedgerow with frequent gaps. No sign of recent management. Varied in structure with heights ranging between 1-5m. Species present included blackthorn *Prunus spinosa*, elder *Sambucus nigra*, field maple *Acer campestre*, hawthorn *Crataegus* monogyna, and elm *Ulmus* minor. Seasonally wet ditch along southern side of hedgerow.
B3	Species-poor, outgrown and gappy hedgerow, measuring between 2-4m in height with 3 taller field maple and ash standards. No sign of recent management. Ash, elm, field maple and elder present. Seasonally wet ditch present on the east side of the hedgerow.
B4	Species-poor, outgrown and gappy hedgerow, measuring approximately 4m in height with 4 taller ash standards. Ash, elm, field maple, hazel *Corylus avellana* and elder present. No sign of recent management although some previous hazel coppicing was evident. Ash, elm, field maple and elder present. Seasonally wet ditch present on the east side of the hedgerow.
B5	A species-poor hedgerow with trees. Intact but with no sign of recent management, with hedgerow stick quite 'leggy' as a consequence. Approximately 4m high with several taller oak and ash standards. Comprised ash, oak, elm and privet *ligustrum vulgare*.
B7	Species-poor hedgerow, outgrown and leggy. Approximately 4m tall with two taller standards, and consisting of field maple, elm, dog rose Rosa canina, field maple and hawthorn. A dry ditch was present at the base of the hedgerow
B8	A species-rich, outgrown and leggy hedgerow with no sign of recent management, although recently planted (<3 years old) infill whips were present at the south end of the hedgerows. Varying in height and structure but generally between 3-5m excluding the smaller whips, and with some taller ash and field maple standards. Species present including field maple, ash, blackthorn, hawthorn, oak, hazel and elder, with hawthorn, blackthorn, dog rose and dogwood among the planted whips.
B9	A species-rich intact hedgerow, approximately 3m high with four taller standards. No sign of recent management. A seasonally wet ditch was present at the eastern base of the hedgerow. Species present included elm, field maple, elder, dog rose, oak, ash, hazel, blackthorn and hawthorn.
B10	Species-poor intact hedgerow with no sign of recent management. Approximately 4-5m tall with three taller standards. Species present included elder, blackthorn, field maple, ash, dog rose, elm and oak. A seasonally wet ditch was present on the south side, which was heavily overshaded by the hedgerow.
B11	Species-poor intact and bushy hedgerow, approximately 5m tall with two taller ash standards. Dominated by elm, with some blackthorn and field maple.
B12	A species-poor, gappy and largely unmanaged roadside hedge. Varying in structure and height but mainly between 3-8m tall. Species present included elm, elder, hawthorn, dog rose, field maple and oak.
B13	An unmanaged and gappy hedge approximately 4-5m tall Largely intact although one large gap ~10m wide at the eastern end. Dominated by elm, with blackthorn, elder and field maple also present.
B14	A line of newly planted, species-rich whips, separating a strip of grassland from the adjacent arable fields. Species present included spindle *Euonymus europaeus*, dogwood, oak, hawthorn, blackthorn, hazel and privet. Typically <1m tall along its length, although more established stock at southern end were topped at 1.5m high. 1 large gap of approximately 15m was present at the junction with B16.

B15	Species-poor unmanaged hedge varying in heigh and structure. Tall trees (~10-12m tall) at western end and eastern end, with species including ash, elder, elm, privet, hawthorn and oak. In the middle of the boundary, the hedge was around 2-3m in height and largely comprised dense bramble. Seasonally wet ditch present on the southern side.
B16	Species-poor hedgerow, outgrown and leggy. Typically between 2-4m tall within two taller standards. Species included field maple, dog rose, oak, elder, hawthorn and blackthorn. A large gap or around 10m was present at the eastern end. A dry ditch was present on the southern base of the hedge.
B17	A line of tall trees providing a wind break. Typically 8-14m in height with no shrub layer. Comprised oak, ash, and field maple.

Evaluation

2.4.29 The hedgerows and lines of trees are considered to be of **Local** importance.

Ditches

Desk Study Information

2.4.30 None.

Field Survey Results

2.4.31 Several ditches were identified at field boundaries. At the time of the initial survey in May 2022, all the ditches at the Site were largely dry, and lacking in aquatic or marginal vegetation indicating regular drying out. Several of the ditches were wetted during the update survey in January 2024, following a period of heavy rainfall. Descriptions of all ditches within the Site are provided in Table 3 below, and they are mapped and labelled on Figure 4.

Table 3: Description of Ditches at the Site

Ditch No.	Description
D1	Along southern edge of hedgerow, approximately 1.2m deep with steep sided banks. Held circa 10cm of water flowing east to west during January 2024, but dry during May to July 2022. Banksides vegetated with ruderals, coarse grasses and occasional bramble scrub with no aquatic/marginal vegetation. The water was notably turbid, likely as a result of run-off from adjacent arable fields.
D2	Along southern edge of hedgerow, approximately 1.5m deep with steep sided banks. Held shallow (<10cm) water flowing east to west during January 2024, but dry during May to July 2022. Banksides vegetated with ruderals, coarse grasses and frequent bramble scrub with no aquatic/marginal vegetation. Likely to be dry for the majority of the year.
D3/4	Ditch along eastern side of hedgerow, approximately 2m deep with steep sided banks. Held moderately shallow (10-20cm) water flowing north to south during January 2024, but dry during May to July 2022. Banksides vegetated with ruderals, coarse grasses and frequent bramble scrub with no aquatic/marginal vegetation. Likely to be dry for the majority of the year. The water was notably turbid, likely as a result of run-off from adjacent arable fields.
D5	A ditch along the northern side of hedgerow, approximately 1.5m deep with steep sided banks. Held moderately shallow (10-20cm) standing water flowing during January 2024, but dry during May to July 2022. Banksides vegetated with ruderals, coarse grasses and frequent bramble scrub with no aquatic/marginal vegetation. Likely to be dry for the majority of the year. Heavily shaded by the adjacent hedgerow.
D6	A ditch with no associated hedgerow along the north western Site boundary (see Photograph 5, Appendix B). Approximately 1.8m deep with steep sided banks. The southern part of the ditch held approximately 20cm of water flowing north to south in January 2024. The northern section of the ditch was dry with no water. No aquatic vegetation was present along the length of the ditch, indicating regular drying out, and the whole ditch was dry during May to July 2022.
D9	A ditch at the eastern base of the adjacent hedgerow, approximately 1m deep and holding shallow (<20cm deep) water flowing north to south in January 2024. The ditch was dry during May to July

	2022. The ditch was heavily shaded by the adjacent hedgerow, and no aquatic/marginal vegetation was present.
D15	A ditch on the southern side of the adjacent hedgerows, approximately 1.5m deep with steep banks, heavily overshaded by the hedgerow vegetation. Held shallow (<20cm deep) water flowing east to west during January 2024, although was dry during May to July 2022.

