

ECOLOGICAL IMPACT ASSESSMENT
PELHAM SPRING SOLAR FARM, ESSEX

carried out by



commissioned by

PEGASUS GROUP

on behalf of

LOW CARBON SOLAR PARK 6 LIMITED

SEPTEMBER 2022



ECOLOGICAL IMPACT ASSESSMENT

PELHAM SPRING SOLAR FARM, ESSEX

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	Tom Clarkson	Peter Timms	Hannah Montag

The information, data and advice which has been prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions. This report and its contents remain the property of Clarkson and Woods Ltd. until payment has been made in full.



EXECUTIVE SUMMARY

- Clarkson & Woods Ltd. was commissioned by Pegasus Group on behalf of Low Carbon Solar Park 6 Limited to carry out an ecological survey of land proposed to accommodate solar array, north of Maggots End, Bishop's Stortford, CM23 1BJ in Essex (Ordnance Survey Grid Reference TL 473 281). An Extended Phase 1 Habitat Survey was carried out on 4th and 5th February 2021 by an experienced ecologist. A scoping wintering bird survey was undertaken at the site in February 2021.
- This report sets out the results of these survey, identifies any potential constraints associated with the construction of a solar array and provides recommendations for avoidance, mitigation and enhancement measures to reduce impacts on species or habitats which may arise as a result of the proposed development, and to provide a net gain for biodiversity within the Site.
- The Site primarily comprised a number of fields in arable production, which were partially bounded by a network of hedgerows, ditches and broadleaved woodland. As the majority of habitat on Site comprised agriculturally managed fields with relatively little ecological importance, the installation of a photovoltaic array into this area is unlikely to result in significant adverse impacts upon local biodiversity.
- The field boundary habitats however are likely to support a range of wildlife however. As such, all woodland, hedgerows and ditches are to be retained and protected through the construction phase through the establishment of appropriately fenced buffer zones, which will remain free from development. Adverse impacts upon receptors associated with boundary features such as roosting and foraging/commuting bats, dormouse, otters, water voles and nesting birds are therefore likely to be avoided. Detailed measures to protect habitats and features during construction will be prescribed as part of a Biodiversity Protection Plan (BPP) prepared for the Site once planning permission has been secured.

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- It is considered that the cessation of intensive arable farming within the fields and the subsequent establishment and management of a diverse grassland within the array will benefit local biodiversity, including species targeted for conservation, such as small heath butterfly. A Landscape Ecological Management Plan (LEMP) will be prepared to set out how new and existing habitats will be managed post-construction for the benefit of wildlife.
- eDNA surveys were undertaken of 12 waterbodies suitable for breeding great crested newts within 250m of the Site. Five samples were returned positive for great crested newts. In order to adequately compensate for impacts on newts, an agreed conservation payment will be made under Natural England's District Level Licensing (DLL) scheme. **An Impact Assessment & Conservation Payment Certificate has been accepted and counter-signed by Natural England on 11/11/2021. The certificate will be issued to the LPA as evidence of the Site's registration under the DLL scheme.**
- Approximately 11 skylark breeding territories will be displaced as a result of the development. A blend of on-Site and off-Site measures will be provided in order to mitigate for the loss of breeding territories. This will include on-site skylark mitigation area managed as hay meadow or set aside and provision of 'skylark plots' on and off-site.
- A suite of ecological enhancement measures have also been recommended which ensure that the scheme will have a net positive impact upon biodiversity within the local area. The provision of locally appropriate ecological enhancements also ensures that the scheme is consistent with the requirements of the NPPF.
- Provided the avoidance and mitigation measures outlined in the report are adhered to, the development would be considered in line with relevant local and national planning policy, and the implementation of the recommended ecological enhancements would provide a positive, permanent contribution to biodiversity within the Site.



1 INTRODUCTION

- 1.1.1 Clarkson and Woods Ltd. was commissioned by Pegasus Group on behalf of Low Carbon Solar Park 6 Limited to carry out an Ecological Impact Assessment of land north of Maggots End, Bishop's Stortford, CM23 1BJ in Essex, thereafter referred to as 'the Site'.
- 1.1.2 This Impact Assessment discusses the likely effects of the Proposed Development on the ecology of the Site using information collected during a suite of surveys by Landscape Science Ltd. and Clarkson and Woods Ltd. in 2021. These surveys comprised:
- 1.1.3 Landscape Science Ltd.:
- Great crested newts (GCN) eDNA and Habitat Suitability Index (HSI) surveys – 28th April 2020
- 1.1.4 Clarkson and Woods Ltd.:
- Initial Extended Phase 1 Habitat Survey – 4th and 5th February 2021 and subsequently 14th June 2021 (additional land to the west and proposed cable route)
 - Wintering Bird Scoping Survey - 4th and 5th February 2021
 - eDNA Surveys for Great Crest Newt – 15th April 2021 and subsequently 14th June 2021 (additional land to the west)
 - Scoping Breeding Bird Survey – 15th April 2021
 - Additional Breeding Bird Surveys – May to June 2021
- 1.1.5 For clarity, all updated or added text since the last submitted version of this EclA report (dated September 2021) has been coloured in red.
- 1.1.6 The assessment has been prepared by Adèle Remazeilles, an experienced ecologist, who is an **Associate** member of the Chartered Institute of Ecology and Environmental Management (CIEEM). The report has been subject to a two stage quality assurance review by appropriately experienced senior consultants who are full members of CIEEM.
- 1.1.7 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 conduct¹.
- 1.1.8 If no action or development of the Site takes place within 24 months of the date of this report – providing there are no significant changes in land use within this time period-, then the findings of the assessment and supporting surveys should be reviewed. An update of the surveys and/or assessment may be required.

1.2 Report Aims

- 1.2.1 The aims of this report are:
- To establish, as far as possible, the baseline ecological conditions existing on Site at the time of survey and to identify any likely future changes in the baseline conditions up to the point of commencement.
 - To determine likely significant effects resulting from the proposals upon the ecological features identified within the assessment.
 - To assess whether the proposals are likely to be in accordance with relevant nature conservation legislation and planning policies.
 - To identify where further surveys to establish baseline conditions, inform assessment or develop mitigation or compensatory measures are required.
 - To identify how mitigation or compensation measures will be secured, maintained and monitored.
 - To identify ecological enhancements to be carried out and how they will be implemented, maintained and monitored.

¹ Code of Professional Conduct. CIEEM, January 2019.



1.3 Site Description Summary

- 1.3.1 The Site primarily comprised a number of fields in arable production, which were bounded by a network of hedgerows, ditches and broadleaved woodland. Two of the fields within the Site were semi-improved grassland. The landscape surrounding the Site predominately consisted of rural, arable farmland, with the hamlets of Little London and Mallows Green present to the north and south respectively.
- 1.3.2 It should be noted that the red line boundary has been amended on several occasions and some of the surveys covered a wider area than the most current application Site. This is referred to as the 'Survey Area'. This has also enabled the Site to be assessed within the wider context of its links to the surrounding landscape.
- 1.3.3 The approximate centre of the Site was at Ordnance Survey Grid Reference TL 473 281, and the location of the Site is shown in Figure 1 below.
- 1.3.4 The development Site is 79.28 hectares (ha) in size. An aerial photo of the Site and surrounding area is provided in Figure 2.



Figure 1: Open Street Map Showing Location of Site.

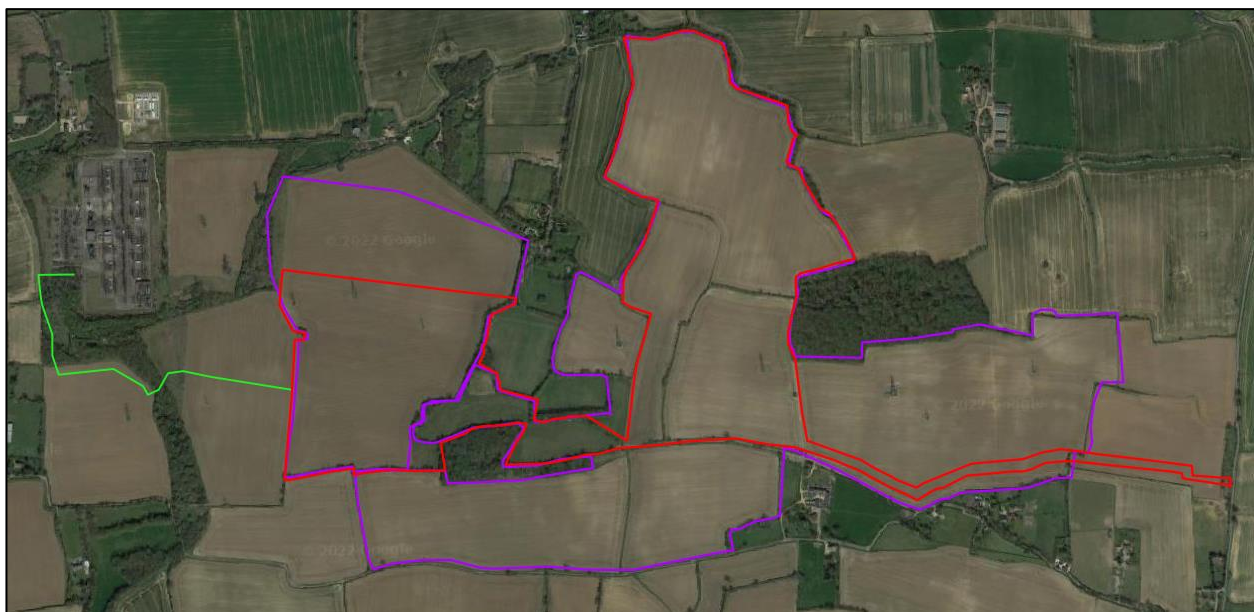


Figure 2: Aerial photograph of Site boundary (Red Line), Survey Area (Purple Line) and Cable Route (Green line) (©2021 Google)

1.4 Development Proposals

- 1.4.1 The proposed development comprises the construction of a photovoltaic solar farm. Panels will be built in east/west rows and attached to metal frames which are driven into the ground, to form south-facing strings of panels. Each string will be connected via underground cable to an inverter, which are situated in each field.
- 1.4.2 The design of the scheme has been modified at an early stage to ensure land of high ecological value remains unaffected by the proposals. Furthermore, easements and exclusion areas within the scheme have been identified as areas which will be managed to provide valuable habitats for a range of wildlife.
- 1.4.3 A DNO substation compound will be constructed centrally within the Site. All structures will be built on concrete pads. As a result of this, approximately 0.36ha of semi-improved grassland will be lost.
- 1.4.4 The array will be situated within the fields with fencing utilised to secure the Site. It is assumed that deer-proof fencing will be used.
- 1.4.5 A cable route is planned to connect the Site to the distribution network at Pelham substation; this will require underground laying of cable in a trench. As yet, no details are known with regards to the methodology used to lay the cable, but it is assumed that the works will comprise a buried cable, which will involve digging a trench approximately 1 m wide and 1.5m deep with a small digger/JCB and laying the cable before backfilling the trench with the excavated soil.
- 1.4.6 Development proposals are shown in Figure 3 and landscape proposals in Figure 4. Any changes to the building design and layout and landscaping made subsequent to publication of this report should be issued to Clarkson and Woods Ltd. for review. Ecological impacts and mitigation opportunities may be affected by any such changes.



1.5 Quality Assurance

- 1.5.1 All ecologists employed by Clarkson and Woods are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct² when undertaking ecological work.
- 1.5.2 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS)³.
- 1.5.3 This report has been prepared in accordance with the relevant British Standard: *BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*⁴. It has been prepared by an experienced ecologist who is a member of CIEEM. The report has also been subject to a two stage quality assurance review by appropriately experienced ecologists who are full members of CIEEM.

1.6 Assessment Scope

- 1.6.1 This impact assessment will consider impacts arising during the construction, operational and decommissioning phases of the scheme in order to encompass its entire lifespan as far as can reasonably be anticipated.
- 1.6.2 The Zone of Influence (Zol) of the development will vary according to the impact or ecological feature being assessed. For most ecological features the Zol will be the Site itself but it may also be greater for populations of species which utilise wider territories, such as birds. Ponds within 250m of the Site, woodland immediately adjacent the Site and all habitat within the Survey Area are also included within the Zol of the Site.
- 1.6.3 **Permission was refused by Uttlesford District Council in January 2022 for the initial submitted application UTT/21/3356/FUL. A new application is being submitted based on the council's pre-application response. A number of panel areas have been removed in the new layout as suggested. These areas are now proposed to be managed for biodiversity as described later in the report.**

² CIEEM (2013). *Code of Professional Conduct*. www.cieem.net/professional-conduct.

³ CIEEM (2013). *Competencies for Species Survey (CSS)*. www.cieem.net/competencies-for-species-survey-css.

⁴ 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 Impact Assessment. The methodologies associated with the baseline assessment are summarised with each ecological feature's subheading below.
- 2.1.2 The specific surveys carried out were chosen on the basis of 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. The following species-specific baseline surveys were chosen: wintering bird survey, breeding bird surveys and great crested newt eDNA surveys of local waterbodies.
- 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 (2015); 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)⁵.
- 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 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 impact assessment. 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 scheme's legal and policy compliance.

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 5km 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 Essex Wildlife Trust Biological Records Centre (EWTBRC) was consulted for records of protected species and species of conservation concern within 2km of the Site. EWTBRC was also asked to provide details of locally-designated and non-statutory sites for nature conservation within 2km of the Site. The Hertfordshire

⁵ 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



Environmental Records Centre (HERC) was also consulted for records within 2km of the Hertfordshire portion of the Site.