Evaluation

2.4.32 The ditches are considered to be of **Local** importance.

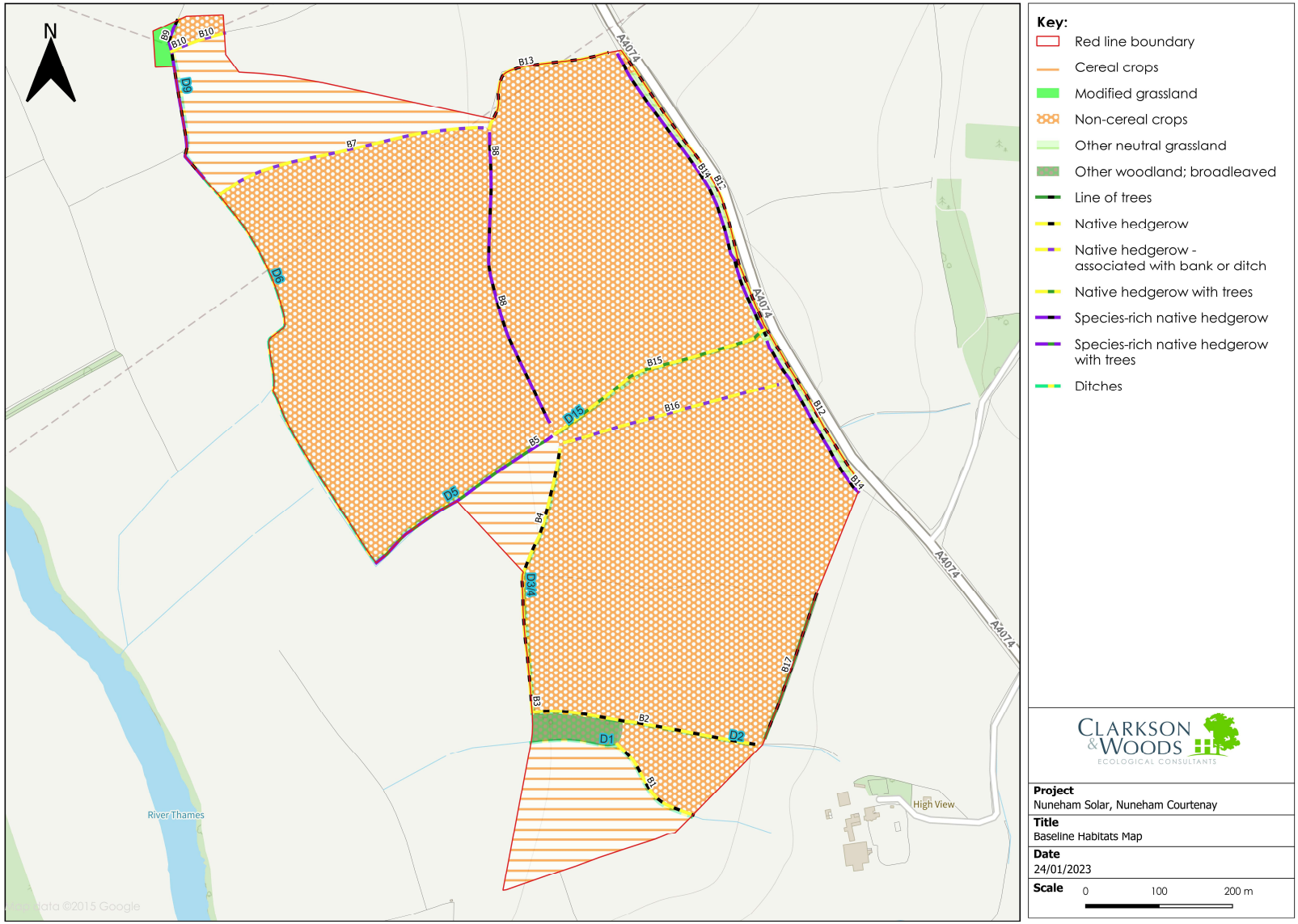

Figure 4: Habitat Map

Table 4: Target Notes

No.	Description
1	Mature oak tree – no potential roosting features (PRFs) seen from the ground, but the tree was of an age and status which often leads to PRFs forming.
2	Single entrance Outlying badger sett. No sign of current occupation, with entrance covered by leaves and ruderals.
3	Single entrance Outlying badger sett. Entrance clear of debris and likely to be in current active use.
4	Relatively small (0.005ha) area of unmanaged field maple and elm scrub.
5	Oak tree with PRF at woodpecker hole in east side of trunk, circa 5m high.
6	Mature ash tree covered in ivy, potentially obscuring PRFs.
7	A dead and hollow oak tree, supporting several crevices forming PRFs (see Photograph 3, Appendix B).
8	Single entrance annexe sett associated with the sett at Target Note 9. Leaves covering the entrance.
9	Main badger sett. 15 entrances, of which 4 were well-used and 11 partially-used.
10	Mature oak with PRF at split limb 7m high on eastern aspect..
11	Dry ditch – did not hold water during January 2024 visit following period of high rainfall, indicating it is dry for most of the year, However, marginal aquatic vegetation was present, indicating periodic inundation.
12	Species-rich grassland with line of newly-planted trees, alongside A4074 road corridor.

2.5 Protected Species Survey and Species of Conservation Concern

Badger

Methodology

2.5.1 A search was made for badger *Meles meles* setts, and any sett entrances found were checked for signs of use by badgers or other mammals. Where found, setts were classified into the following categories: Main, Subsidiary, Annexe or Outlying[9]. Any sett entrances were counted and mapped to record tunnel direction and their relative level of usage.

2.5.2 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped, if found.

Limitations

2.5.3 Areas with dense ground cover (hedges and woodland) were examined closely. If impenetrable vegetation prevented entry, then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

[9] Lewns, P., Clarkson, T. & Lewns, D. (2019). *Badger Survey and Mitigation Guidelines (The Mammal Society Mitigation Guidance Series)*. Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London. (*as yet unpublished*)

Desk Study Information

2.5.4 Records from TVERC confirmed the presence of seven known badger setts within 2km of the Site. The status and precise locations of the setts are kept confidential. Records of numerous other badger sightings, road casualties and field signs from within 2km of the Site are also held by TVERC. The closest of these is a road casualty from the A4074 road adjacent to the south-east of the Site, as well as a sighting of an individual on the same road just to the south.

2.5.5 Badgers are protected under the Protection of Badgers Act (1992).

Field Survey Results

2.5.6 A total of four badger setts were discovered within the Site. The location and description of setts are provided as Target Notes 2, 3, 8 and 9 on Figure 4 and Table 4.

2.5.7 The Site contains large extents of habitat suitable for foraging by badgers, across the arable fields and the field margins. Badgers predominantly feed on soil invertebrates, particularly earthworms, but will take a wide variety of plant and animal prey items depending on availability. Arable fields have a lower earthworm abundance than grassland fields and badgers will often favour permanent pasture as a foraging resource. However, there is a lack of this habitat type within the Site, and the arable fields present are therefore likely to represent key foraging grounds for the local social groups of badgers.

Evaluation

2.5.8 Badgers are not a species of conservation concern but receive legal protection on account of historic and ongoing persecution. Consequently, they are considered to be of **Site Importance** in terms of conservation status.

Bats

Methodology

2.5.9 The assessment of the suitability of the Site for foraging and roosting bats was based on guidance set out by the Bat Conservation Trust[10] which was current at the time of survey.

2.5.10 The habitats within the Site were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on Site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

2.5.11 An inspection of trees on Site was carried out from the ground, using binoculars, to evaluate the trees' suitability to support roosting bats. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were recorded. Any signs of staining (from urine or fur rubbing) and scratch marks below potential access points were noted, and a search was made for droppings underneath these features.

Limitations

2.5.12 Bats are very small animals, capable of accessing extremely tight spaces and it is possible that they, or their signs, might have been missed during the survey if they are normally present opportunistically or in small numbers for a short period of time each year.

2.5.13 Not all features in trees suitable for use by bats are visible from the ground and there can be no external evidence of use of features by bats; consequently, it is only possible to make a best effort when carrying out such a survey.

[10] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.

Desk Study Information

2.5.14 Bats and their roosts are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

2.5.15 TVERC returned records of five known bat roosts within 2km of the Site, the closest of which was at a church approximately 430m south-east of the Site, which contains unspecified roosts used by brown long-eared bat *Plecotus auritus* and soprano pipistrelle *Pipistrellus pygmaeus*. Elsewhere, unspecified soprano pipistrelle roosts are present at two properties approximately 1.15km to the north and 1.58km to the north-west, and a farm approximately 1.53km to the south-east contains unspecified roosts belonging to soprano pipistrelle, brown long-eared bat, and a Myotis species.

2.5.16 In addition to roost sites, the data search reported numerous bat flight records within 2km of the Site. Such records included the following species: brown long-eared bat, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle, Leisler's bat *Nyctalus leisleri*, Myotis sp., noctule *Nyctalus noctule*, serotine *Eptesicus serotinus* and barbatelle *Barbastella barbastellus*.

2.5.17 Three granted European Protected Species mitigation licences for bats were found within 2km of the Site. These are summarised in Table 5 below:

Table 5: Granted European Protected Species Licences for Bats within 2km of the Site.

Licence Reference	Species	Dates	Impact	Distance and Direction from Site
2019-43788-EPS-MIT	Brown long-eared bat, common pipistrelle, soprano pipistrelle	03/01/2020 – 30/05/2025	Damage of a breeding site; damage and destruction of a resting place	1.3km southwest
2020-48889-EPS-MIT	Brown long-eared bat, common pipistrelle, Natterer's bat	08/10/2020 – 06/10/2030	Destruction of a breeding site and resting place	1.7km east
2019-38819-EPS-MIT	Brown long-eared bat	01/02/2019 – 29/02/2024	Destruction of a resting place	2km west

Field Survey Results

2.5.18 Five trees were identified with suitability for roosting bats within the hedgerow network. The location and description of trees with bat roosting potential are provided as Target Notes 1, 5, 6, 7 and 10 on Figure 4 and Table 4.

2.5.19 No further detailed survey has been undertaken to establish the presence or likely absence of bat roosts within these trees, on the basis that they will be retained and protected as part of the proposals and there would be no impacts to roosts, if present

2.5.20 The hedgerows, woodland and trees are likely to be utilised by foraging and commuting bats, however, the majority of the site comprised monoculture arable crops which offers only suboptimal opportunities for foraging. No further detailed bat survey work was considered necessary to inform this assessment as all key habitat features at the field boundaries likely to be utilised by bats will be retained.

Evaluation

2.5.21 The ecological importance of the Site for roosting, foraging and commuting bats is unknown. However, given the quality of the hedgerows and trees and the bat species recorded in the immediate wider area, along with the habitats immediate bounding the Site, the Site is potentially of **Local** value to foraging and commuting bats. In terms of roosting, the Site is considered to be of **Local** value given that there are several large trees which offer roosting opportunities.

Otter & Water Vole

Methodology

2.5.22 A search was made along the banks of water courses and water bodies and their adjacent habitats for otter *Lutra lutra* signs including spraints, tracks, castling, and rolling. The banks of any water courses were searched for the presence or potential for holts or other sheltering areas.

2.5.23 The banks of the water course were searched for water vole *Arvicola amphibius* signs including latrines, burrow entrances, feeding stations, 'runways' and footprints. Surveys and field recording followed the protocol set out within the Water Vole Mitigation Handbook[11].

Limitations

2.5.24 Otters have no defined breeding season and the breeding holt is kept deliberately obscure by the female so locating one can be difficult and time consuming.

Desk Study Information

2.5.25 Otters are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. Water vole are protected under the Wildlife and Countryside Act (1981).

2.5.26 This species is known to be present along the River Thames, which lies approximately 380m west of the Site at the closest point, with numerous records existing from along the river in this location. Three granted European Protected licences for otters were revealed by the MAGIC website within 2km of the Site. These have all been granted to permit the damage of a breeding holt at the same site between 2016 and 2018, located approximately 1.56km to the north west of the application Site (Licence References 2015-18409-EPS-MIT, 2015-18409-EPS-MIT-1, and 2015-18409-EPS-MIT-2).

2.5.27 31 records of water voles since 2000 exist as revealed by the data search, primarily associated with the River Thames as well as Littlemore Brook, a tributary which runs through the southern suburbs of Oxford. The closet record is from the Thames, approximately 600m north west of the Site.

Field Survey Results

2.5.28 The ditch network at the Site was noted to be dry for much of the year, meaning it is highly unlikely to represent valuable habitat for otters when foraging or for holt/couch sites. It is feasible that individual otters could utilise hedgerow bases and ditches to cross the site when moving between foraging ground and holt sites. There is however a lack of aquatic habitats in the immediate vicinity of the Site, meaning otters associated with the River Thames are only likely to visit the Site infrequently at most.

2.5.29 The majority of the ditch network at the Site offers suitable foraging and burrowing habitat for water voles, with moderately steep, earth banks vegetated with grasses, herbs and marginal vegetation. However, the ditch network does not appear to hold water year round, with all ditches found to be dry over the course of site visits made between May and July 2022., for Phase 1/UKhab and breeding bird surveys. Whilst several ditches were found to hold water in January 2024 (following a period of heavy rainfall), water voles are generally reliant on permanent presence of water as a habitat requirement for predator evasion.

Evaluation

2.5.30 The Site is considered to be of **Site Importance** for otters if present.

2.5.31 Given the Site's lack of features which hold water permanently, specific water vole surveys were not considered proportionate to undertake at the Site. It is considered that water voles are likely to be absent from the Site, and the Site is consequently of **Negligible Importance** for this species.