- 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 2km of the Site. Unfortunately such data is only available for licence applications made between 2012 and 2015. Recent licence applications do not currently appear.
- 2.3.5 The Uttlesford District Council Local Plan (adopted January 2005) was consulted for details of planning policies relevant to designated sites, protected species and habitats, and general ecological and environmental protection.
- 2.3.6 The Essex Biodiversity Action Plan (BAP) was consulted for information on conservation priority species and habitats which may require further consideration and weight within Ecological Impact Assessments.
- 2.3.7 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.
- 2.3.8 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.

Limitations

- 2.3.9 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.
- 2.3.10 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.
- 2.3.11 It should be noted that the red line boundary of the Site has been expanded to the west after the data search from EWTBRC and HERC were requested. This is because various design options were considered by Low Carbon Solar Park 6 Limited and subsequently decided. The new red line boundary compared to the initial one included the additional arable field to the west (Field 9, Figure 5 refers). This is not considered to be a significant limitation to the impact assessment.

Desk Study Findings

Designated Sites

Statutory Designated Sites

- 2.3.12 No internationally designated sites lie within 10km of the Site. No nationally designated sites lie within 2km of the Site. The closest is Hillcollins Pit Site of Special Scientific Interest (SSSI), which lies approximately 2.2km to the south-west, designated due to its geological interest.

Local and Non-statutory Designated Sites

- 2.3.13 Six local or non-statutory designated sites for nature conservation were identified within the desk study and are summarised in Table 1 overleaf. Appendix C provides maps showing the relationship between the designated sites located within Zol and the development Site.



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

Site Name	Size, Distance and Direction from Site	Reason for Designation (text extracted from EWTBRC and HERC descriptions)	Importance
Battle's Wood Local Wildlife Site (LWS) (Reference Ufd33 in Appendix C)	9.5 ha Immediately adjacent to Site boundary to the east (see Figure 5)	Battle's Wood comprises standards of Pedunculate Oak (<i>Quercus robur</i>) and Ash (<i>Fraxinus excelsior</i>) over old coppice of Ash, Hornbeam (<i>Carpinus betulus</i>), Hazel (<i>Corylus avellana</i>) and Field Maple (<i>Acer campestre</i>). The ground flora is rich and includes Hairy Wood-rush (<i>Luzula pilosa</i>), Bluebell (<i>Hyacinthoides non-scripta</i>), Dog's Mercury (<i>Mercurialis perennis</i>) and Sanicle (<i>Sanicula europaea</i>).	Local – within Zol
Park Green LWS (Reference Ufd17 in Appendix C)	3.2 ha Directly adjacent to the west	This site is a registered common and supports a good range of grasses and herbs in a part of the county where large, species-rich grasslands are rare. Characteristic species include Rough Meadow-grass (<i>Poa trivialis</i>), Yorkshire Fog (<i>Holcus lanatus</i>), Meadow Barley (<i>Hordeum secalinum</i>), Crested Dog's-tail (<i>Cynosurus cristatus</i>) and Selfheal (<i>Prunella vulgaris</i>).	Local – within Zol
Pelham Centre Meadow LWS (Reference Ufd13 in Appendix C)	2.5ha 200m west	This strip of grassland lies within the transformer station grounds at Stocking Pelham, which is used as an educational reserve. The meadow supports a very wide variety of grasses and herbs, with a notable population of Bee Orchids (<i>Ophrys apifera</i>). Two small areas of planted trees provide additional habitat interest.	Local – within Zol
Stocking Pelham Field Centre LWS (Reference 26/009 in Appendix C)	7.87 ha 340m west	A site predominantly of grassland but with a variety of other habitats present. The grassland supports neutral grassland indicator species, including abundant Cowslip (<i>Primula veris</i>). There are small areas of broadleaf woodland supporting several woodland indicator species, for example Wood Anemone (<i>Anemone nemorosa</i>), Dog's Mercury (<i>Mercurialis perennis</i>) and Bluebell (<i>Hyacinthoides non-scripta</i>), and a boundary hedge. A pond adjoins the hedgerow with a long ditch supplying water to the pond. The site is locally important for birds and mammals and supports protected species. Wildlife Site criteria: Woodland indicator species; grassland indicators.	Local – within Zol
Ley Wood LWS	1.5 ha 980m south	This small, possibly ancient wood is dominated by neglected Hornbeam (<i>Carpinus betulus</i>) coppice, with some Field Maple (<i>Acer campestre</i>). The ground flora is characterised by abundant Dog's Mercury (<i>Mercurialis perennis</i>) and Bluebell (<i>Hyacinthoides non-scripta</i>), with lesser quantities of Three-veined Sandwort (<i>Moehringia trinervia</i>), Wood Meadow-grass (<i>Poa nemoralis</i>) and Violets (<i>Viola sp.</i>).	Local – beyond Zol

Local BAP

2.3.14 The following habitats and species that are relevant to the Site were identified from the Essex BAP.

Habitats

- Ancient and/or Species Rich Hedgerows And Green Lanes
- Ancient Woodland
- Cereal Field Margins

Species

- Skylark *Alauda arvensis*
- Brown Hare *Lepus europaeus*
- Otter *Lutra lutra*



- Hazel Dormouse *Muscardinus avellanarius*
- Grey Partridge *Perdix perdix*
- Great Crested Newt *Triturus cristatus*
- Shril Carder Bee *Bombus sylvarum*
- Hornet Robber Fly *Asilus crabroniformis*
- Stag Beetle *Lucanus cervus*
- Scarlet Malachite Beetle *Malachius aeneus*
- Common Pipistrelle *Pipistrellus pipistrellus*
- Oxlip *Primula elatior*
- Song Thrush *Turdus philomelos*
- Water Vole *Arvicola terrestris*
- Stone Curlew *Burhinus oedicanus*

Planning Policy

2.3.15 Table 2 provided the relevant local planning policies found within the Uttlesford District Local Plan (adopted January 2005).

Table 2: Relevant Policy taken from Uttlesford District Local Plan

Policy Ref	Description
Policy ENV7 – The Protection of the Natural Environment – Designated Sites	<p>Development proposal that adversely affect areas of nationally important nature conservation concern, such as Sites of Scientific Interest and National Nature Reserves, will not be permitted unless the need for the development outweighs the particular importance of the nature conservation value of site of reserve.</p> <p>Development proposals likely to affect local areas of nature conservation significance, such as County Wildlife sites, ancient woodland, wildlife habitat, sites of ecological interest and Regionally Important Geological/ Geomorphological Sites, will not be permitted unless the need for the development outweighs the local significance of the site to the biodiversity of the District. Where development is permitted the authority will consider the use of conditions or planning obligations to ensure the protection and enhancement of the site's conservation interest.</p>
Policy ENV8 – Other Landscape Elements of Importance for Nature Conservation.	<p>Development that may adversely affect these landscape elements: hedgerows, linear tree belts, larger semi natural or ancient woodlands, semi-natural grasslands, green lanes and special verges, orchards, plantations, ponds, reservoirs, river corridors, linear wetland features, networks or patterns of other locally important habitats will only be permitted if the following criteria apply:</p> <p>a) The need for the development outweighs the need to retain the elements for their importance to wild fauna and flora;</p> <p>b) Mitigation measures are provided that would compensate for the harm and reinstate the nature conservation value of the locality.</p> <p>Appropriate management of these elements will be encouraged through the use of conditions and planning obligations.</p>
Policy GEN7 – Nature Conservation	<p>Development that would have a harmful effect on wildlife or geological features will not be permitted unless the need for the development outweighs the importance of the feature to nature conservation. Where the site includes protected species or habitats suitable for protected species, a nature conservation survey will be required. Measures to mitigate and/or compensate for the potential impacts of development, secured by planning obligation or condition, will be required. The enhancement of biodiversity through the creation of appropriate new habitats will be sought.</p>
Policy ENV15 – Renewable Energy	<p>Small scale renewable energy development schemes to meet local needs will be permitted if they do not adversely affect the character of sensitive landscapes, nature conservation interests or residential and recreational amenity.</p>



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)⁶. The survey was completed on the 4th and 5th February 2021 by Adèle Remazeilles, GradCIEEM. Adèle has 3 years' experience undertaking ecological surveys and has an MSc in relevant subjects.
- 2.4.2 At the time of survey, the weather conditions were partly foggy, with scattered rain, approximately 5°C and still on the 4th and clear, dry, approximately 6°C with light breeze on the 5th.
- 2.4.3 Field 9 to the west (see Figure 5) was subsequently added within the red line boundary. This additional field was surveyed on the 14th June 2021 by Mike Hockey ACIEEM. Mike has over 7 years' experience in nature conservation and ecological surveys; with the most recent 5 years based in ecological consultancy. The proposed cable route was also surveyed on the 14th June 2021.
- 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 Phase 1 Habitats Survey are included in map form on Figure 5. Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (Table 5) are used to describe habitats not readily conforming to recognised types and evidence of, or potential for, protected species and species of conservation concern.

2.5 Biodiversity Impact Assessment

- 2.5.1 In line with NPPF planning guidance and Environment Act 2021, a Biodiversity Impact Assessment (BIA) has been undertaken for the Site using the Natural England Biodiversity **Metric 3.1**. The Metric was used to calculate the biodiversity value of area and linear habitats both before and after development and was used as a proxy measure to determine if the development is likely to result in an on-site habitat biodiversity net loss or gain.
- 2.5.2 Findings of the BIA are discussed in Section 3.4. The completed BIA Summary Sheet is provided in Appendix B.

Habitat Assessment Limitations

- 2.5.3 Although the initial survey was conducted in February, which is outside the optimal time for a Phase 1 habitat survey (April to October inclusive), it was possible to adequately classify and assess the nature conservation value of the habitats involved. Although particular groups of species such as flowering herbs and spring ephemerals may have been under-recorded or missed, considering the habitats recorded on the Site, any noteworthy species were unlikely to have been missed. An extensive species list was not collected but species characteristic of the recorded habitats were recorded. In addition, while undertaking further protected species surveys in April to June 2021, opportunity was taken to confirm the assessment of habitats within the Site.
- 2.5.4 Dense and scattered scrub habitats recorded within the Site were too small in extent to be visible on the overall Extended Phase 1 Survey map (Figure 5) produced for the Site. Location of these habitats are however detailed in the relevant subheading.

Arable

Desk Study Information

- 2.5.5 Cereal Field Margins are listed as an Essex local BAP habitat. Arable Field Margins is a Habitat of Principal Importance under Section 41 of the NERC Act 2006

⁶ Nature Conservancy Council. (1990 - 2010 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee

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

- 2.5.6 The Survey Area comprises nine distinct fields and the large majority of these (seven fields) were arable land, see Photo 1. Discussion with the farmer while on Site informed that the fields have been harvested before Christmas and were planted with winter wheat. The farmer also indicated that rapeseed and more rarely barley are also occasionally grown instead of winter wheat. Most arable fields were broad bean crops in the summer.
- 2.5.7 The fields were a monoculture with no other species identified with field margin habitat limited to circa 0.5m-8m wide strips. The sward of the margins were short (20cm in average) although had developed in to rough grassland in some places, with grass species recorded including cocksfoot grass *Dactylis glomerata*, perennial rye grass *Lolium perenne*, meadow foxtail *Alopecurus pratensis*, soft brome *Bromus hordeaceus*, false oat-grass *Arrhenatherum elatius*, barren brome *Bromus sterilis* and red fescue *Festuca rubra*. Broadleaved species present included garlic mustard *Alliaria petiolate*, cowslip *Primula veris*, common dog violet *Viola riviniana*, dog's mercury *Mercurialis perennis*, oxeye daisy *Leucanthemum vulgare*, comfrey *Symphytum officinale*, knapweed *Centaurea nigra*, meadow buttercup *Ranunculus acris*, common poppy *Papaver rhoeas*, creeping buttercup *Ranunculus repens*, yarrow *Achillea millefolium* and bristly oxtongue *Helminthotheca echioides*.
- 2.5.8 Several tall ruderal and injurious weed species were also recorded within the grassland margins, including spear thistle *Cirsium vulgare*, broadleaved dock *Rumex obtusifolius*, curled dock *Rumex crispus*, common nettle *Urtica dioica*, horsetail species, field bindweed *Convolvulus arvensis*, hogweed *Heracleum sphondylium*, cleavers *Galium aparine*, creeping thistle *Cirsium arvense* and cow parsley *Anthriscus sylvestris*.



Photo 1: Showing Harvested Arable Crop within the Site

- 2.5.9 In February 2021, Fields 4, 5, 6 and 8 comprised some uncropped areas (Figure 5 refers), which appeared to be used as a game cover crop as shown on Photo 2.



Photo 2: Game Cover Crop

Evaluation

- 2.5.10 The land within the cultivated arable fields holds very little intrinsic value for biodiversity. The field margins were not representative of the local BAP habitat 'Cereal Field Margins'. Overall, arable habitat is considered to be of **Site** Importance. It should however be noted that the arable fields do provide habitat for a number of different species including birds and badgers. The relative importance of the arable habitat for species or species groups associated with the habitat is assessed individually (in Section 2.6 below) so as to avoid pseudo replication within the impact assessment.

Semi-Improved Grassland

Field Survey Results

- 2.5.11 Field 7 and 8 (Figure 5 refers) consisted of semi-improved grassland. Discussion with the farmer informed that these fields are occasionally rented as horse pasture. At the time of the survey, no horses were present within the fields.
- 2.5.12 Grassland within Field 7 and 8 were broadly similar with a short sward (30cm in average) and dominated by grass species. The following grass species were recorded: barren brome, meadow foxtail, common bent *Agrostis capillaris*, Timothy *Phleum pratense*, false oat grass, Yorkshire fog *Holcus lanatus*, cock's foot grass and perennial ryegrass. Flowering species present included teasel *Dipsacus fullonum*, red clover *Trifolium pratense*, common mouse-ear chickweed *Cerastium fontanum*, creeping cinquefoil *Potentilla reptans*, bush vetch *Vicia sepium*, meadow buttercup, creeping buttercup, germander speedwell *Veronica chamaedrys*, hogweed, common knapweed and lesser celandine *Ficaria verna*. There was an overall absence of structural diversity although small tussocks were starting to form in places.



Photo 3: Semi-improved grassland within Field 7



2.5.13 The south-east corner of Field 9 appeared to be left as set aside at the time of survey in June 2021, see Target Note 20 Figure 5. The grassland contained a modest diversity of grasses and included the following broadleaved species: oxeye daisy, red campion *Silene dioica*, knapweed, brome species and cut-leaved crane's-bill *Geranium dissectum*.



Photo 4: Set Aside in Field 9

Evaluation

2.5.14 The semi-improved grassland on Site has a modest floristic diversity and lack of structure. It may offer foraging opportunities for badgers, bats and birds, especially the set aside field. Overall the semi-improved grassland habitat was considered to be of **Site** ecological importance.

Hedgerows

Desk Study Information

2.5.15 Ancient and/or Species Rich Hedgerows and Green Lanes Ancient are listed as Essex local BAP habitat. Hedgerows are a Habitat of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC Act). Hedgerows are also afforded some protection under the Hedgerows Regulations (1997).

Field Survey Results

2.5.16 The majority of fields within the Survey Area were bounded by hedgerows. The ecological quality of the hedgerows varied widely in terms of species-richness, management and structure, intactness and the presence of standard trees. The key features of the hedgerows are set out in Table 3 below. The numbering of hedgerows is shown in the Phase 1 habitat map in Figure 5.

Table 3: Descriptions of Hedgerows within the Survey Area

Hedge No.	Classification	Length (m)	Height (m)	Width (m)	Ditch Along ½ Length
H1	Defunct species-poor hedgerow with standard trees	285	2	2	Yes (wet)
H2	Intact species-poor hedgerow	200	2	2	No
H3	Defunct species-poor hedgerow with standard trees	120	5	2.5	Yes (dry)
H4	Defunct species-poor hedgerow with standard trees	45	3	1	Yes (dry)
H5	Defunct species-poor hedgerow with standard trees	205	5	2.5	Yes (wet)
H6	Intact species-poor hedgerow	50	3	2	Yes (wet)



Hedge No.	Classification	Length (m)	Height (m)	Width (m)	Ditch Along ½ Length
H7	Defunct species-rich hedgerow with standard trees	830	4	5	Yes (wet)
H8	Defunct species-poor hedgerow with standard trees	375	5	2.5	Yes (dry)
H9	Defunct species-rich hedgerow with standard trees	275	4	2	Yes (wet)
H10	Defunct species-rich hedgerow with standard trees	260	4	2	Yes (wet)
H11	Defunct species-poor hedgerow with standard trees	345	5	2.5	Yes (wet)
H12	Defunct species-rich hedgerow with standard trees	380	2	2	Yes (wet)
H14	Defunct species-poor hedgerow with standard trees	350	1.5	1.5	Yes (wet)
H15	Defunct species-poor hedgerow with standard trees	250	2.5	1.5	Yes (wet)
H16	Intact species-poor hedgerow	330	1.5	1	Yes (wet)
H17	Defunct species-poor hedgerow with standard trees	55	3	2	No
H18	Defunct species-poor hedgerow with standard trees	410	5	2	Yes (wet)
H19	Defunct species-poor hedgerow with standard trees	235	1	1	No
H20	Intact species-poor hedgerow	50	3	2	Yes (dry)
H21	Defunct species-poor hedgerow with standard trees	160	4	2.5	Yes (wet)
H22	Intact species-poor hedgerow	145	1.5	1.5	No
H23	Intact species-poor hedgerow	75	4	3	No
H24	Intact species-poor hedgerow	45	3	3	Yes (wet)
H25	Defunct species-poor hedgerow with standard trees	45	4	3	No
H26	Intact species-poor hedgerow	85	2.5	2.5	Yes (wet)
H27	Defunct species-poor hedgerow with standard trees	175	3	5	Yes (wet)
H28	Intact species-rich hedgerow with standard trees	305	10	7	No

2.5.17 In summary, of the 28 hedgerows surveyed, 8 were intact, 5 were species-rich and 16 had trees present. Only one of the hedgerows possessed all three of these attributes. Some of the hedgerows were very gappy and defunct.

2.5.18 As a general rule, the hedgerows running alongside flowing water supported the greatest range of woody species and also mature trees. The range of woody species recorded along with an estimated overall relative abundance is shown in Table 4 below.

Table 4: Woody species recorded in hedgerows

Common Name	Scientific Name	Estimated Abundance (DAFOR Scale)
Ash	<i>Fraxinus excelsior</i>	Occasional
Beech	<i>Fagus sylvatica</i>	Rare



Common Name	Scientific Name	Estimated Abundance (DAFOR Scale)
Blackthorn	Prunus spinosa,	Abundant
Crab apple	Malus sylvestris	Occasional
Dog rose	Rosa canina	Abundant
Dogwood	Cornus sanguinea	Occasional
Elder	Sambucus nigra	Abundant
English elm	Ulmus procera	Rare
English Oak	Quercus robur	Occasional
Field maple	Acer campestre	Abundant
Hawthorn	Crataegus monogyna	Frequent
Hazel	Corylus avellana	Abundant
Holly	Ilex aquifolium	Rare
Spindle	Euonymus europea	Rare
Wayfaring tree	Viburnum lantana	Rare
Wild privet	Ligustrum vulgare	Rare

2.5.19 A number of mature oak and ash trees were identified within the hedgerow network, which are important ecological features. These varied in age with some being very large. The trees are likely to offer valuable habitat for a range of fauna such as birds and bats as well as fungi and lichen.

Evaluation

2.5.20 These habitats offer high ecological value in their own right as they are long established historic features, of which some are species-rich. As such, they are likely to support a range of wildlife including nesting and foraging birds, dormouse, foraging and commuting bats, reptiles and a range of invertebrate species. These important wildlife corridors provide connectivity within the Site and to the wider landscape. Whilst the quality of the individual hedgerows varied, the overall evaluation is considered to be of **Local** importance.

Woodland (Off Site)

Desk Study Information

2.5.21 Ancient Woodland is listed as an Essex local BAP habitat. Lowland Mixed Deciduous Woodland also constitutes a Habitat of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC Act).

2.5.22 Oxlip, a local BAP species, was recorded in Battle's Wood in 2011 by Essex Wildlife Trust.

Field Survey Results

2.5.23 Five areas of broadleaved woodland are located immediately adjacent the red line boundary. Battle's Wood LWS is designated as an ancient woodland and listed in the National Forest Inventory Woodland GB 2018. The woodland located to the north of Field 6 and to the south of Field 8 is also listed in the National Forest Inventory Woodland GB 2018 as broadleaved woodland.



- 2.5.24 Battle's Wood LWS is approximately 10ha in size. Description of the woodland is provided in Table 1. Bramble understorey was established within the woodland.



Photo 5: Track from Field 4 towards Battle's Wood LWS

- 2.5.25 Other areas of woodland bordering the Site were all more open with younger trees. Species recorded included ash, hazel, oak beech, poplar, holly and coniferous species. Ground flora species included lord and ladies with bluebell recorded in the woodland between Field 6 and 8 (listed in the National Forest Inventory Woodland GB 2018). The woodland to the north of Field 8 was not accessible at the time of the survey.
- 2.5.26 A pheasant pen and corvid traps were noted within the woodland located between Fields 6 and 8.

Evaluation

- 2.5.27 This habitat establishes over a long period of time, is of high intrinsic importance and is likely to support a range of wildlife. At a landscape scale and given its classification as a priority habitat and a LWS for Battle's Wood, woodland is considered to be of **Local** level ecological importance.

Watercourses

Desk Study Information

- 2.5.28 Ponds are a Habitat of Principal Importance under Section 41 of the NERC Act 2006.

Field Survey Results

- 2.5.29 Ditches occurred along most of the field boundaries within the Site. Many of the ditches were wet. Many of the ditches were also shaded by hedgerow, possibly restricting the flora diversity, which was often dominated by common ruderals such as nettles.
- 2.5.30 A number of wet ditches were open ditch cutting through the centre of arable fields, as shown in Figure 5 and Photo 6 below.
- 2.5.31 Some of the ditches may be suitable to support otter and water vole and this is discussed in Section 2.6.
- 2.5.32 There are 12 ponds within 250m of the development Site. Their suitability to support great crested newt is discussed in Section 2.6.



Photo 6: Wet Ditch with Running Water Cutting Through Site Between Fields 5 and 6

Evaluation

- 2.5.33 The individual ditches are not of high ecological value, however, as an overall ecological feature these provide valuable ecological connectivity around some of the Site perimeter. The ditches are considered to be of **Local** Importance.

Dense and Scattered Scrub

Desk Study Information

- 2.5.34 N/A

Field Survey Results

- 2.5.35 A number of patches of dense bramble scrub were present around the Survey Area, although these were always small in extent.
- 2.5.36 Scattered elder and hawthorn scrub were also present along the ditch bordering Field 5 to the west and along the eastern boundary of Field 4.

Evaluation

- 2.5.37 Although relatively limited in extent, this habitat adds some diversity to the Survey Area. It is likely to provide some cover and foraging opportunities to a range of wildlife species, including birds, invertebrates and small mammals, which is discussed further in Section 2.6. The scrub habitat within the Site is considered to be of **Site** Importance.

Cable Route

Desk Study Information

- 2.5.38 The proposed cable route will be passing through Stocking Pelham Field Centre Local Wildlife Site (see Appendix C for LWS location) for approximately 330m.

Field Survey Results

- 2.5.39 The results of the Phase 1 Habitats Survey of the cable route are included in map form on Figure 5b.
- 2.5.40 The cable route starts at the west of Field 9 and runs through another bean crop arable field. The route then follows the line of a grassy track separating two arable fields and crosses a ditch at this location. The ditch was holding 10cm of water at the time of the survey in June 2021 and was heavily overgrown. The route then runs along the ditch through grassy field margins.
- 2.5.41 Within the Stocking Pelham Field Centre LWS, the route runs through dense and scattered scrub, broadleaved woodland and species-rich meadow grassland. This habitat has the potential to support

widespread reptiles such as slow-worm and grass snake. The scrub has the potential to support nesting birds.



Photo 7: Photographs Showing Heavily Overgrown Ditch (top left), Scrub Habitat (top right) and Species-rich Meadow (bottom)

Evaluation

2.5.42 The woodland, scrub, wet ditch and species-rich grassland are all of ecological value. The habitat along the cable route, in general, is considered to be of **Local** Importance.

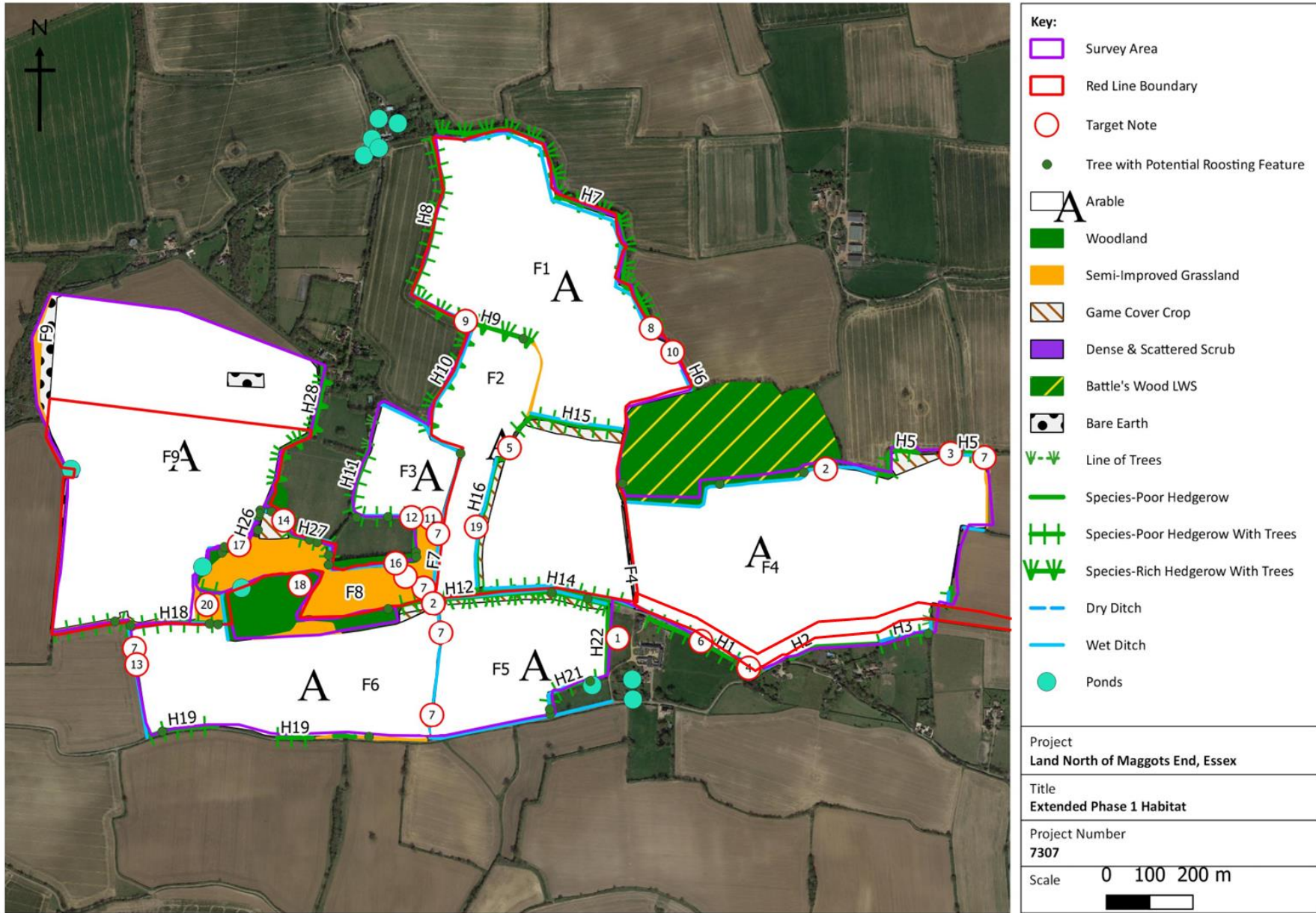


Figure 5: Extended Phase 1 Habitat Survey Map



Table 5: Target Notes

No.	Description
TN1	Wildflower meadow field (offsite)
TN2	Log pile with reptile/amphibian hibernation potential
TN3	New shrub planting with tree guards still in place
TN5	Possible roe deer droppings near wet ditch
TN15	Mammal path crossing wet ditch with deer footprints
TN17	Mature oak tree with remnant of a barn owl box
TN18	Rookery with at least 20 rook nests
TN20	Set aside in Field 9