Dormouse

Methodology

2.5.32 Any hedgerows, scrub and woodlands were assessed during the walkover for their suitability to support dormice *Muscardinus avellanarius*. Particular consideration was paid to the abundance of food sources

[11] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.

within them, density for nesting and overnight shelter and the strength of connectivity to other suitable habitats leading off site. In addition, any direct sightings, nests or feeding signs during the site visit were also recorded.

Limitations

2.5.33 None.

Desk Study Information

2.5.34 The data search returned no records of dormouse within 2km of the Site. Similarly, no records of dormouse EPS licenses were found within 2km of the Site using the MAGIC database. Although records of this species in South Oxfordshire are scarce, dormouse are known to occur elsewhere in Oxfordshire and it is likely that this species is under-recorded.

2.5.35 Dormice area protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

Field Survey Results

2.5.36 Although no evidence of dormouse activity (chewed nuts or nests) was found during the walkover survey, the hedgerow and woodland network across the site offers suitable habitat (albeit of varying quality) for dormice, and is connected to areas of optimal habitat in the form of woodland in the landscape to the south. The arable fields comprising the majority of the Site are highly unlikely to be used by this largely arboreal species.

2.5.37 Applying the precautionary principle, it has been assumed this species is present within suitable habitat at the Site, namely hedgerows, tree lines and woodland. As this habitat will be almost entirely retained and protected as part of the proposals, no further survey was considered essential or proportionate to inform this assessment.

Evaluation

2.5.38 The site would likely be of **District Importance** for dormice if present at the site given the scarcity of this species within the county.

Other Mammals

Methodology

2.5.39 The habitats at the Site were assessed during the walkover for their suitability to support other mammal species of conservation concern, which are potentially present on Site and are capable of being impacted by the proposals. This included polecat *Mustela putorius*, brown hare *Lepus europaeus* and hedgehog *Erinaceus europaeus*, all of which are Species of Principal Importance and nearby records of which were revealed by the desk study.

Limitations

2.5.40 Although brown hare are active and often observed during the day, both polecats and hedgehogs are predominantly nocturnal, and are unpredictable in their movements and denning behaviour. All three species do not leave many distinctive field signs, and as such their detection at any Site can be difficult.

Desk Study Information

2.5.41 Two polecat road casualty records from the village of Nuneham Courtney were revealed by the desk study, the closest of which was approximately 720m south of the Site.

2.5.42 Brown hare have been frequently recorded within the local area as revealed by the desk study. All existing records of this species within the search area were from Marsh Baldon, approximately 2km to the south east and on the opposite site of the A4074 road which may inhibit brown hare movement to some extent.

2.5.43 Twenty nine existing records of hedgehog were revealed by the data search, the majority of which were associated with suburban areas of south Oxford and the village of Radley. However, the closest record was approximately 250m south of the Site boundary.

Field Survey Results

2.5.44 Polecat favour sheltered habitats with abundant prey such as small woodlands, mature hedgerows, scrub and tall grassland with good rabbit and rodent populations. This habitat is relatively poorly represented at the Site, although given the presence of nearby records, the Site possibly forms part of the home range of individual polecats. The regular disturbance of ground within the extensive arable habitat is considered to reduce the likelihood that a significant polecat population is present.

2.5.45 The arable farmland at the Site offers suitable habitat for brown hare. However, this species has not been recorded on the Site during multiple field surveys to date. Given the behaviour and habits of this species, sightings would have been expected if they were present at the Site in good numbers. As such, if present, brown hare are likely to be in small numbers.

2.5.46 Hedgehogs typically require sheltered habitats such as woodland edges, scrub and hedgerows, as well as gardens in order to forage for invertebrate food and make shelter. The Site does not represent optimal habitat, being dominated by arable cropland and with the only woodland present being fenced for pheasant rearing, and not being accessible to hedgehogs.

Evaluation

2.5.47 The Site is likely to be of **Local Importance** for polecat, and of **Site Importance** for both brown hare and hedgehogs.

Great Crested Newts & Other Amphibians

Methods

2.5.48 All waterbodies within 250m of the Site were identified using Ordnance Survey maps and aerial imagery. Waterbodies within the Site ownership and on publicly accessible land were assessed during the field survey for their suitability to support amphibian species where access was possible.

2.5.49 From a desk based study of maps and aerial images, a single pond was located within 500m of the Site, approximately 300m to the south east, with another pond located approximately 520m to the south east. GCN eDNA surveys of both of these ponds were undertaken on 21st June 2022, within the optimal survey window (mid-April-June) to determine presence/likely absence of GCN. Water samples were collected from both ponds following best practice guidance as provided by the Freshwater Habitats Trust[12] eDNA survey and samples were submitted for analysis to ADAS. The survey was carried out by Giles Sutton MCIEEM, who has been assessed by Clarkson and Woods as competent to complete the survey.

2.5.50 Terrestrial habitats were also assessed for their suitability for foraging and sheltering great crested newts. This species requires habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

Limitations

2.5.51 None.

Desk Study Information

2.5.52 Great crested newts are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

2.5.53 A number of records of these species were revealed by the desk study, although the closest records were at least 1km from the Site. Two granted European Protected Species mitigation licences for great crested newts (GCN) were found within 2km of the Site. These are summarised in Table 6 below:

[12] 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. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

Table 6: Granted European Protected Species Licences for GCN within 2km of the Site

Licence Reference	Dates	Impact	Distance and Direction from Site
EPSM2011-2941	07/11/2011 – 31/10/2012	Destruction of a resting place	0.89km south
EPSM2010-2018	12/07/2010 – 31/10/2011	Destruction of a resting place	1.65km southwest

2.5.54 Ponds within 500m of the Site are shown in Figure 5.

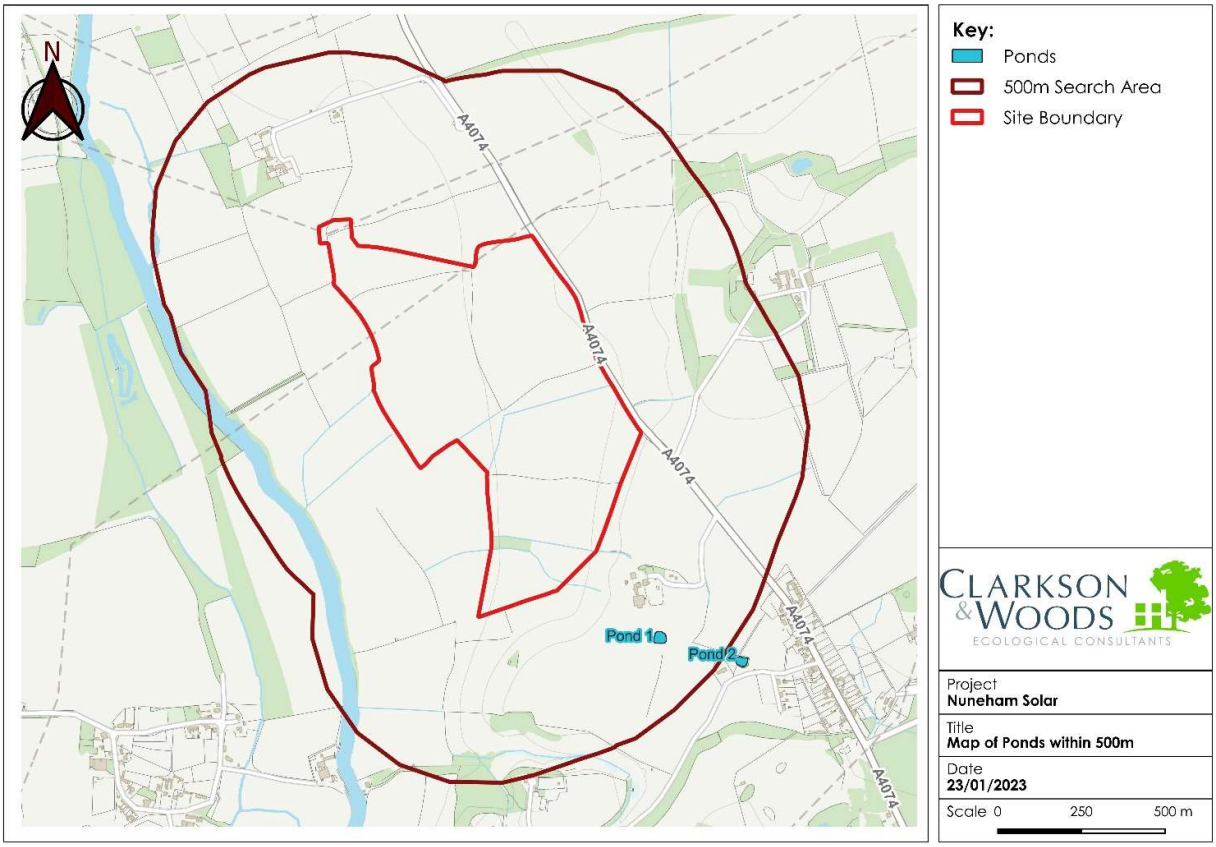

Figure 5: Map of Ponds within 500m of the Site.

Field Survey Results

2.5.55 No ponds were present within the Site boundary. The two off-site ponds (Figure 5 refers) were subject to an eDNA surveys in June 2022, which recorded negative results for GCN, indicating the likely absence of this species from the ponds (and consequently the Site given the lack of other suitable breeding features). Laboratory results are provided in Appendix C.

2.5.56 More widespread amphibians, such as common toad and common frog, may use the field boundary habitats, in the form of hedgerows, ditches and narrow field margins during the terrestrial phase. However, considering the distance of suitable breeding ponds from the Site, amphibians are unlikely to be found within these habitat in significant numbers, and highly unlikely to be found within the arable fields which offer poor terrestrial habitat.

Evaluation

2.5.57 The Site is considered to be of **Site Importance** for amphibians if present.

Reptiles

Methods

2.5.58 Features on Site were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

Limitations

2.5.59 None.

Desk Study Information

2.5.60 Reptiles are protected under the Wildlife and Countryside Act (WCA) 1981.

2.5.61 The data search revealed records of two species of reptile within 2km of the Site. Small numbers of grass snake *Natrix helvetica* have been previously in two locations, one approximately 1.9km north of the Site and the other 1.93km south-east.

2.5.62 13 records of slow-worm *Anguis fragilis* also exist from the search area. The majority of these records are from a former allotment site, approximately 2km to the north, which has since been developed for residential housing. Aside from these, a single record of slow-worm also exists from a location approximately 1.84km to the north-west. One record of grass snake and one record of slow worm were records by WSBRC dated June 2013 and located approximately 0.9km west of the Site.