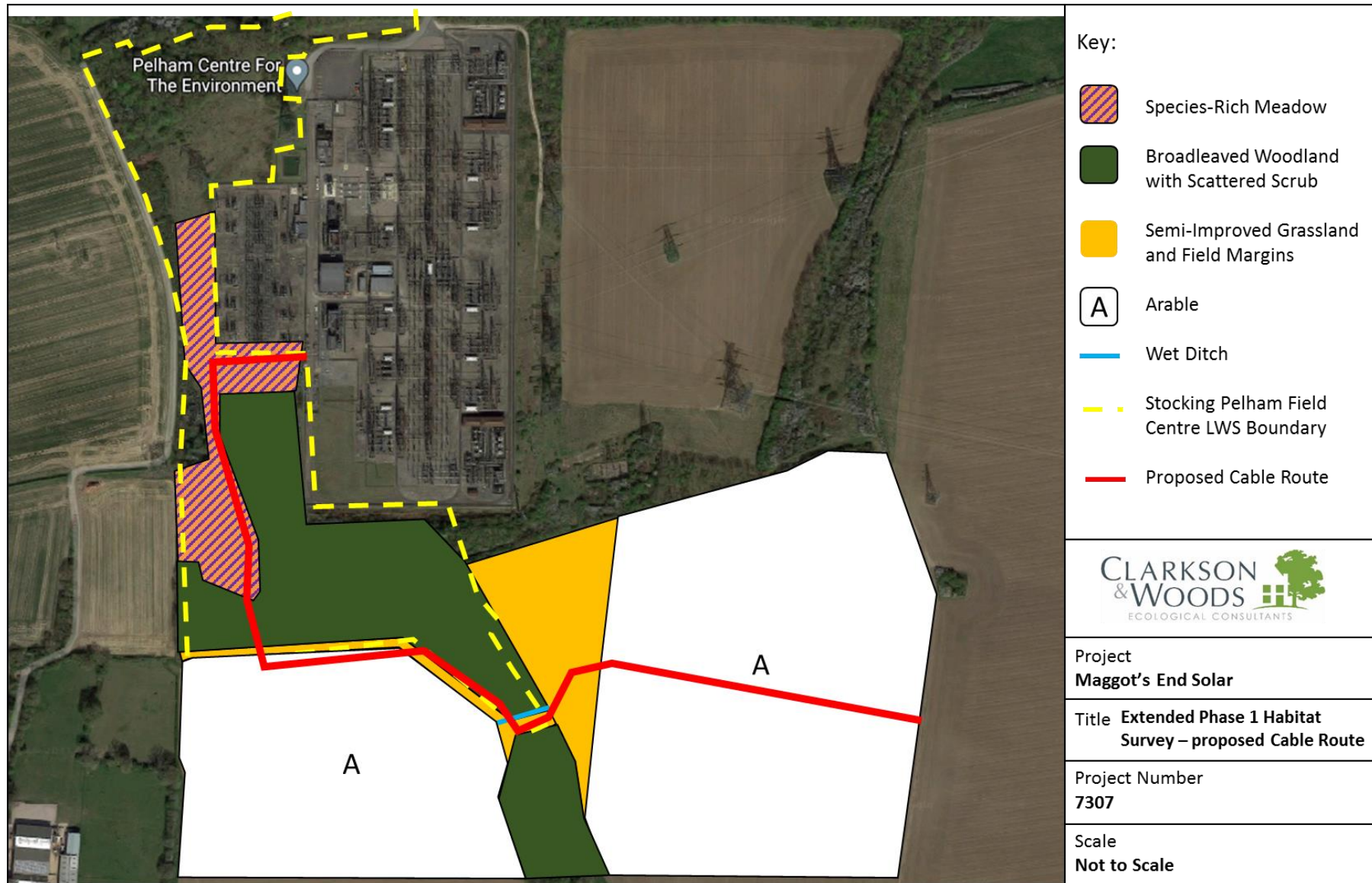


Figure 5b: Extended Phase 1 Habitat Survey Map – Proposed Cable Route



2.6 Protected Species Survey and Species of Conservation Concern

Badgers

Methodology

- 2.6.1 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. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying⁹. Sett entrances found were counted and mapped to record tunnel direction and their relative level of usage.
- 2.6.2 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

- 2.6.3 Areas with dense ground cover (hedgerows, scrub 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.

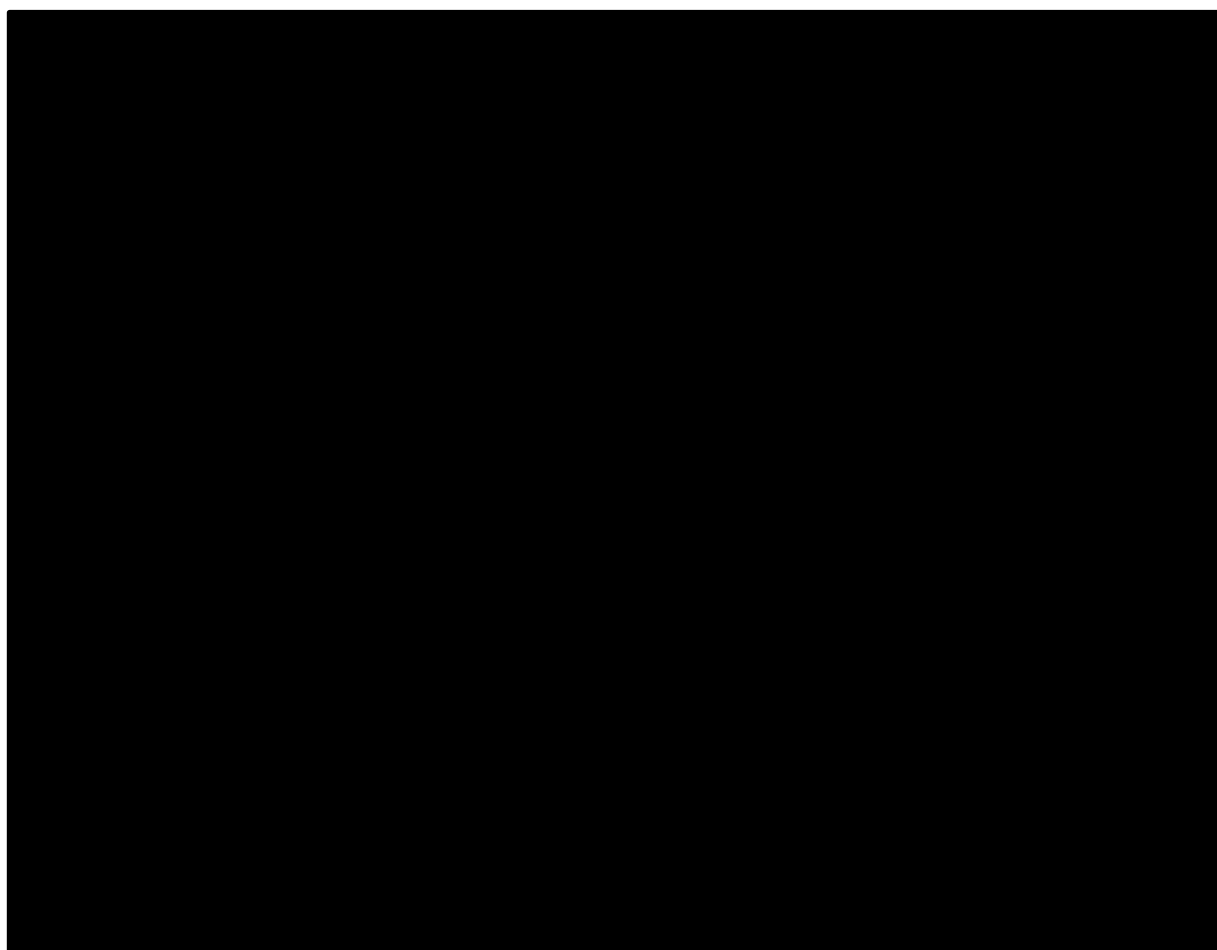
Desk Study Information

2.6.4

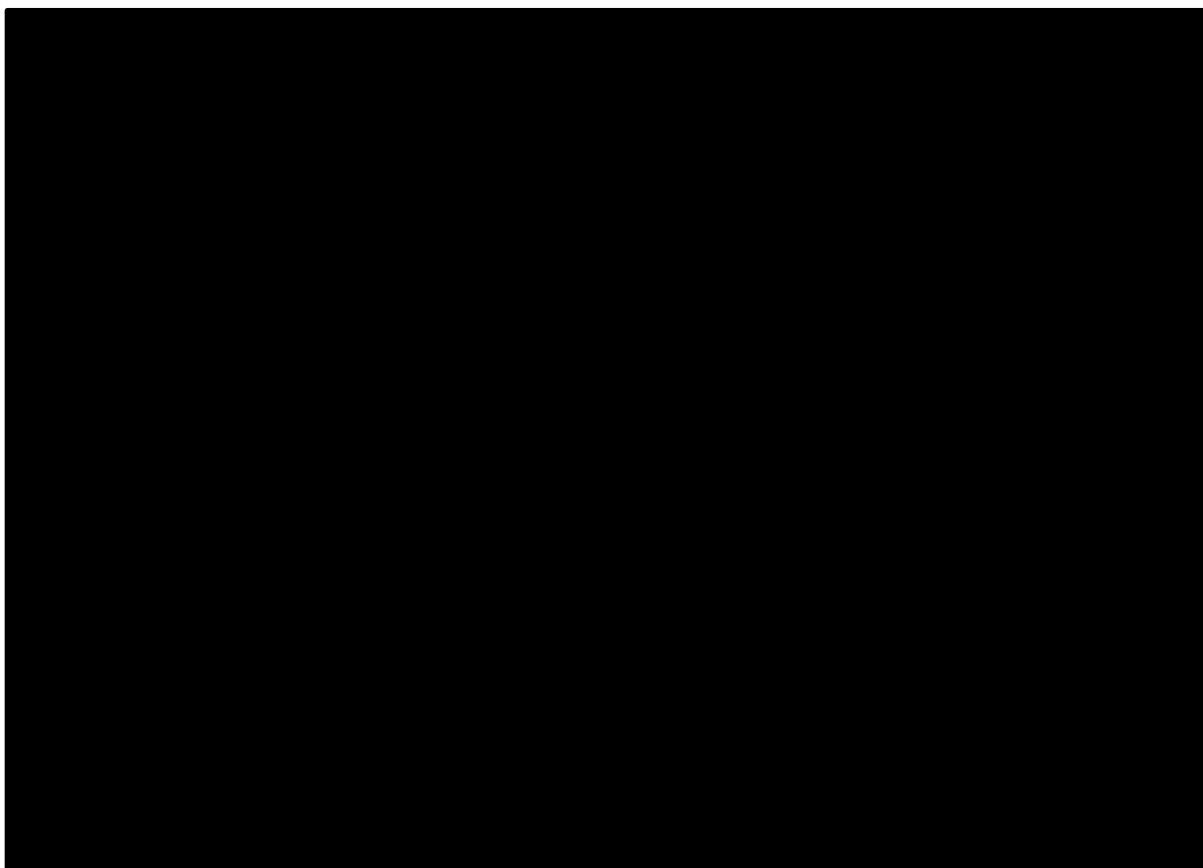


Field Survey Results

2.6.5



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)



2.6.6

2.6.7

Evaluation

2.6.8



Badgers on Site are considered to be of **Local** level importance.

Bats

Methodology

- 2.6.9 The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust¹⁰.
- 2.6.10 *Trees*: an inspection of trees on site was carried out from the ground, using binoculars, to record any signs of use of the tree by bat species. A ladder, powerful torch and a video fibrescope were available. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were inspected and 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.
- 2.6.11 *Habitat*: 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.

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.



Limitations

- 2.6.12 Bats are very small creatures, capable of roosting within extremely small spaces and it is possible that these animals, 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.
- 2.6.13 Trees were surveyed from the ground where accessible, but given the size of many of the trees on Site, a full inspection could not be carried out from ground level. Therefore, features may be missed which are obscured from view.

Desk Study Information

- 2.6.14 Common pipistrelle bats are designated as a priority species within the Essex BAP.
- 2.6.15 The data search returned the following species of bats recorded within 2km of the Site: Nathusius' pipistrelle *Pipistrellus nathusii*, Leisler's bat *Nyctalus leisleri*, Natterer's bat *Myotis nattereri*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared *Plecotus auritus* bats.
- 2.6.16 The EWTBRC data search returned the following bat roosts records within 1km of the Site: one brown long-eared roost recorded in March 2016 approximately 640m north of the Site, one brown long-eared and one common pipistrelle bat roosts recorded in July 2018 approximately 1.6km south-east of the Site and one brown long-eared roost recorded in December 2015 approximately 820m north of the Site.
- 2.6.17 The HERC data search returned the following bat roosts records, all located within 1km of the Site but with exact location unknown:
- 7 records of brown long-eared roosts between 1998 and 2013 including two maternity roosts, one recorded in July 1998 and one in August 1998,
 - 3 records of common pipistrelle roosts between 2010 and 2013,
 - 4 records of pipistrelle sp. roosts in summer 1998, and
 - 3 records of Natterer's bat roosts between 2010 and 2013.
- 2.6.18 One bat licence was identified using the MAGIC database:
- EPSM2010-2040 (01/08/2010 - 31/10/2011), allowing for the destruction of a resting place for brown long-eared, common pipistrelle and Natterer's bats. This was recorded approximately 1.1km to the south of the Site.

Field Survey Results

Habitat

- 2.6.19 The woodland, hedgerows and watercourses within and adjacent to the Site are likely to be utilised by local bat populations for foraging and commuting. The hedgerow network present at the Site is likely to provide important linear features for bats commuting through the local landscape. Similarly, these features are likely to support a range of common invertebrates, and therefore also provide a valuable foraging resource for bats.
- 2.6.20 However, the arable fields with narrow field margins offered little foraging opportunities for bats given the lack of diversity and intensive management.

Trees

- 2.6.21 A total of 37 mature trees were identified as having potential to support roosting bats and these are mapped on Figure 5. Species included mature ash, oak, sycamore and hawthorn trees. Potential Roosting Features (PRF) varied and were in the forms of woodpecker holes, dense ivy covers, knot holes and lifting bark. A complete assessment of the trees was not carried. All of the trees with PRF were located within the boundary habitat with the exception of one hawthorn mature tree located at the southern boundary of Field 2.
- 2.6.22 The nationally listed woodland between Field 6 and 8 as well as Battle's Wood LWS also comprised some trees with potential for roosting bats, whereas the other woodland areas bordering the Site seemed to offer negligible bat roosting potential.



Evaluation

- 2.6.23 The ecological importance of the Site for foraging and commuting bats is unknown but 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.

Otters and Water Voles

Methodology

- 2.6.24 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.
- 2.6.25 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 Handbook¹¹

Limitations

- 2.6.26 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.
- 2.6.27 High flow or heavy rain preceding the survey may have washed some evidence such as latrines. In addition, the water levels were high possibly obstructing burrows. All watercourses were surveyed, and every effort was made to survey thoroughly, however some supporting evidence could have been missed.

Desk Study Information

- 2.6.28 Otter and water vole are designated as priority species within the Essex BAP and under the NERC Act 2006.
- 2.6.29 The data search returned no records of otter within 1km of the Site and only one historic record of water vole dated 1987 (exact location unknown).

Field Survey Results

- 2.6.30 No field signs evidencing the presence of water voles nor otters were noted during the surveys. However, the ditches within the Site have potential to be used by these species, with suitable foraging and burrowing habitat present.

Evaluation

- 2.6.31 Due to the fact that no signs of these species were identified during the survey and that the data search returned no records for these species within 1km of the Site since 1987, the likelihood of water voles and/or otters being present within the Site is low but cannot be ruled out. In view of the quality of wet ditches network around the Site, if present, the Site is likely of **Local** level importance for water voles and/or otters.

Dormouse

Methodology

- 2.6.32 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 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. Where hazel *Corylus avellana* was recorded on site, a search for gnawed hazelnuts was conducted.

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.



Desk Study Information

- 2.6.33 Dormouse is designated as a priority species within the Essex BAP and UK BAP.
- 2.6.34 No dormice were identified within the HERC and EWTBRC data search. This species is known to be present in Essex although its distribution is thought to be more in central and eastern parts of the county.

Field Survey Results

- 2.6.35 The hedgerows on Site were habitats of potential value to dormice. The woodland areas also have the potential to support a population of dormice. The hedgerows surrounding the Site are well-connected offering potential for commuting dormice associated with nearby woodland to move through the Site. There is also potential for a small number of dormice to utilise the hedgerows and woodland throughout the year.

Evaluation

- 2.6.36 The suitability of habitats on-Site, availability of food sources and connectivity to the woodland areas and hedgerows all increase the potential for the Site to support dormouse. Dormice, if present on Site, are considered to be of **Local** Importance.

Great Crested Newts and Toads

Methods

Habitat Inspection

- 2.6.37 All waterbodies within 250m of the Site were identified using Ordnance Survey maps and aerial imagery. Waterbodies within the site ownership and on publically accessible land were assessed during the field survey for their suitability to support amphibian species where access was possible.
- 2.6.38 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.

Habitat Suitability Index (HSI) Assessment

- 2.6.39 Accessible ponds were assessed for their probability to support breeding GCN based on the Habitat Suitability Index (HSI) criteria set out by Oldham et al. (2000). The assessment methodology also followed the National Amphibian and Reptile Recording Scheme (NARRS) methodology (HCT, 2009). The assessment involved the measurement of ten different indices that indicate the general suitability of pond for breeding GCN, including water quality, shade, presence of fish or waterfowl, and quality of surrounding terrestrial habitat.
- 2.6.40 The pond suitability index categories are as follows; <0.5 – poor, 0.5-0.59 – below average, 0.6-0.69 - average, 0.7-0.79 – good, >0.8 – excellent.

GCN eDNA Survey

- 2.6.41 Suitable water bodies on accessible land were also subject to an environmental DNA (eDNA) survey in order to demonstrate the presence or likely absence of great crested newts in the pond. The eDNA kit was provided, and water samples analysed, by ADAS. Care was taken to strictly follow the field sampling protocol defined by Biggs et al. (2014) . Guidelines regarding the methodology and timescales described in Technical Advice Note WC0167 (Defra, Sept 2014) were strictly adhered to during the water sampling process.
- 2.6.42 This involved the collection of water samples which were subsequently posted to ADAS for eDNA analysis. Samples were collected on 15th April 2021 and 15th June 2021, which is within the sampling period for eDNA collection. Of the 12 ponds present within 250m of the Site boundary, ten were subject to eDNA surveys. The remaining two ponds were visited and found to be dry, and therefore samples could not be taken.

Limitations

- 2.6.43 Any very small off-site ponds that were not revealed by aerial imagery or Ordnance Survey mapping could have been overlooked.

Desk Study Information

- 2.6.44 Great crested newt is designated as a priority species within the Essex BAP and under the NERC Act 2006
- 2.6.45 Four ponds within 2km were found to contain great crested newt DNA after being tested within the Natural England great crested newt surveys for District Licensing in 2018. One pond was located approximately 100m south-east of the red line boundary of the Site and is referred as Pond 3 later in this report (see Figure 6 refers), one pond approximately 600m south-east, one pond approximately 275m north-east and one pond approximately 555m west.
- 2.6.46 One pond located approximately 400m south of the red line boundary was found to contain great crested newt DNA after being tested in April 2021.
- 2.6.47 No European Protected Species Mitigation Licence relating to great crested newts was found within 2km of the Site using the MAGIC database.
- 2.6.48 No great crested newts records were identified within the HERC and EWTBRC data search. One historic record of common toad was returned by HERC within 1km of the Site, dated 1970 and exact location unknown.

Field Survey Results

- 2.6.49 12 ponds were identified within 250m of the red line boundary, including three which were located directly adjacent or within the red line boundary of the Site (Pond 1, 2 and 12) as shown in Figure 6.

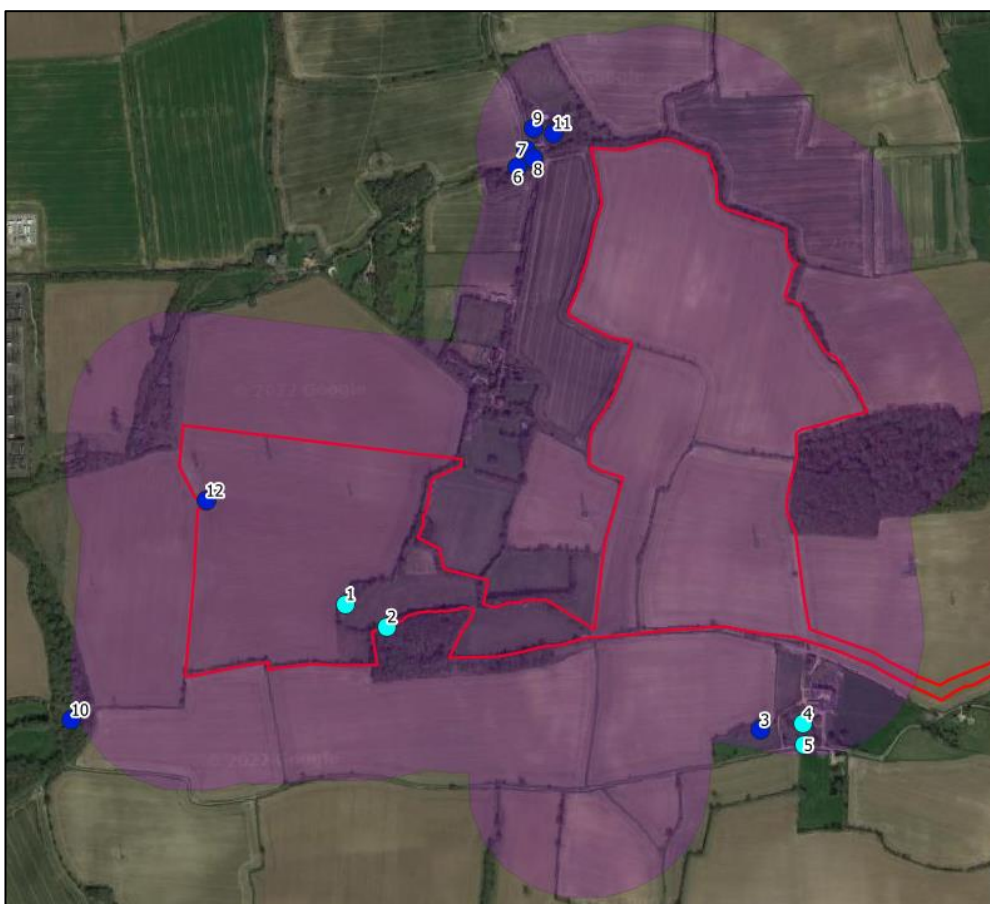


Figure 6: Ponds within 250m (250m buffer in light purple) of the Site Boundary (Ponds already surveyed for GCN in 2020 by Landscape Science Ltd are shown in light blue)




2020 Landscape Science Ltd. Surveys:

2.6.50 Three of these ponds were tested for GCN eDNA by Landscape Science Consultancy Ltd in April 2020. Samples collected from all ponds (Pond 1, 4 and 5) were negative for this species. A further pond (Pond 2) was dry at the time of this survey. As this was dry during the peak breeding season for newts, it is unlikely to be important for supporting a local population of newts should they be present.





2021 Clarkson and Woods Surveys:

2.6.51 Of the eight remaining ponds, one pond (Pond 6) was dry at the time of the survey in April 2021. As a result, seven eDNA surveys were conducted by Clarkson and Woods in 2021. The results of these surveys is outlined in Table 7 below, and a map showing the locations of the ponds is presented in Figure 7.





Table 7: Pond descriptions

Pond ID	Distance from Site	HSI Score	Photograph	eDNA Survey Result
Pond 1	Within red line	0.46 > Poor 2020 eDNA survey confirmed likely absence		Negative
Pond 2	Within red line	0.38 > Poor		Dry during breeding season
Pond 3	210m	0.78 > Good		Positive



Pond ID	Distance from Site	HSI Score	Photograph	eDNA Survey Result
Pond 4	175m	0.69 > Average 2020 eDNA survey confirmed likely absence		Negative
Pond 5	225m	0.74 > Good 2020 eDNA survey confirmed likely absence		Negative
Pond 6	165m	0.53 > Below Average		Dry during breeding season
Pond 7	140m	0.49 > Poor		Positive



Pond ID	Distance from Site	HSI Score	Photograph	eDNA Survey Result
Pond 8	130m	0.59 > Below Average		Positive
Pond 9	130m	0.57 > Below Average		Positive
Pond 10	265m	0.87 > Excellent		Negative
Pond 11	90m	0.71 > Good	Not available	Positive
Pond 12	Immediately adjacent red line	0.68 > Average		Negative