Field Survey Result-

2.5.63 Suitable habitat for reptiles is limited at the Site, being restricted to hedgerow bases, ditches, and generally narrow field margins, which are all generally to be retained as part of the Proposed Development. For these reasons, specific reptile surveys were not considered proportionate to undertake at the Site.

2.5.64 The strip of other neutral grassland along the eastern Site boundary, along with the narrow field margins adjacent to hedgerows, were suitable for widespread reptiles such as slow worms.

Evaluation

2.5.65 Considering the restricted extent and suitability of habitats for reptiles, and their likely presence at the Site at low or very low densities, the Site is considered to be of **Site Importance** for reptiles.

Breeding Birds

Methodology

Initial Assessment

2.5.66 During the habitat survey, any birds seen or heard were noted. The Site's potential to support bird species of particular conservation concern (i.e. Schedule 1, NERC S41 and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the Site, the context of the Site in the wider landscape and the results of the desk study.

Targeted Surveys

2.5.67 A series of four breeding bird surveys were conducted between May and July 2022. Surveys broadly accorded with BTO guidelines, where the observer systematically walked through the Site, ensuring that all points were visited to within 50m. The location and behaviour of all birds and flocks of birds seen was noted on large-scale survey maps. Particular attention was paid to birds exhibiting breeding behaviour, for instance birds in full song, exhibiting antagonistic behaviour/calling, carrying nest material, carrying food, and returning to nesting sites. Standard BTO Common Birds Census symbology and species codes were used to record species, abundance and behaviour. The surveyors were equipped with binoculars to aid identification. Detailed survey methodologies and results are given in Appendix D at the end of this document.

Limitations

2.5.68 Early season data was not gathered as surveys commenced in May. However, it is considered unlikely that any breeding species will have been missed since the survey period covers the key part of the breeding season, with four surveys spread across this period. As such, this is not considered a significant limitation.

Desk Study Information

2.5.69 Skylark *Alauda arvensis* are a Species of Principal Importance (S41 of NERC Act).

2.5.70 TVERC returned records pertaining to 85 species within 2km of the Site, listed in Table 7 below. Those species recognised as Red or Amber listed species of conservation concern by British Trust for Ornithology are highlighted by corresponding colour. In addition, birds listed on schedule 1 and 2 of the Wildlife and Countryside Act (as amended), which receive additional protection when breeding, are highlighted in **bold**.

Table 7: Bird Species Records Returned within 2km of the Site.

Scientific Name	Common Name	Number of Records
Acanthis cabaret	Lesser Redpoll	30
Acanthis flammea	Common Redpoll	2
Actitis hypoleucos	Common Sandpiper	19
Alauda arvensis	Skylark	401
Alcedo atthis	**Kingfisher**	**129**
Anas acuta	**Pintail**	**14**
Anas crecca	**Teal**	**158**
Anas platyrhynchos	Mallard	358
Anser anser	Greylag Goose	140
Anthus pratensis	Meadow Pipit	190
Apus apus	Swift	91
Asio flammeus	Short-eared Owl	1
Aythya ferina	Pochard	95
Botaurus stellaris	**Bittern**	**4**
Branta leucopsis	Barnacle Goose	4
Bucephala clangula	**Goldeneye**	**42**
Calidris alpina	Dunlin	8
Calidris pugnax	**Ruff**	**9**
Cettia cetti	Cetti's Warbler	157
Charadrius dubius	Little Ringed Plover	40
Charadrius hiaticula	Ringed Plover	5
Chlidonias niger	Black Tern	1
Chroicocephalus ridibundus	Black-headed Gull	255
Circus aeruginosus	**Marsh Harrier**	**2**
Columba oenas	Stock Dove	380
Cuculus canorus	Cuckoo	55
Cygnus olor	Mute Swan	138
Delichon urbicum	House martin	102
Dryobates minor	Lesser Spotted Woodpecker	4
Emberiza calandra	Corn Bunting	3
Emberiza citrinella	Yellowhammer	346
Emberiza schoeniclus	Reed Bunting	128

Falco peregrinus	**Peregrine**	**14**
Falco subbuteo	**Hobby**	**61**
Falco tinnunculus	Kestrel	237
Fringilla montifringilla	**Brambling**	**21**
Gallinago gallinago	Snipe	30
Haematopus ostralegus	Oystercatcher	26
Hydrocoloeus minutus	**Little Gull**	**1**
Ichthyaetus melanocephalus	**Mediterranean Gull**	**1**
Larus argentatus	Herring Gull	175
Larus canus	Common Gull	38
Larus fuscus	Lesser Black-backed Gull	170
Larus glaucoides	Iceland Gull	1
Larus marinus	Great Black-backed Gull	7
Linaria cannabina	Linnet	496
Locustella naevia	Grasshopper Warbler	9
Loxia curvirostra	**Crossbill**	**2**
Luscinia megarhynchos	Nightingale	4
Mareca penelope	Wigeon	67
Mareca strepera	Gadwall	125
Mergellus albellus	Smew	6
Milvus milvus	**Red Kite**	**760**
Motacilla cinerea	Grey Wagtail	74
Motacilla flava	Yellow wagtail	48
Muscicapa striata	Spotted flycatcher	37
Numenius arquata	Curlew	3
Pandion haliaetus	**Osprey**	**2**
Passer domesticus	House sparrow	647
Perdix perdix	Grey Partridge	22
Phylloscopus sibilatrix	Wood warbler	1
Phylloscopus trochilus	Willow Warbler	100
Poecile palustrs	Marsh tit	78
Porzana porzana	**Spotted Crake**	**1**
Prunella modularis	Dunnock	822
Pyrrhula pyrrhula	Bullfinch	338
Recurvirostra avosetta	**Avocet**	**1**
Saxicola rubetra	Whinchat	1
Scolopax rusticola	Woodcock	7
Spatula clypeata	Shoveler	90
Spatula querquedula	Garganey	1
Sterna hirundo	Common Tern	61
Streptopelia turtur	Turtle dove	12
Strix aluco	Tawny owl	23
Sturnus vulgaris	Starling	438
Tadorna tadorna	Shelduck	12

Tringa nebularia	Greenshank	7
Tringa ochropus	Green Sandpiper	57
Tringa totanus	Redshank	35
Turdus iliacus	**Redwing**	**361**
Turdus philomelos	Song thrush	678
Turdus pilaris	**Fieldfare**	**312**
Turdus viscivorus	Mistle thrush	158
Tyto alba	Barn Owl	18
Vanellus vanellus	**Lapwing**	**100**

Field Survey Results

Initial Assessment

2.5.71 The arable fields provided suitable habitat for ground nesting farmland bird species, such as skylark and meadow pipit, which require long open sightlines for predator detection. The hedgerows, line of trees and woodland all provided suitable habitat for a range of breeding bird species which nest and forage amongst woody vegetation.

2.5.72 There are no statutorily designated sites for birds in close proximity to the proposed development and the site is not situated close to the coastal/estuarine habitats or large waterbodies; it is therefore unlikely to be a significant foraging area for wintering birds.

Targeted Surveys

2.5.73 A breeding bird survey (BBS) was conducted over four visits, on 20th May, 27th May, 21st June and 6th July 2022. The surveys recorded the presence of a moderately diverse bird assemblage. Full results of the surveys are provided in map form in Appendix D.

2.5.74 Populations of farmland birds of conservation concern, such as skylark, linnet and yellowhammer, were recorded using the Site and the surrounding areas.

Skylark Territories

2.5.75 A key consideration for the impact assessment is the number of ground-nesting bird territories present. Up to 4-5 likely skylark territories were recorded within the Site boundary, which is a somewhat low density for typical lowland arable farmland in the UK. The assumed skylark territories are shown in Figure D5 in Appendix D.

Evaluation

2.5.76 The overall breeding bird assemblage is considered to be of **Local** importance.

Invertebrates

Methods

2.5.77 Any notable invertebrates identified during the survey were recorded. The habitat was also assessed for its suitability for notable invertebrates, including the presence of specific species known to be foodplants or larval plants or habitats which may be favoured by invertebrates (such as bare ground, deadwood or grass tussocks). The habitat structure was also considered, such as mosaics, brownfield or unmanaged areas.

Limitations

2.5.78 None.

Desk Study Information

2.5.79 The following invertebrate species, which are all listed as SPIs under Section 41 of the NERC Act (2006), have all been recorded within 2km of the Site:

- Coleoptera: rugged oil beetle *Meloe rugosus*, stag beetle *Lucanus cervus*
- Unionida (molluscs): depressed river mussel *Pseudanodonta complanate*
- Lepidoptera: brown hairstreak *Thecla betulae*, dingy skipper *Erynnis tages*, small blue *Cupido minimus*, small heath *Coenonympha pamphilus pamphilus*, white-letter hairstreak *Satyrium w-album*, white admiral *Limenitis camilla*, blood vein *Timandra comae*, buff ermine *Spilosoma lutea*, cinnabar *Tyria jacobaeae*, deep-brown dart *Aporophyla lutulenta*, dusky thorn *Ennomos fuscantaria*, gallium carpet *Epirrhoe galiata*, ghost moth *Hepialus humuli*, green-brindled crescent *Allophyes oxyacanthae*, knot grass *Acronicta rumicis*, large nutmeg *Apamea anceps*, minor shoulder-knot *Brachylomia viminalis*, mouse moth *Amphipyra tragopoginis*, oak hook-tip *Watsonalla binaria*, powdered quaker *Orthosia gracilis*, rosy rustic *Hydraecia micacea*, rustic *Hoplodrina blanda*, shoulder-striped wainscot *Leucania comma*, small emerald *Hemistola chrysoprasaria*, small phoenix *Ecliptopera silaceata*, small square-spot *Diarsia rubi,* sprawler *Asteroscopus sphinx*, white ermine *Spilosoma lubricipeda*.

2.5.80 The majority of lepidoptera records arise from Harcourt Arboretum, an arboretum operated by the University of Oxford situated approximately 1km south of the Site.

Field Survey Results

2.5.81 With the exception of the strip of species-rich grassland strip along the eastern Site boundary, the narrow field margins provided habitat of limited value to pollinating insects such as bees and butterflies due to the low diversity of flowering plants. Other habitats at the margins and boundaries of the field are likely to be of value for a range of invertebrate species typical of hedgerows, tree lines and seasonally wet ditches. However, assemblages of invertebrates supported by the arable fields comprising the vast majority of the site are likely to be poor, particularly for pollinating species.

Evaluation

2.5.82 The overall invertebrates assemblage is considered to be of **Local** importance.

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2.6 Summary of Ecological Importance

2.6.1 Table 8 below gives all the identified ecological features on Site and their individual assessment of importance. Those coloured green are considered to be Important Ecological Features and will form the basis of the Assessment of Effects within the Environmental Statement (ES) chapter on Ecology and Nature Conservation. Those coloured yellow will be included on the basis of their specific legal protection or applicable planning policies.

Table 8: Summary of Ecological Importance

Feature	Importance
Designated Sites	
Lower Farm Bottom Meadow LWS	County
Thames at Cherwell and Oxford CTA	County
Nuneham Arboretum LWS	County
Radley Gravel Pits, including Radley Gravel Pits Extension North and Extension South pLWS	County
Thames Radley to Abingdon CTA	County
Radley Little Wood LWS	County
Radley Large Wood LWS	County
Fiddlers Elbow Marsh OCWS	County
Oxford Heights West CTA	County
Minchery Farm OCWS	County
Littlemore Brook OCWS	County
Littlemore and Northfield Brooks OCWS	County
Sandford Brake LWS	County
Kennington Memorial Field LWS	County
Spindleberry Park OCWS	County
Habitats	
Other Woodland; Broadleaved	Local
Arable	Site
Other Neutral Grassland	Site
Modified Grassland	Site
Hedgerows	Local
Ditches	Local
Species	
Bats	Local

Feature	Importance
Badgers	Site
Dormice	District (if present)
Otter	Site
Water Vole	Negligible
Polecat	Local
Hedgehog	Site
Brown Hare	Site
Great Crested Newts & Other Amphibians	Site
Reptiles	Site
Breeding Birds	Local
Invertebrates	Local

APPENDIX A: WILDLIFE LEGISLATION & SPECIES INFORMATION

BADGER

Badgers and their setts are protected under the Protection of Badgers Act 1992 (as amended) against damage or destruction of a sett, or disturbance, death or injury to the badgers. The Act defines a sett as "any structure or place which displays signs indicating current use by a badger". The definition of current use is subject to considerable debate. Natural England have produced guidance on the definition of current use. (*Badgers and Development – A guide to best practice and development . Natural England 2011*). Given the ambiguity surrounding the definition in all circumstances we would recommend an assessment of current use is always undertaken by a qualified ecologist. Natural Resources Wales (NRW) have a slightly different definition of current use. Please see the NRW website for further information. Penalties for offences against badgers or their setts include fines of up to £5,000 and/or up to six months in prison.

Disturbance of badgers could be caused by any digging activity or scrub clearance within 30 metres of an occupied sett and therefore every case needs to be assessed individually. Felling of trees close to a badger sett may also cause disturbance in some situations. Some activities such as pile driving may cause disturbance at even greater distances, and should be discussed with Natural England or NRW.

Licences are issued by Natural England (or NRW in Wales) to allow the disturbance of badgers, and the destruction of their setts in certain circumstances, in relation to development. Full planning permission must be obtained before a licence application will be considered. Although licences can be applied for at any time of year, disturbance of badgers or exclusion of badgers from a sett can only take place between 1 July and 30 November, to avoid the breeding season when dependant young may be underground. This restriction may be relaxed in some cases where a sett is seasonal and badgers can be shown to be absent from a sett at that time of year.

This report contains information of a confidential nature relating to the location of badger setts. Public access to this data should be restricted to those who have a legitimate need to assess the information and to know the exact situation of the setts rather than simply that badgers are present.

BATS

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2017, known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

DORMOUSE

Dormice and their nests are protected in England and Wales under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a dormouse, or to deliberately disturb a dormouse such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of dormice in their nests, and damage to or obstruction of nests are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against dormice or their nests include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of nest sites, or which could result in killing of or injury to dormice, need to take place under licence. Works which could disturb dormice may also be licensable, though this is rarely the case unless loss of dormouse habitat is also proposed, and should be assessed on a case by case basis. In practice this means that works involving any removal of habitat (typically woodland, hedgerows, and scrub) supporting dormice are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of dormice in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

AMPHIBIANS

Great Britain supports seven native amphibian species. The four most widespread species; smooth and palmate newts, common frog, and common toad, receive partial protection under the Wildlife and Countryside Act 1981 (as amended) which prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. The great crested newt, pool frog and natterjack toad are also fully protected in England and Wales under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. Penalties for offences against amphibian species include fines of up to £5,000 and/or up to six months in prison.

Four amphibian species (great crested newt, pool frog, common toad, natterjack toad) are listed as priority species under the UK Biodiversity Action Plan, and are therefore considered to be Species of Principal Importance in England and Wales (excluding the pool frog, which does not occur in Wales) under the Natural Environment and Rural Communities (NERC) Act 2006. All public bodies including local and regional authorities have a duty under this legislation to have regard for the conservation of biodiversity.

REPTILES

All six native reptile species receive protection under the Wildlife and Countryside Act 1981 (as amended). The four more common species (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*) receive partial protection which makes it an offence to intentionally kill or injure a reptile. The two other reptile species (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), both of which are rare with very restricted UK ranges receive full protection under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. Penalties for offences against reptile species include fines of up to £5,000 and/or up to six months in prison.

Works such as site clearance or topsoil stripping which could result in killing or injury of reptiles could be considered result in an offence unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on common reptile species despite these mitigation measures being in place would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence. Works which could affect smooth snakes or sand lizards, or their habitats, would need to take place under licence from Natural England or Natural Resources Wales. However sites supporting smooth snakes or sand lizards are very rarely affected by development proposals.

In practice, mitigation for impacts of development on common reptiles generally comprise one or more of the following techniques: displacement, in which reptiles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where reptile-resistant fencing is provided between a development site and suitable retained habitat allowing reptiles to be trapped from the development footprint and released elsewhere on the site; and translocation, where animals are trapped from a development site and released on another suitable site nearby. Reptile mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with the local planning authority.

BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

OTTER

Otters and their holts are protected in England and Wales under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure an otter, or to deliberately disturb an otter such that its ability to breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of otters in their holts, and damage to or obstruction of holts are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against otters or their holts include fines of up to £5,000 and/or up to six months in prison.

Any development works which are likely to involve the loss of holts, or which could result in killing of or injury to otters (which are only likely to occur extremely rarely), need to take place under licence. Works which could disturb otters may also be licensable, though this is also rarely the case as the majority of developments on watercourses and coastal areas where otters are present can be carried out in a way which avoids significant disturbance.

Where it is necessary, licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of otters in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

PLANNING POLICY IN RELATION TO BIODIVERSITY

The National Planning Policy Framework (NPPF), was published in March 2012 and revised in July 2021. Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 174), including:

- (a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- (d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- (e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- (f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. protecting and enhancing valued landscapes, geological conservation interests and soils;

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 176):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within all these designated areas should be limited, while development within their setting should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 175) by applying principles including:

- (a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- (b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- (c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons[6] and a suitable compensation strategy exists; and
- (d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate..

The following should be given the same protection as habitats sites:

- (a) potential Special Protection Areas and possible Special Areas of Conservation;
- (b) listed or proposed Ramsar sites7; and
- (c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

There is a general presumption in favour of sustainable development within the NPPF. It is noted in Paragraph 182 that this presumption does not apply where the plan or project is likely to have a significant effect on a habitat site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

The Environment Act (2021) was passed into law in November 2021. This Act is comprised of 8 Parts and sets out targets for conservation and environmental betterment along with a system for their implementation, including the creation of a new Office for Environmental Protection (OEP). Of particular pertinence to Ecology is Part 6 – Nature and biodiversity, which includes a mandatory requirement for developments to deliver a minimum 10% biodiversity net gain (as quantified through an approved metric such as the Defra 3.0 metric). Such gains must be secured for a minimum of 30 years post-completion of development.

For most schemes, Net Gain will be secured via amendment to the Town and Country Planning Act, which was passed into law in 2024. Nationally Significant Infrastructure Projects (NSIPs) will also be subject to this requirement, but this will be secured through the Planning Act 2008, which means that for NSIPs the mandatory net gain requirement will not be in place until 2025. Certain small schemes are exempt from the requirement for delivering net gain.

UK Biodiversity Action Plans

The UK Biodiversity Action Plan (UK BAP) 2011 is a policy first published in 1994 to protect biodiversity and stems from the 1992 Rio Biodiversity Earth Summit. The policy is continuously revised to combine new and existing conservation initiatives to conserve and enhance species and habitats, promote public awareness and contribute to international conservation efforts. Each plan details the status, threats and unique conservation strategies for the species or habitat concerned, to encourage spread and promote population numbers.

Species or habitats identified as priorities under the UK Biodiversity Action Plan receive some status in the planning process through their identification as Species/Habitats of Principal Importance in England and Wales, under the Natural Environment and Rural Communities (NERC) Act 2006 (as amended).

Current planning guidance in England, the National Planning Policy Framework, does not specifically refer to Species or Habitats of Principal Importance, though it includes guidance for conservation of biodiversity in general. Supplementary guidance is available online at http://planningguidance.planningportal.gov.uk/blog/guidance/ and this guidance indicates that it is '*useful to consider*' the potential effects of a development on the habitats or species on the Natural Environment and Rural Communities Act 2006 section 41 list.

The Hedgerows Regulations

In England and Wales the Hedgerows Regulations (1997) as amended confer a level of protection on hedgerows (though hedgerows within or bordering domestic gardens are excluded), particularly those hedgerows classified as 'Important' under the legislation. The Regulations require those wishing to remove hedgerows to submit a Hedgerow Removal Notice to the Local Planning Authority (LPA), which will then determine whether the hedgerow affected is classified as 'Important' under the Regulations. If it is, the LPA will either approve the proposed hedgerow removal, or issue a retention notice. It is an offence to remove or destroy a hedgerow which is subject to a retention notice, or to remove one without a removal notice.

Routine management of hedgerows, removal of hedgerows for development which has been granted planning consent, and certain other situations are allowed under the Regulations, which also specifically exclude hedgerows within or bordering domestic gardens. Determination of whether a hedgerow should be classified as 'Important' is based on a number of criteria including assessment of its likely historic value (e.g. old parish boundary or part of an ancient monument), ecological value (e.g. presence of protected species, and/or diversity of tree/shrub species in the hedgerow), and landscape value (e.g. associated with a public footpath, or being associated with hedgebanks, ditches, hedgerow trees etc).