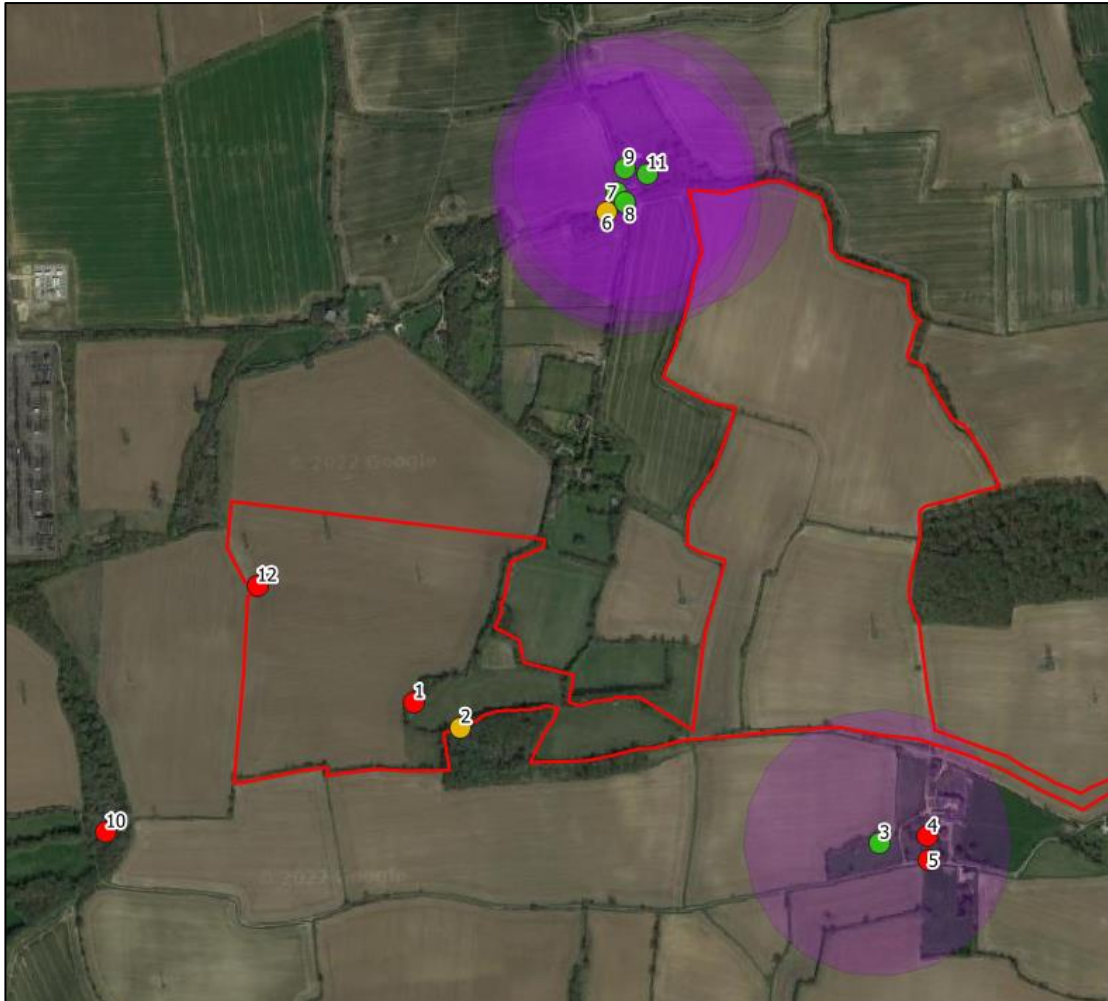


Figure 7: Great Crested Newt eDNA Survey Results. Green = Positive, Red = Negative, Yellow = Dry (Purple = 250m buffer from positive ponds)

- 2.6.52 The red line boundary contained grassland that is considered to be suboptimal to support a population of GCN or toads. The grassland structure was short and it is occasionally grazed, which offers limited opportunities for shelter and foraging amphibians, although the presence of slugs, snails and other invertebrates species may elevate the suitability of the Site to support foraging amphibians.
- 2.6.53 Whilst the majority of the Site is of low quality, the woodland/hedgerow bases and ditches may be used for shelter and commuting by GCN, toads and other widespread amphibians.

Evaluation

- 2.6.54 Given the close proximity of ponds which tested positive for great crested newt DNA, it is possible that great crested newts are present within the Site. However, individuals are likely to inhabit the boundary habitats such as the hedgerows and woodland which border the arable fields, as the arable fields are considered to offer sub-optimal habitat for this species. Nevertheless, individual newts may occasionally be present within the arable fields when dispersing.
- 2.6.55 Overall, the Site is considered to be of **Local** level Importance for great crested newts.

Reptiles

Methods

- 2.6.56 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

- 2.6.57 The weather was cool and cloudy and was not suitable for basking reptiles. Additionally, the survey was conducted right at the end of the active reptile season.

Desk Study Information

- 2.6.58 The data search returned no reptile records within 2km of the Site since 2010.

Field Survey Results

- 2.6.59 The hedgerows, woodland edges, ditches and narrow field margins offer some value for foraging and sheltering widespread reptile species, such as slow worm *Anguis fragilis* and grass snake *Natrix natrix*, with some potential sheltering features present (e.g. log piles - Target Note 2, Figure 5). However, the large arable fields, which comprise the majority of the Site, offered habitat of poor suitability for reptiles.

Evaluation

- 2.6.60 Should reptiles be present, they are likely to be in small numbers and confined to the field margins and boundary features of the Site. The Site is therefore considered likely to be of Site level importance for reptiles if present.

Birds

Methodology

Extended Phase 1 Habitats Survey

- 2.6.61 Vegetation around the Site was surveyed for signs of use by nesting birds and any birds seen or heard during the survey 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.

Wintering Bird Surveys

- 2.6.62 The Site (and wider Survey Area) was subject to a single wintering bird scoping survey. The purpose of this survey was to obtain baseline information on which bird species were using the Site during the winter and which habitats appeared to be of greatest value in terms of shelter and foraging.
- 2.6.63 The survey was carried out on the 4th and 5th February 2021 by Adèle Remazeilles GradCIEEM. Adèle is an experienced bird surveyor and has been assessed under the Clarkson and Woods QA processes as competent to complete the survey. Weather conditions during the survey were partly foggy, with scattered rain, approximately 5°C and still on the 4th and clear, dry, approximately 6°C with light breeze on the 5th.
- 2.6.64 The survey followed BTO guidelines, where the observer systematically walked through the Site, ensuring that all areas of the Site were visited to within 50m. The location and behaviour of all birds and flocks of birds seen were noted on large-scale survey maps, which were later collated onto master maps for interpretation.
- 2.6.65 To assist in the interpretation of data, the Site was divided into two survey zones of grouped habitats, with one zone comprising the field boundary habitat (i.e. hedgerows and woodland) and the other zone comprising the inner arable fields away from the boundaries. This separation of the Site's features allowed the relative usage of the Site's habitats by notable species or numbers of species to be assessed. Bird species flying over Site but not associated with the Site itself were also recorded.

Breeding Bird Surveys

- 2.6.66 On completion of the initial scoping breeding bird survey and Extended Phase 1 Habitat Survey undertaken in April 2021, the Site was considered suitable for a potentially noteworthy assemblage of breeding birds. As such, a full breeding bird survey was carried out between April and June 2021 by experienced bird surveyors. The purpose of the survey was to record all bird species within the Site, along with their behaviour, to assess their abundance and breeding status within the Site.



Survey Area

- 2.6.67 The Survey Area covered the area shown within the purple line boundary in Figure 1.
- 2.6.68 Bird sightings were separated into different habitat "Zones" as detailed below. The locations of birds recorded were categorised by which zone they occurred in and also whether they occurred in open field or on boundaries. This separation of the Site's features allowed the relative usage of the Site's habitats by notable species or numbers of species to be assessed.
- Boundary Habitats (Hedgerows, Woodland, Ditches and Trees)
Birds recorded within the hedgerows, woodland, ditches and trees bordering the fields (foraging and / or roosting). These species may forage within the margins of the fields, but are primarily associated with the hedgerows on Site.
 - Arable Habitats
Birds which were recorded within open arable fields (foraging).
 - Grassland Habitats
Birds which were recorded within the open areas of semi-improved grassland (foraging).
 - Flying Over
Birds flying overhead, considered to be using the Site for commuting.

Personnel

2.6.69 Surveys were undertaken by Mark Baker BSc MCIEEM (MB), Adèle Remazeilles MSc GradCIEEM (AR), Adrian Woodhall MCIEEM (AW), Mike Hockey BSc ACIEEM (MH) and Peter Dolton (PD). Mark, Adèle, Adrian, Mike and Peter are highly experienced bird surveyors able to identify all British species by sight and sound. All surveyors have been assessed under the Clarkson and Woods QA processes as competent to complete the surveys.

Survey Timings and Protocol

- 2.6.70 The Site was surveyed for breeding birds four times between April and June 2021, to identify which bird species were using the Site for breeding or exhibited territorial behaviour and which habitats appeared to be of greatest value.
- 2.6.71 Field 9 was added to the red line boundary in June and after the four breeding bird visits were already completed at the Site. Two breeding surveys of Field 9 were undertaken in June and these visits have been named Visits A and B. The Survey Area is therefore different for Visits 1 – 4 and Visits A and B.
- 2.6.72 The surveys were carried out on the following days, under the weather conditions described in Table 8 below.

Table 8: Dates and Weather Conditions during Breeding Bird Surveys

Survey Visit	Surveyor	Date	Description of weather: Precipitation; Cloud (Oktas); Wind (Beaufort Scale)	Temperature (°C)	Timings
1	MB	15/04/2021	Dry, Cloud 0-8, Wind 1	8 - 11	08:00 - 11:00
2	AR	10/05/2021	Drizzle towards the end of the survey, Cloud 4--8, Wind 3	12 - 14	08:00 - 11:00
3	AW	19/05/2021	Intermittent rain, Cloud 4, Wind 2	9 - 11	06:30 – 09:20
4	AR	03/06/2021	Dry, Cloud 5-2, Wind 1	17 - 21	06:45 – 09:45
A (Field 9)	MH	15/06/2021	Dry, Cloud 7-4, Wind 2	13 - 15	08:30 – 10:30
B (Field 9)	PD	25/06/2021	Occasional light rain, Cloud 5, Wind 0-1	12 - 13	05:45 – 09:45



2.6.73 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 which were later collated onto master maps for interpretation. 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.

Mapping

2.6.74 Each of the nine fields was divided up into arable habitats, grassland habitats and “boundaries” (comprising hedgerows, woodland and ditches) according to similar habitat characteristics to assist in the interpretation of data (see Table 10 & Figure 8). This separation of the Site’s features allowed the relative usage of the Site’s habitats by notable species or numbers of species to be assessed.

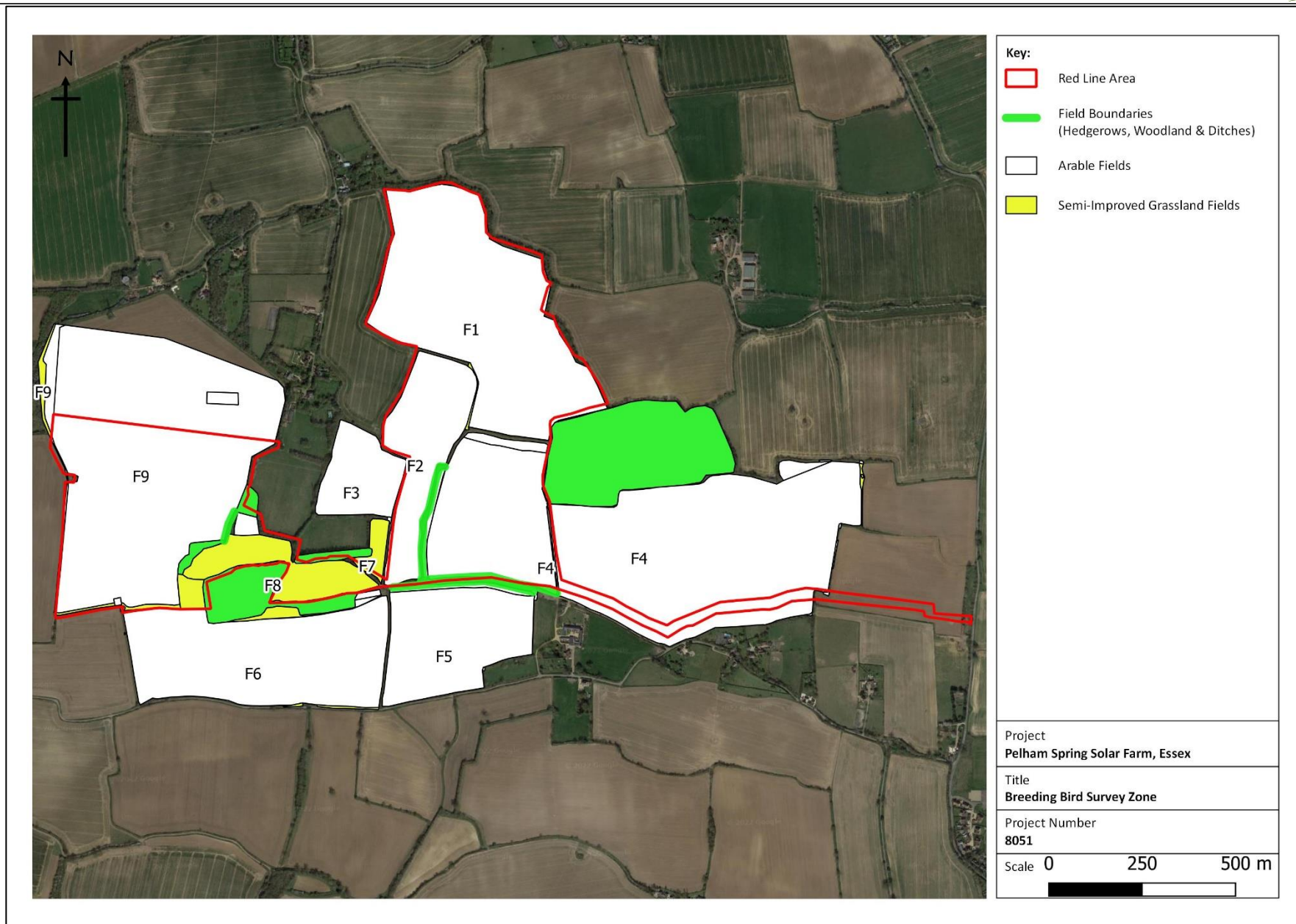


Figure 8: Map showing Habitat/Boundary Zones



Limitations

- 2.6.75 As Field 9 was added to the red line boundary in June 2021, it was not surveyed during the visits in the early part of the breeding bird season in May 2021. . Best efforts were made to cover this additional field during the breeding season and therefore two surveys of Field 9 were completed in June. Numerous individual birds and species was recorded during these two visits, and a good picture of breeding bird abundance and distribution were obtained, and therefore it is not considered to be significant limitation to this impact assessment.
- 2.6.76 For the same reason as above, the scoping wintering bird survey undertaken at the Site in February 2021 did not cover Field 9. However, Field 9 is an arable field, which is a habitat type largely covered by the scoping wintering bird Survey Area. It is likely the results of this survey would reflect what type of bird assemblage could be expected at Field 9.
- 2.6.77 Light rain was recorded intermittently during the survey on Visit 3 and B. 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.
- 2.6.78 Nocturnal bird surveys were not undertaken and as such the activity on Site of birds such as owls cannot be determined. In lieu of survey data, a judgement has been made based on the results of the data search and an assessment of the value of the habitats on site to such species.
- 2.6.79 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.