Ancient and species-rich hedgerows are listed as a priority habitat in the UK Biodiversity Action Plan (2011)

APPENDIX B: PHOTOGRAPHS OF SITE FEATURES

Photograph 1: Fenced woodland, used for pheasant rearing

Photograph 2: Arable land typical of the majority of the survey area (photograph taken January 2024)

Photograph 3: Dead, hollow oak tree at Target Note 7

Photograph 4: 6m wide strip of species-rich grassland along eastern Site boundary.

Photograph 5: Partially wet ditch (January 2024) at D6 along north western Site boundary

Photograph 6: Narrow field margin typical of arable field margins across the survey area.

APPENDIX C: GREAT CRESTED NEWT EDNA RESULTS

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Sample ID: ADAS-3393	Condition on Receipt: Good	Volume: Passed
Client Identifier: Pond 1, Nuneham Courtenay Eco3406	Description: pond water samples in preservative	
Date of Receipt: 15/06/2022	Material Tested: eDNA from pond water samples	

Determinant	Result	Method	Date of Analysis
Inhibition Control†	2 of 2	Real Time PCR	20/06/2022
Degradation Control§	Within Limits	Real Time PCR	20/06/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	20/06/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)#	4 of 4	Real Time PCR	As above for GCN
Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	22/06/2022	Date of issue:	22/06/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

† Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

§ No degradation is expected within time frame of kit preparation, sample collection and analysis.

#Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

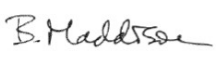
Client: Charlie Durigan,
Clarkson and Woods

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3386	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Nuneham Courtenay Eco3406	Description: pond water samples in preservative	
Date of Receipt: 15/06/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	20/06/2022
Degradation Control[§]	Within Limits	Real Time PCR	20/06/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	20/06/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN
Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	22/06/2022	Date of issue:	22/06/2022

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** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

APPENDIX D: BREEDING BIRD SURVEYS

METHODOLOGY

Survey Area

The survey area consisted of approximately 73 ha of predominantly arable fields. This covered a larger area than the Site red line boundary, which was reduced in size subsequent to completion of the breeding bird surveys.

Survey Timings and Protocol

The site was surveyed for breeding birds four times between May 2022 and July 2022, to identify which bird species were using the site for breeding or exhibited territorial behaviour and which habitats appeared to be of greatest value.

The surveys were carried out on the following days, under the weather conditions described in Table D1 below.

Table D1: Dates and Weather Conditions during Breeding Bird Surveys

Survey Number	Date	Description of weather: Precipitation; Cloud (Oktas); Wind (Beaufort Scale)	Temperature (°C)	Timings
1	20/05/2022	Intermittent light rain, Cloud 8, Wind 0	13-14	06:00 – 11:15
2	27/05/2022	Dry, Cloud 2, Wind 2	11-19	06:00 – 10:30
3	21/06/2022	Dry, Cloud 0, Wind 0	24-18	19:00 – 22:30
4	06/07/2022	Dry, Cloud 6, Wind 0	14-18	07:00 – 12:15

The survey followed BTO guidelines, where the observer systematically walked through the site, ensuring that all points on site were visited to within 50m. The location and behaviour of all birds and flocks of birds seen was noted on large-scale survey maps. Particular attention was paid to bird exhibiting breeding behaviour, for instance birds in full song, exhibiting antagonistic behaviour/calling, carrying nest material, carrying food, and returning to nesting sites. Standard BTO Common Birds Census symbology and species codes were used to create a survey map of each individual visit (Figure D1 – D4).

The early morning surveys were complemented by a single dusk survey during the 3rd visits, to include sufficient survey effort for nocturnal species or those more vocal at night or early evening, in particular owls. This survey took place during the evening and continued for at least one hour after sunset.

Personnel

All surveys were undertaken by Giles Sutton MCIEEM. Giles is a highly experienced bird surveyor able to identify all British species by sight and sound.

Survey Limitations

The initial breeding bird surveys were started in May 2021, preventing a complete season's worth of visits from being completed within the same year

Light rain was recorded intermittently during the 1st survey visit. Birds may have been less active as a consequence, although a reasonable record of birds using the Site was still obtained from the visits. This is unlikely to have made a significant impact on the overall findings.

The surveys offer only 'snapshots' of the Site and whilst trying to account for seasonal differences, may miss certain species which attend the Site infrequently or which might choose to take up residence subsequent to completion of the surveys. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.

RESULTS

In total, 29 bird species were recorded during the survey visits. 10 of these were BTO Birds of Conservation Concern red/amber lists or Species of Principal Importance (SPI) , comprising 4 'red listed' birds and 6 'amber listed' birds. 7 species were listed as being SPI for nature conservation and as such are capable of being material considerations within the planning process. The patterns of abundance and distribution of each of these species is discussed later in this section, with greatest detail given to birds of conservation concern and SPIs.

Table D3 shows the numbers of each species encountered across all the survey visits with the peak count(s) of sightings highlighted. This enables patterns in changing abundance of each species to be observed over the course of the breeding season.

In Table D3. bird species are colour coded to indicate their conservation status and their likely breeding status on-site is indicated by abbreviations as outlined in Table D2 below:

Table D2: Colours and symbols used in Table D3

Bold text	Listed under Section 41 of the NERC Act 2006 (Species of Principal Importance - SPIs) or UK Biodiversity Action Plan species
Red fill	'Red listed' species according to BTO/RSPB Bird of Conservation Concern
Orange fill	'Amber listed' species according to BTO/RSPB Bird of Conservation Concern
Yellow fill	Peak Count of Survey for each species
Y	Breeding confirmed (nests located or adults with food/nest material, or fledglings seen)
Pr	Breeding probable
Po	Breeding possible
N	Not likely to breed on site

Table D3: Numbers of Each Species Recorded During Each Survey Visit

Common Name	Latin Name	Visit				Breeding?
		1	2	3	4	
Blackbird	*Turdus merula*	3	9	17	12	Y
Blackcap	*Sylvia atricapilla*	2	4	1	4	Pr
Bullfinch	***Pyrrhula pyrrhula***	0	1	0	0	N
Blue tit	*Cyanistes caeruleus*	1	6	1	3	Pr
Buzzard	*Buteo buteo*	0	1	0	1	Po
Carrion Crow	*Corvus corone*	0	2	2	2	Po
Chiffchaff	*Phylloscopus collybita*	1	0	0	1	N
Chaffinch	*Fringilla coelebs*	3	7	3	18	Pr
Dunnock	***Prunella modularis***	1	5	4	3	Y
Feral Pigeon	*Columba livia*	0	0	0	3	N
Goldfinch	*Carduelis carduelis*	0	2	0	5	N
Great tit	*Parus major*	1	1	0	1	Po
Grey Heron	*Ardea cinerea*	0	2	0	0	N
Jackdaw	*Corvus monedula*	0	2	0	0	N
Linnet	***Carduelis cannabina***	0	2	4	25	Pr
Magpie	*Pica pica*	0	0	0	1	N
Pheasant	*Phasianus colchicus*	0	6	9	0	Y
Red kite	Milvus milvus	0	2	0	3	N
Red-legged Partridge	*Alectoris rufa*	1	3	0	0	N
Reed bunting	***Emberiza schoeniclus***	0	3	0	0	N
Robin	*Erithacus rubecula*	3	8	5	0	Y
Skylark	***Alauda arvensis***	4	8	1	1	Y
Stock dove	*Columba oenas*	0	2	0	0	N
Song thrush	***Turdus philomelos***	0	1	0	0	N

Common Name	Latin Name	Visit				Breeding?
		1	2	3	4	
Whitethroat	*Sylvia communis*	11	7	4	0	Pr
Woodpigeon	*Columba palumbus*	0	15	5	0	Pr
Willow Warbler	*Phylloscopus trochilus*	0	1	0	0	N
Wren	*Troglodytes troglodytes*	1	3	0	0	Po
Yellowhammer	***Emberiza citrinella***	8	3	2	3	Y
Total Individuals		41	104	58	86	
Number of Species		13	26	13	17	

Overall Assemblage

The breeding bird assemblage was moderately diverse, comprising typical species of farmland and hedgerows. A small number of summer visitors were recorded, including chiffchaff, whitethroat and willow warbler. All other species were residents, though numbers may be swelled by an influx of migrant birds.

Red-listed Species

Skylark

Skylark are a species mainly associated with arable habitats, grassland and moorland in the UK. This species is red listed as a Species of Conservation Concern due to recent breeding and wintering population decline and range contraction. It is also a Species of Principal Importance under section 41 of the NERC Act (2006).

Skylark were recorded on each visit with peak count of 8 individual recorded on the 2nd visit. Sightings were spread across the open arable fields within the survey area. The majority of fields at the site were suboptimal for breeding skylark, as they were cropped with rapeseed which typically grows too tall and dense to provide the required long sightlines for predator monitoring.

The Site supports a low population of skylark and surveys indicate this is around 4-5 territories. A further two territories were recorded within the survey area, but outside of the Site red line boundary. Figure D5 provides a distribution map of skylark found during the survey.

Linnet

Linnets are found on farmland wherever there is a plentiful supply of seeds throughout the year. Mixed farmland is particularly valuable. They nest in dense hedgerows, bramble or other types of scrub. Linnet numbers have dropped substantially over the past few decades, with the UK population estimated to have declined by 57 per cent between 1970 and 2008. This is largely the result of a lack of food sources in modern farming. Linnet is a red listed bird of conservation concern and a Species of Principal Importance.

Linnet were recorded on 3 out of the 4 visits, typically in low numbers although a peak count of 25 was during the 4th visit. The survey area appears to support a low to medium population. This species was typically associated with hedgerow boundary habitat.

Yellowhammer

Yellowhammers are mainly associated with open countryside and hedgerows. This species is red listed as a Species of Conservation Concern due to recent population declines. This is likely due to changes in agricultural practices, such as the removal of hedgerows and increased use of pesticides. Yellowhammers were most regularly observed within the boundary habitats. These features offer suitable nesting habitat for foraging yellowhammers and appear low numbers, with a peak count of 8 recorded during Visit 1.

Amber-listed Species

Dunnock

Dunnock inhabit any well vegetated areas with scrub, brambles and hedges, including field edges. They spend large amounts of time on the ground in amongst grassland but also remain close to shrubby vegetation cover. Dunnock abundance fell substantially between the mid-1970s and mid-1980s, after a period of population stability. Some recovery has occurred throughout the UK since the late 1990s. Dunnock is an amber listed Species of Conservation Concern and a Species of Principal Importance.

Dunnock were recorded in low numbers during each survey visit, and were primarily observed with the boundary habitats. This species is present all year round and the Site appears to support a small breeding population.

Other Species of Conservation Concern

Individuals or small numbers of each of song thrush (red-listed species) as well as bullfinch, reed bunting, stock dove, woodpigeon and willow warbler (amber-listed species) were recorded on one or two occasions and did not show a persistent association with the Site. It is therefore likely that they are not present within the Site throughout the breeding season but may use the Site opportunistically.

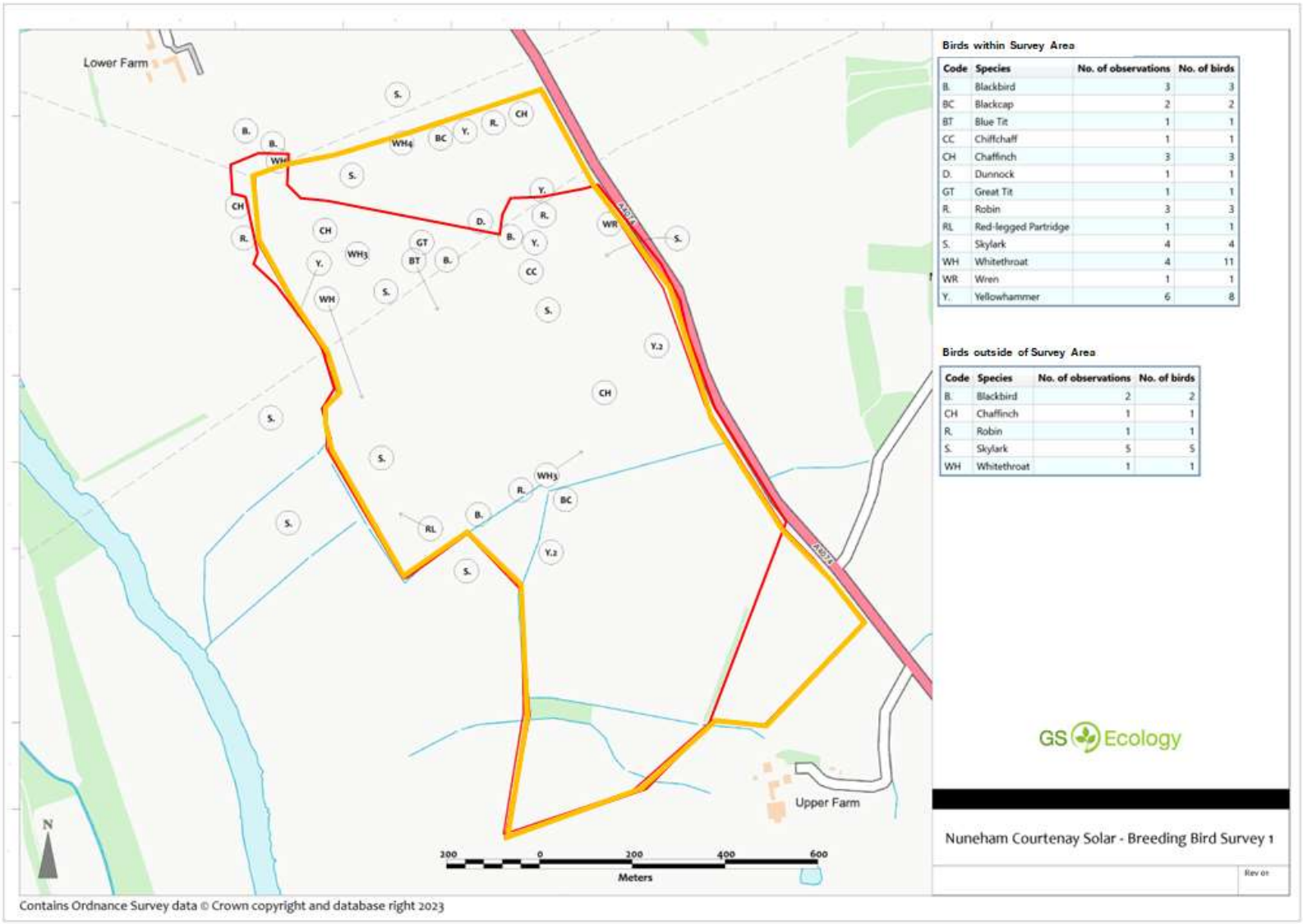

Figure D1: Breeding Bird Survey Results – Visit 1. Site Boundary Demarcated by Red Line, Survey Area Demarcated in Orange.

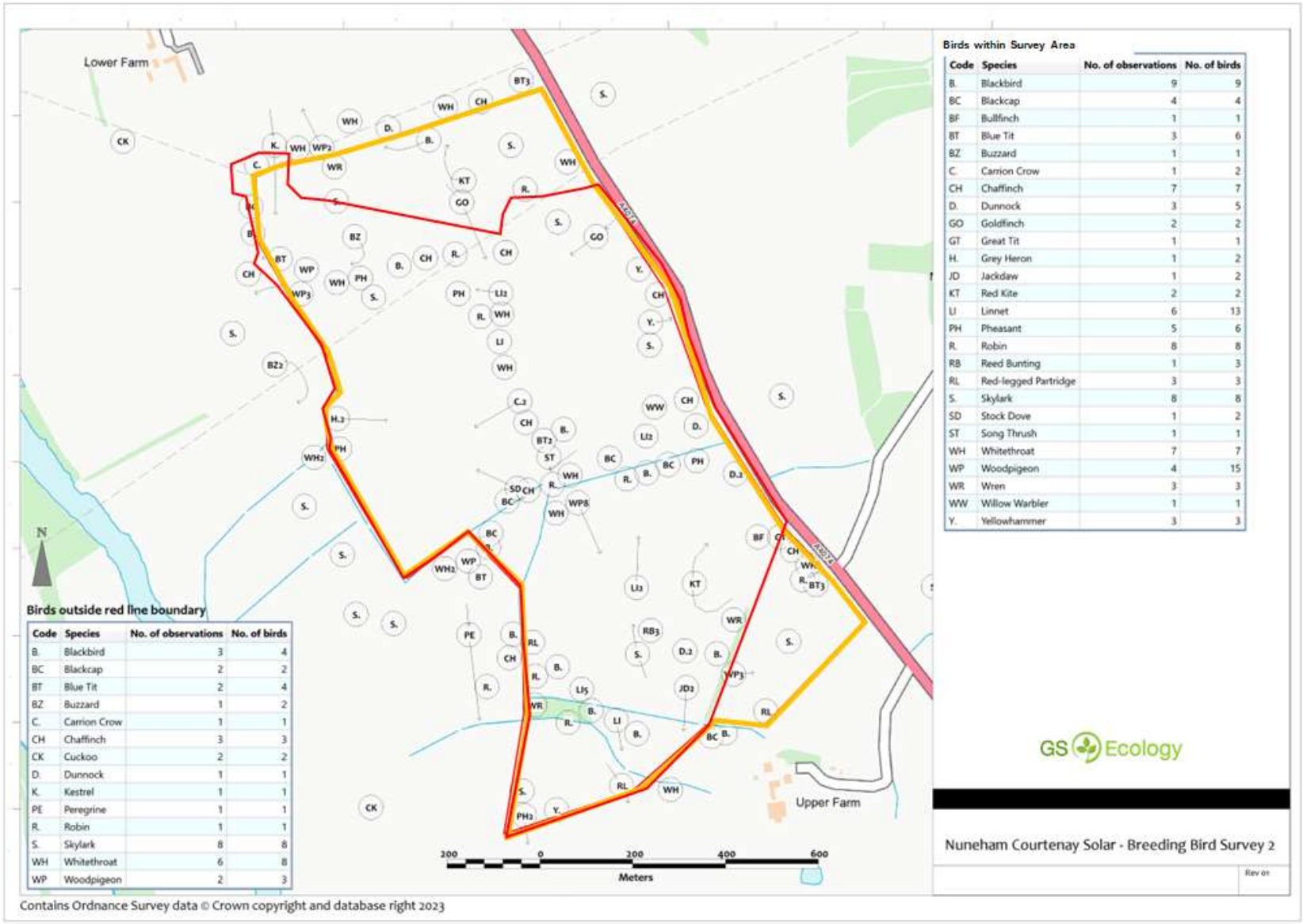

Figure D2: Breeding Bird Survey Results – Visit 2. Site Boundary Demarcated by Red Line, Survey Area Demarcated in Orange.