Desk Study Information

- 2.6.80 Skylark, grey partridge, song thrush and stone curlew are designated as priority species within the Essex BAP.
- 2.6.81 Table 9 details the species of wild bird of conservation concern that have been recorded within 2km of the Site (data provided by HERC and EWTBRC). The conservation status of the species based on 2015 population status data is detailed (see Key below). Species listed as 'Priority Species' are those listed as Species of Principal Importance under the Natural Environment and Rural Communities (NERC) Act 2006.

Table 9: High Status Bird Species Occurring Within 1km of the Site since 2009

Common name	Scientific name
Barn Owl 1	Tyto alba
Bullfinch	Pyrrhula pyrrhula
Common Gull	Larus canus
Dunnock	Prunella modularis
Eurasian Skylark	Alauda arvensis
Fieldfare 1	Turdus pilaris
Grey Partridge	Perdix perdix
Hawfinch	Coccothraustes coccothraustes
House Martin	Delichon urbicum
House Sparrow	Passer domesticus
Kestrel	Falco tinnunculus



Linnet	Linaria cannabina
Marsh Tit	Poecile palustris
Meadow Pipit	Anthus pratensis
Mistle Thrush	Turdus viscivorus
Red Kite 1	Milvus milvus
Reed Bunting	Emberiza schoeniclus
Song Thrush	Turdus philomelos
Spotted Flycatcher	Muscicapa striata
Starling	Sturnus vulgaris
Stock Dove	Columba oenas
Swallow	Hirundo rustica
Swift	Apus apus
Tawny Owl	Strix aluco
Turtle Dove	Streptopelia turtur
Willow Tit	Poecile montanus
Woodcock	Scolopax rusticola
Yellowhammer	Emberiza citrinella

Key:	
1	Listed under Schedule 1 species under the Wildlife and Countryside Act 1981 (as amended)
<i>Italic text</i>	UKBAP Priority Species and a Species of Principal Importance
UKBAP	UKBAP Priority Species but not a Species of Principal Importance
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

Field Survey Results

Extended Phase 1 Habitats Survey

2.6.82 The arable fields comprising the majority of the Site provide potentially suitable habitat for ground nesting birds, such as skylarks and meadow pipits. The land could also offer important foraging opportunities for a variety of farmland birds.



2.6.83 The woodland, trees and hedgerows around the Site are also likely to provide suitable nesting and foraging habitat for a range of species associated with these habitats, such as yellowhammer *Emberiza citrinella*, linnet *Linaria cannabina* and starling *Sturnus vulgaris*.

Wintering Bird Survey

2.6.84 In total, 33 bird species were recorded during the survey visits. 11 of these were BTO Birds of Conservation Concern red/amber listed¹², comprising 6 'red listed' species and 5 'amber listed' species, and 6 of these species were Species of Principal Importance (SPI)¹³. 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.

2.6.85 Table 10 shows the peak counts of each species recorded in each survey zone/boundary. This allows the relative usage of each survey zone and habitat type to be inferred. Table 10 should be read in conjunction with the colour scheme shown in Table 9 for highlighting the conservation status of bird species.

Table 10: Numbers of Each Species Recorded During Each Survey Visit

Common Name	Species Name	Habitat		Flying Over Site	Total
		Arable Field	Field Boundary		
Mallard	<i>Anas platyrhynchos</i>		2		2
Red legged partridge	<i>Alectoris rufa</i>		2		2
Pheasant	<i>Phasianus colchicus</i>		6		6
Buzzard	<i>Buteo buteo</i>			1	1
Woodpigeon	<i>Columba palumbus</i>	60			60
Great spotted woodpecker	<i>Dendrocopos major</i>		1		1
Green Woodpecker	<i>Picus viridis</i>		2		2
Kestrel	<i>Falco tinnunculus</i>		2		2
Jay	<i>Garrulus glandarius</i>		2		2
Jackdaw	<i>Corvus monedula</i>		70		70
Rook	<i>Corvus frugilegus</i>			3	3
Carrion crow	<i>Corvus corone</i>	3			3
Raven	<i>Corvus corax</i>		3		3
Coal tit	<i>Parus ater</i>		2		2
Blue tit	<i>Cyanistes caeruleus</i>		15		15
Great tit	<i>Parus major</i>		8		8
Skylark	<i>Alauda arvensis</i>	9			9
Long-tailed tit	<i>Aegithalos caudatus</i>		10		10
Goldcrest	<i>Regulus regulus</i>		2		2
Wren	<i>Troglodytes troglodytes</i>		4		4
Nuthatch	<i>Sitta europaea</i>		3		3
Blackbird	<i>Turdus merula</i>		8		8

¹² Red list species are those that are globally threatened, whose population or range has declined rapidly in recent years (i.e. >50% in 25 years), or which have declined historically and not recovered. Amber list species are those whose population or range has declined moderately in recent years (>25% but <50% in 25 years) declined historically but recovered recently, rare breeders (fewer than 300 pairs), internationally important populations in the UK, localised populations and those with an unfavourable conservation status in Europe.

¹³ Species of Principal Importance (SPI) are listed in section 41 of the Natural Environment and Rural Communities (NERC) Act 2006



Common Name	Species Name	Habitat		Flying Over Site	Total
		Arable Field	Field Boundary		
Fieldfare 1	Turdus pilaris		60		60
Redwing 1	Turdus iliacus		25		25
Song thrush	Turdus philomelos		7		7
Mistle thrush	Turdus viscivorus		1		1
Robin	Erithacus rubecula		7		7
Dunnock	Prunella modularis		9		9
Chaffinch	Fringilla coelebs		4		4
Bullfinch	Pyrrhula pyrrhula		1		1
Goldfinch	Carduelis carduelis		31	5	36
Reed bunting	Emberiza schoeniclus		1		1
Yellowhammer	Emberiza citrinella		9		9
Total Individuals		72	297	9	378
Number of Species		3	28	3	33

- 2.6.86 The boundary habitat (hedgerows, trees and woodland) were used by the greatest number of species all of which are commonly occurring resident and wintering farmland birds. The more mature hedgerows with trees supported the greater variety of species.
- 2.6.87 The arable land supported far fewer species, although included skylark individuals in each field (up to four individuals at the same time in one field). A flock of 60 woodpigeons was noted foraging on arable in Field 6.
- 2.6.88 Overall the wintering bird assemblage recorded was moderately diverse, comprising typical species of lowland arable farmland and was concentrated on boundary habitats.

Breeding Bird Surveys

Table 11: Numbers of Each Species Recorded During Each Survey Visit

Common Name	Latin Name	Visit						Total Species count	Breeding?
		1	2	3	4	A	B		
Blackbird	Turdus merula	5	4	3	5	0	6	23	Pr
Blackcap	Sylvia atricapilla	0	10	6	5	3	5	29	Pr
Black-headed Gull	Chroicocephalus	0	1	0	0	0	0	1	N
Blue tit	Cyanistes caeruleus	10	12	5	5	1	2	35	Pr
Buzzard	Buteo buteo	1	0	0	0	1	0	2	Po
Chaffinch	Fringilla coelebs	6	3	7	6	3	4	29	Pr
Chiffchaff	Phylloscopus collybita	3	2	3	5	0	2	15	Pr
Coal Tit	Parus ater	1	0	0	0	0	0	1	Po
Dunnock	Prunella modularis	5	4	2	2	1	4	18	Pr
Great Spotted Woodpecker	Dendrocopos major	0	0	0	1	0	1	2	Po



Common Name	Latin Name	Visit						Total Species count	Breeding?
		1	2	3	4	A	B		
Goldcrest	Regulus regulus	0	0	0	1	0	0	1	Po
Goldfinch	Carduelis carduelis	0	5	2	2	0	1	10	Pr
Great tit	Parus major	2	4	0	3	0	1	10	Pr
Greylag Goose	Anser anser	0	0	0	5	0	0	5	N
Jackdaw	Corvus monedula	3	63	0	0	0	0	66	Pr
Jay	Garrulus glandarius	0	1	0	0	0	2	3	N
Kestrel	Falco tinnunculus	2	1	0	1	0	1	5	Y
Lesser Whitethroat	Sylvia curruca	0	2	0	1	0	1	4	Po
Linnet	Carduelis cannabina	12	2	0	3	1	1	19	Pr
Long-tailed tit	Aegithalos caudatus	2	0	0	0	1	0	3	Pr
Mallard	Anas platyrhynchos	0	0	0	1	0	0	1	N
Mistle Thrush	Turdus viscivorus	0	0	0	0	1	0	1	N
Nuthatch	Sitta europaea	1	0	0	0	0	0	1	Po
Peregrine 1	Falco peregrinus	0	0	0	0	1	0	1	N
Pheasant	Phasianus colchicus	2	2	1	1	3	1	10	Pr
Raven	Corvus corax	0	1	0	0	1	0	2	N
Red Kite 1	Milvus milvus	1	1	1	1	0	0	4	N
Red Legged Partridge	Alectoris rufa	1	4	2	2	0	0	9	Pr
Reed Bunting	Tadorna tadorna	1	0	0	0	0	0	1	N
Robin	Emberiza schoeniclus	7	4	1	8	4	1	25	Pr
Rook	Corvus frugilegus	0	10	12	60	1	0	83	Y
Skylark	Alauda arvensis	10	13	17	21	8	6	75	Y
Song thrush	Turdus philomelos	1	5	3	4	1	2	16	Pr
Stock Dove	Columba oenas	0	0	0	4	0	1	5	N
Swallow	Hirundo rustica	0	1	0	0	0	0	1	N
Whitethroat	Sylvia communis	0	4	5	4	4	5	22	Pr
Wren	Troglodytes troglodytes	6	5	5	10	2	3	31	Pr
Yellow Wagtail	Motacilla flava	0	0	0	0	2	3	5	Po
Yellowhammer	Emberiza citrinella	68	16	3	13	3	2	105	Pr
Total Individuals		150	180	78	195	43	56	702	
Number of Species		22	26	17	27	20	23	40	

Note that wood pigeon and carrion crow were excluded from the survey. They were recorded as present on all visits but counts were not made.



Table 12: Numbers of Each Species Recorded During Each Survey Visit

Common Name	Flying Over	Boundary Habitats (Hedgerows, Ditches and Trees)	Arable Habitats	Grassland Habitats
Blackbird	0	20	3	0
Blackcap	0	29	0	0
Black-headed Gull	1	0	0	0
Blue tit	0	35	0	0
Buzzard	0	0	2	0
Chaffinch	0	29	0	0
Chiffchaff	0	15	0	0
Coal Tit	0	1	0	0
Dunnock	0	18	0	0
Great Spotted Woodpecker	0	2	0	0
Goldcrest	0	1	0	0
Goldfinch	0	10	0	0
Great tit	0	10	0	0
Greylag Goose	5	0	0	0
Jackdaw	0	10	56	0
Jay	0	3	0	0
Kestrel	1	4	0	0
Lesser Whitethroat	0	4	0	0
Linnet	0	19	0	0
Long-tailed tit	0	3	0	0
Mallard	0	1	0	0
Mistle Thrush	0	1	0	0
Nuthatch	0	1	0	0
Peregrine 1	0	0	1	0
Pheasant	0	9	1	0
Raven	0	2	0	0
Red Kite 1	0	0	4	0
Red Legged Partridge	0	7	2	0
Reed Bunting	0	1	0	0
Robin	0	25	0	0
Rook	0	83	0	0
Skylark	0	0	75	0



Common Name	Flying Over	Boundary Habitats (Hedgerows, Ditches and Trees)	Arable Habitats	Grassland Habitats
Song thrush	0	16	0	0
Stock Dove	0	5	0	0
Swallow	1	0	0	0
Whitethroat	0	22	0	0
Wren	0	31	0	0
Yellow Wagtail	0	0	5	0
Yellowhammer	0	73	30	2
Total Individuals	8	512	180	2
Number of Species	4	32	11	1

2.6.89 The results of the surveys are discussed below, taking into consideration the diversity of species recorded and each species' abundance; plus their spatial distribution within the Site and changes in use of the Site across the survey season. Individual species of conservation concern are then discussed separately in turn.

Species Diversity

2.6.90 In total, 41 bird species (including woodpigeon *Columba palumbus* and carrion crow *Corvus corone* which were not enumerated) were recorded during the survey visits. 13 of these were listed on the BTO's Birds of Conservation Concern red/amber lists¹⁴ or were Species of Principal Importance (SPI)¹⁵, comprising six 'red listed' birds and seven 'amber listed' birds. Seven species were listed as being SPI for nature conservation and as such are capable of being material considerations within the planning process. Skylark and song thrush are listed as local conservation priorities within the Essex Biodiversity Action Plan.

2.6.91 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.

Breeding Status

2.6.92 Of the 41 species recorded, it is considered that 23 species are either confirmed as breeding or that their breeding is probable within the Site. Seven species could possibly breed within the Site, whilst a further 11 species are unlikely to be breeding.

Temporal Changes

2.6.93 The highest number of individual birds recorded was greatest in Visit 4 (early June): 195, with the least number recorded in Visit 3 (late May): 78 and intermediate numbers counted in Visits 1 and 2.

2.6.94 For the surveys conducted of Field 9, Visit B recorded a greater number of birds than Visit A.

2.6.95 Over the course of the surveys, the overall level of usage of the Site changed as young fledged and began to move around. Most notably, the skylark numbers increased significantly with only small numbers

¹⁴ Red list species are those that are globally threatened, whose population or range has declined rapidly in recent years (i.e. >50% in 25 years), or which have declined historically and not recovered. Amber list species are those whose population or range has declined moderately in recent years (>25% but <50% in 25 years) declined historically but recovered recently, rare breeders (fewer than 300 pairs), internationally important populations in the UK, localised populations and those with an unfavourable conservation status in Europe.