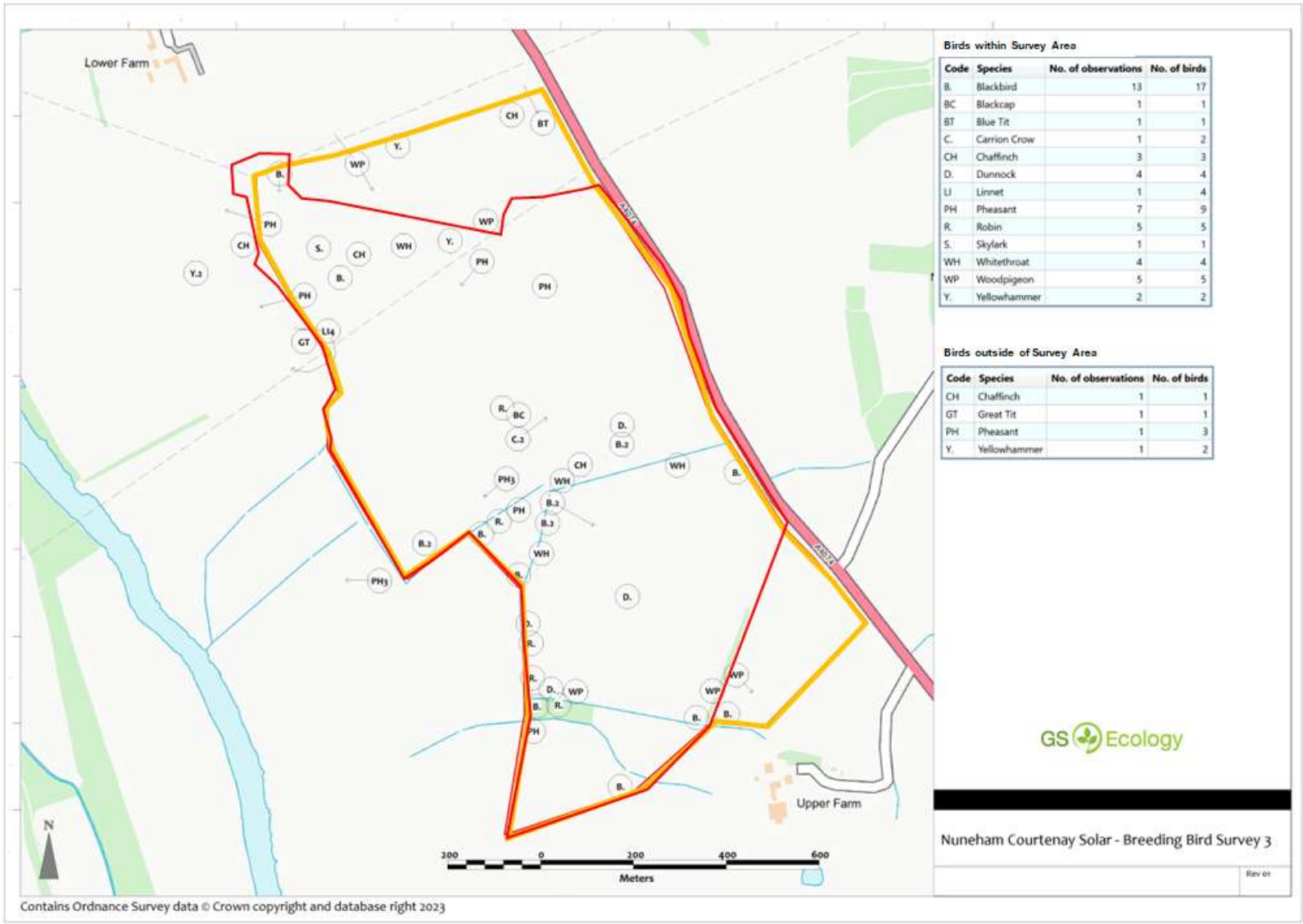

Figure D3: Breeding Bird Survey Results – Visit 3. Site Boundary Demarcated by Red Line, Survey Area Demarcated in Orange.

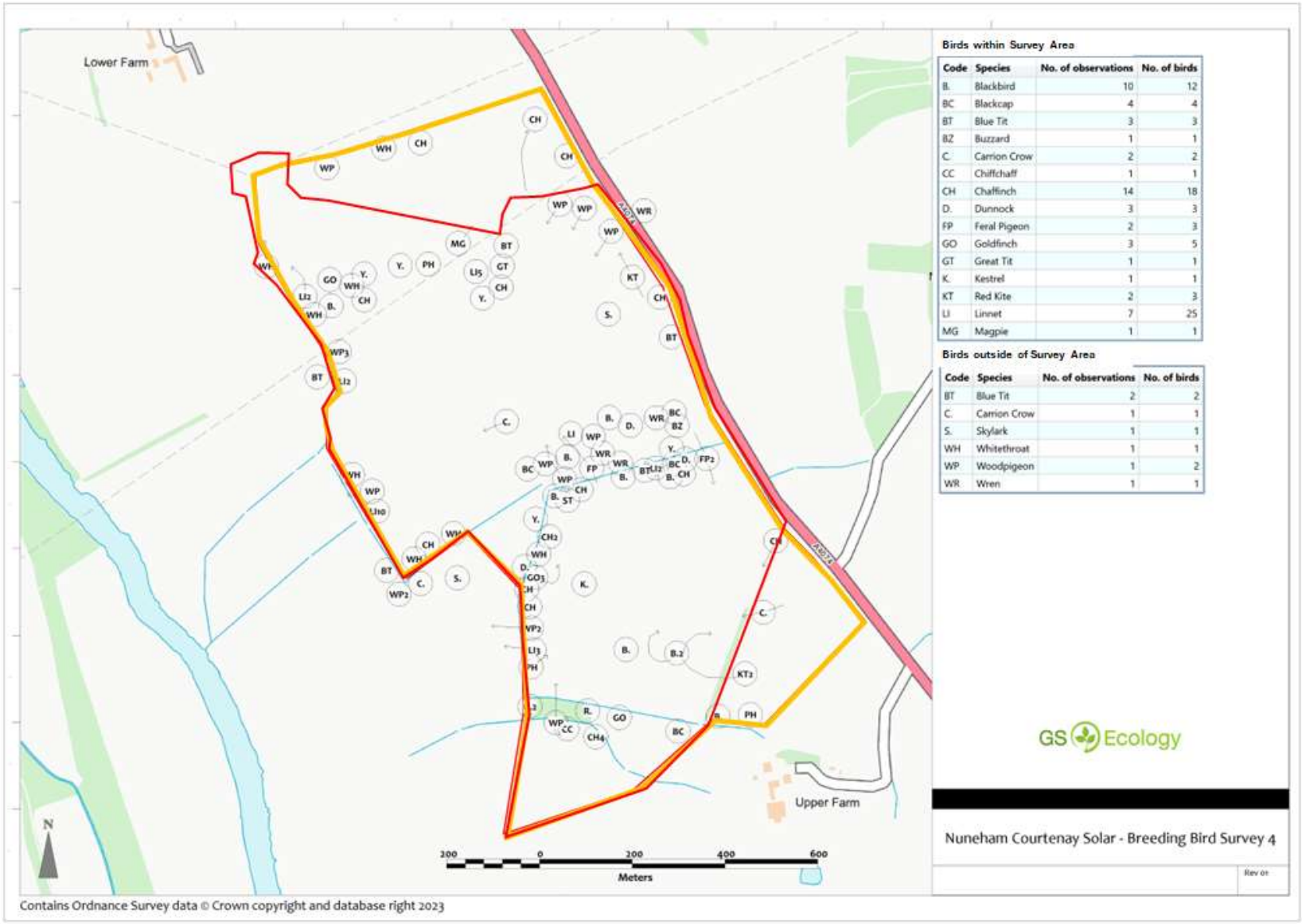

Figure D4: Breeding Bird Survey Results – Visit 4. Site Boundary Demarcated by Red Line, Survey Area Demarcated in Orange.

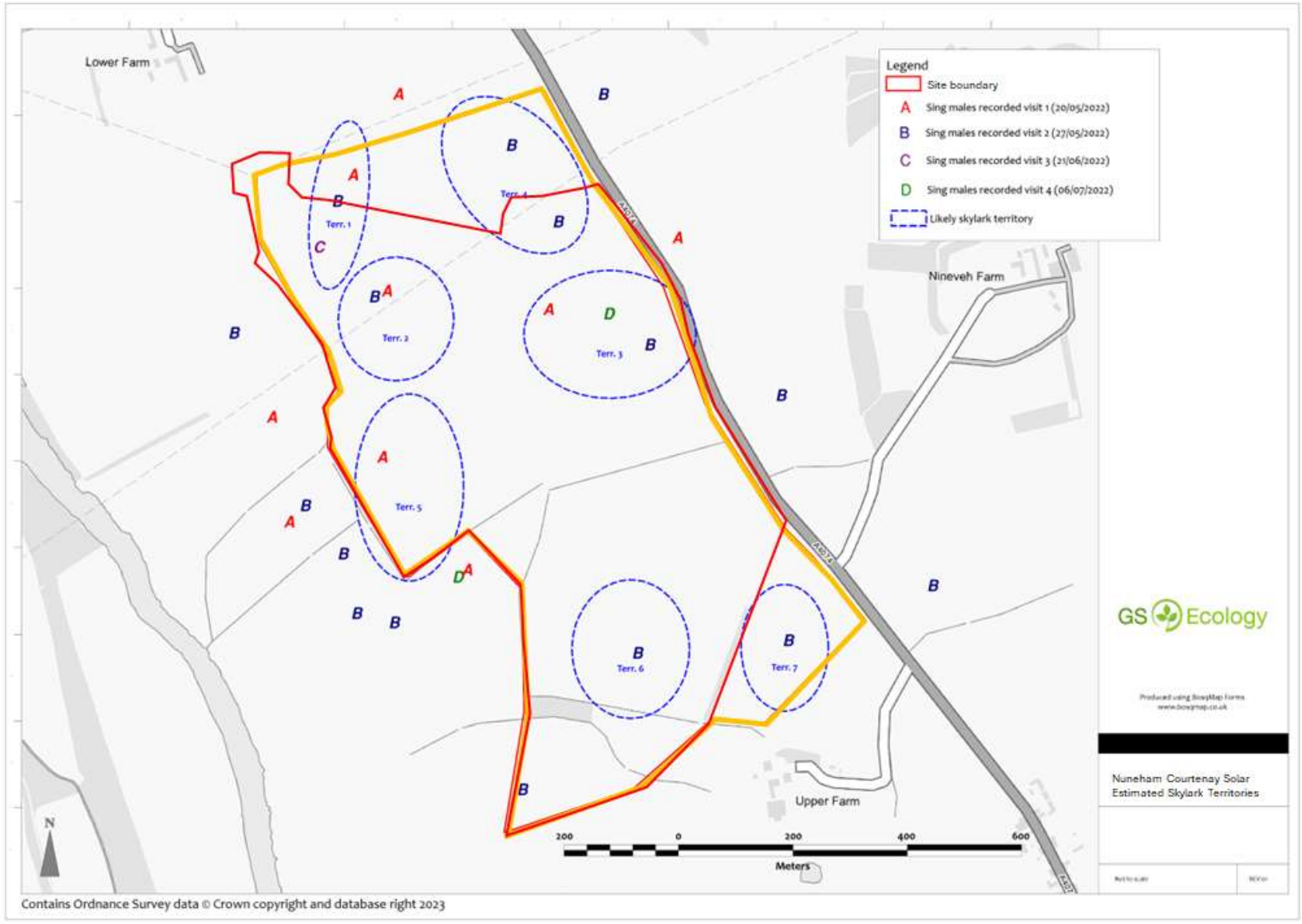

Figure D5: Estimated Skylark Territories Based on Combined Survey Results. Site Boundary Demarcated by Red Line, Survey Area Demarcated in Orange.

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