¹⁵ Species of Principal Importance (SPI) are listed in section 41 of the Natural Environment and Rural Communities (NERC) Act 2006



found in mid-April (10 individuals), increasing to 21 sightings of individuals seen in early June. This is likely a reflection of territories breaking down and young moving around through the Site (some individuals may have been double counted).

- 2.6.96 Several species were recorded only on one or two occasions. Two species were only recorded at Field 9 during Visit A and B (peregrine, mistle thrush and yellow wagtail). The overall number of species recorded within the Site during each visit varied by 10 as a maximum (27 species in Visit 4 and 17 species in Visit 3) with an average of 22.5 species recorded across all visits.

Spatial / Habitat Distribution

- 2.6.97 Table 12 above shows the counts for each bird species within different main habitats across the Site.

Flying Over

- 2.6.98 A small number of notable species such as greylag goose were only observed commuting across the Site but are unlikely to have been using the Site for roosting and / or foraging.

Boundary Habitats (Hedgerows, Woodland, Ditches and Trees)

- 2.6.99 The greatest number of different species were associated with the boundary hedgerows, ditches and woodland (32 species). This included a range of resident and summer migrant species of which at least 23 were confirmed or probably breeding. The distribution of birds within the hedgerow boundaries was relatively well spread across the survey area, however the hedgerows adjacent to watercourses and broadleaved woodland seemed to support the greatest variety of birds. This is likely to be due to the age, height, structural diversity, woody species diversity and presence of mature trees providing a higher range of food and nesting resources.

Arable Habitats

- 2.6.100 The arable land in general was relatively poorly used by birds, particularly when taking into account its large land area. It did provide large areas potentially suitable for breeding by species typical of open ground such as skylark and potentially yellow wagtail. These species are discussed in greater detail in Section 5.7. Buzzard, jackdaw and yellowhammer were also recorded using arable fields as foraging ground.

Grassland Habitats

- 2.6.101 No bird species seemed to be particularly associated with the grassland habitat at the Site with only two foraging individuals yellowhammer recorded on Visit 1.

Birds of Conservation Concern – Red-listed Species

Skylark

- 2.6.102 The skylark is a species mainly associated with arable habitats, grassland and moorland in the UK. They nest on or close to the ground in vegetation 20-50cm high and are often associated with spring sown cereal crops, which provide the right vegetation height for them. They need to have 2-3 broods per year to maintain their population levels. Territory size varies between 0.25 – 2ha depending on the suitability of the vegetation and birds may change their territory location over the breeding season if the vegetation gets too tall or is cut/harvested.
- 2.6.103 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 the NERC Act (2006) and is listed under the Essex Local BAP.
- 2.6.104 Skylark were recorded on each visit, entirely on arable habitats at the Site. The number of skylark territories on Site increased over the survey period with only small number (10) seen during the first survey, but increasing to 21 territories in early June, Visit 4. Six to eight skylark individuals were observed on Field 9 alone in mid and late June (Visit A and B). The skylark territories within the Site are likely to be very fluid through the year and also between years, depending on the crops planted and management of adjacent fields.

2.6.105 The Site supports a moderate population of skylark and surveys indicate this is around 17 breeding territories. Figure 9 provides a distribution map of skylark found during the survey. For the purpose of assessing the number of likely breeding territories, only singing males (or individuals showing any other signs of breeding behaviour) were mapped on Figure 9.



Figure 9: Skylark Results and Territory Mapping

Yellow wagtail

2.6.106 The yellow wagtail is a migratory bird which winters in West Africa. It is found in wet meadows, grazing marshes and river valleys but more recently is found in arable fields. The nest is built on bare ground in large arable fields away from boundary habitats and as with skylark and lapwing, this species requires unbroken sightlines to spot predators. Nesting territories are in low densities.

2.6.107 There has been dramatic decreases in yellow wagtail populations with numbers falling by 80% in the UK since the 1970s. The species is a red listed Species of Conservation Concern and is also a Species of Principal Importance under the NERC Act (2006).

2.6.108 Yellow wagtail were exclusively recorded on Field 9 during Visit A and B and entirely on arable habitat with 2-3 individuals (including singing males) per visit. It is likely that Field 9 holds at least one breeding territory.

Yellowhammer

2.6.109 Yellowhammers occur on farmland and moorland where there are open areas of grassland, heathland or arable crops, but with perching areas provided by trees or tall scrub. They nest on or close to the ground in ditch vegetation or at the base of short, thick hedgerows and scrub. They are most commonly found in hedgerows that have a wide, uncut grass margin or ditch.

2.6.110 UK yellowhammer populations have declined rapidly in the recent past with the loss of uncultivated field margins, intensive agriculture and the decline in winter food sources such as winter stubble. As a result yellowhammers are designated as Red Species of Conservation Concern and Species of Principal Importance.



2.6.111 Yellowhammers were recorded on all visits in relatively high numbers. These were primarily associated with boundary habitats although 30 individuals were also recorded foraging on arable and two individuals on grassland. Woodland and hedgerows at the Site offer suitable nesting habitat and appear to support relatively high numbers of breeding yellowhammer, with a peak count of 68 recorded during Visit 1.

Linnet

2.6.112 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.

2.6.113 Linnet numbers have dropped substantially over the past few decades, with the UK population estimated to have declined by 57% 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.

2.6.114 Linnet were recorded on each survey visit with the exception of Visit 3 with a peak count of 12 individuals recorded during Visit 1. These were entirely recorded on boundary habitats. It is likely that the Site support a small linnet population.

Song thrush

2.6.115 The song thrush is associated with thick hedgerows, native woodland, damp ground, and grazed pasture. The bulk of the song thrush diet is earthworms and snails, particularly when insect larvae and berry crops are not available. Therefore, damp ground where these food sources are readily found is essential.

2.6.116 The UK song thrush population fell by 50% between 1970 and 2003. Loss of damp food-rich habitats, particularly in the summer, is thought to be the main cause of the decline on farmland. Song thrush is a red listed bird of conservation concern, a Species of Principal Importance and are listed under the Essex Local BAP.

2.6.117 Song thrush were recorded on all visits in low numbers, with a peak count of 5 individuals during Visit 2. They were exclusively recorded in boundary habitat and were recorded in bordering broadleaved woodland. This species holds large territories and the Site is likely to support a small breeding population.

Amber-listed Species

Dunnock

2.6.118 Dunnock inhabit any well-vegetated areas with scrub, brambles and hedges, including field edges, earning their moniker "hedge sparrow". 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 an SPI.

2.6.119 Dunnock were recorded in low numbers on all visits, with a peak count of 5 during Visit 1. They were observed exclusively in hedgerow and woodland habitat. This species is present all year round and the Site is likely to support a small breeding population.

Kestrel

2.6.120 Kestrels are found in a variety of habitats and are widespread, preying on small mammals and birds as well as invertebrates and worms. They have declined since the 1970s and it is thought that this decline is related to changes in farming practices.

2.6.121 This species was observed in four of the six survey visits flying over or on a tree at the boundary habitat. This species is likely utilising the open semi-improved grassland habitat for hunting. Young were heard calling during Visit B towards the west of Field 9 and the boundary habitat is likely to hold at least one kestrel nest.

Other Birds of Conservation Concern

2.6.122 Individuals or small numbers of each of mistle thrush (red-listed species) as well as stock dove, greylag goose, black-headed gull, mallard and reed bunting (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.

2.6.123 Although generally narrow across the Site, the grassland margins together with the woodland and hedgerows at the field boundaries offer potential foraging grounds and perching/nesting sites for nocturnal bird species such as barn owl and tawny owl. As such, these species are likely to use the Site, although the large arable fields provide suboptimal habitat.

2.6.124 Other records of interests included a rookery of at least 20 rook nests (TN 18 refers). In addition, a female mandarin duck *Aix galericulata* and two young were seen on Pond 10 on Visit B.

Evaluation

2.6.125 The Site supported a good assemblage of birds with 41 species, which are typical of farmland incorporating arable crops and hedgerows. The notable birds utilising the Site can be split into two categories: those which were recorded predominantly within open habitats and those recorded foraging predominantly in boundary habitats. These are summarised in Table 13 below.

Table 13: Summary of Notable Birds in Open and Boundary Habitats

Notable Birds Recorded within Open Habitats (Arable and Grassland)	Notable Birds Recorded within Boundary Habitat (Hedgerows, Woodland, Ditches and Trees)
Skylark	Yellowhammer
Yellow Wagtail	Linnet
Yellowhammer	Song Thrush
	Dunnock
	Kestrel
	Stock Dove

2.6.126 Most of the species are strongly associated with the hedgerows and woodland present around the field boundaries, but not the open arable fields. The Site appears to support low to moderate breeding populations of red and amber listed species and the importance of the Site to these birds was considered to be of **Local Importance**.

2.6.127 Of farmland bird species that are more dependent on open areas such as arable land for foraging and nesting, skylark showed a persistent association with the Site. These are red-listed species of conservation concern and Species of Principal Importance and Essex BAP priority species. Around 17 skylark territories were recorded within the open habitats and the breeding populations of these species at the Site are considered to be of **Local Importance**.

Invertebrates

Methods

2.6.128 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

2.6.129 The initial Extended Phase 1 Habitat Survey was undertaken in February 2021 when many invertebrates are less easily recorded. An assessment of the habitats was made and the habitats present within the Site were considered unlikely to support notable assemblages of invertebrates. Further visits to Site were undertaken during spring and summer within 2021 and any casual records of notable species would have flagged any requirement for more detailed invertebrate surveys.

Desk Study Information

2.6.130 Shrill carder bee, hornet robber fly, stag beetle and scarlet malachite beetle are designated as priority species within the Essex BAP.



2.6.131 No records of invertebrates were returned by the data search since 2010. Historical records between 1894 and 2005 were provided and included the following UK BAP and/or Local BAP species within 1km of the Site:

Common Name	Scientific Name	Common Name	Scientific Name
August Thorn	<i>Ennomos auercinaria</i>	Lackey	<i>Malacosoma neustria</i>
Beaded Chestnut	<i>Aarochola lychnidis</i>	Large Nutmeg	<i>Anamea anceps</i>
Bordered Gothic	<i>Sideridis reticulata</i>	Large Wainscot	<i>Rhizedra lutosa</i>
Brindled Beauty	<i>Lydia hirtaria</i>	Latticed Heath	<i>Chiasmia clathrata</i>
Broom Moth	<i>Ceramica pisi</i>	Marsh Fritillary	<i>Euphydryas aurinia</i>
Brown-spot Pinion	<i>Aarochola litura</i>	Minor Shoulder-knot	<i>Brachylomia viminalis</i>
Buff Ermine	<i>Spilosoma lutea</i>	Mottled Rustic	<i>Caradrina morpheus</i>
Centre-barred Sallow	<i>Atethmia centrarea</i>	Mouse Moth	<i>Amphipoea tragopoginis</i>
Cinnabar	<i>Tyria jacobaeae</i>	Narrow-bordered Bee Hawk	<i>Hemaris tityus</i>
Crescent	<i>Helotropha leucostigma</i>	Oak Hook-tip	<i>Watsonalla binaria</i>
Dark Brocade	<i>Mniotrope adusta</i>	Pale Faar	<i>Trichiura crataegi</i>
Dark Spinach	<i>Peluraea comitata</i>	Pale Shining Brown	<i>Polia bombycina</i>
Dark-barred Twin-spot Carpet	<i>Xanthorhoe ferrugata</i>	Powdered Quaker	<i>Orthosia arcuata</i>
Deep-brown Dart	<i>Anorophya luteola</i>	Pretty Chalk Carpet	<i>Melanthia procellata</i>
Dinav Skipper	<i>Frynia tages</i>	Rosy Rustic	<i>Hydraecia micacea</i>
Dot Moth	<i>Melanchna persicariae</i>	Rustic	<i>Hoplodrina blanda</i>
Double Dart	<i>Graphiphora aurum</i>	Sallow	<i>Cirrhia icteritia</i>
Dusky Brocade	<i>Anamea remissa</i>	September Thorn	<i>Ennomos erosaria</i>
Dusky Thorn	<i>Ennomos fuscantaria</i>	Shaded Broad-bar	<i>Scototroch</i>
Dusky-lemon Sallow	<i>Cirrhia gilvaea</i>	Shoulder-striped Wainscot	<i>Leucania comma</i>
Ear Moth	<i>Amphipoea oculata</i>	Small Emerald	<i>Hemistola chrysoprasaria</i>
Feathered Gothic	<i>Tholera decimalis</i>	Small Phoenix	<i>Ecliptopera silaceata</i>
Figure of Eight	<i>Diloba caeruleocephala</i>	Small Square-spot	<i>Diersia rubi</i>
Four-spotted	<i>Tyta luctuosa</i>	Spinach	<i>Eulithis mellinata</i>
Garden Dart	<i>Fuxia nigrifrons</i>	Sprawler	<i>Asteroscopus sphinx</i>
Garden Tiger	<i>Arctia caia</i>	Stag Beetle	<i>Lucanus cervus</i>
Ghost Moth	<i>Heptamelus humuli</i>	Streak	<i>Chesias leucostella</i>
Goat Moth	<i>Cossus cossus</i>	V-Moth	<i>Macaria wauraria</i>
Green-brindled Crescent	<i>Allophyes oxycanthae</i>	Wall	<i>Lasiommata megera</i>
Grey Dagger	<i>Acronicta psi</i>	White Admiral	<i>Limenitis camilla</i>
Grizzled Skipper	<i>Pieris malvae</i>	White Ermine	<i>Spilosoma lubricipeda</i>
Heart Moth	<i>Dicyncla oo</i>	White-letter Hairstreak	<i>Satyrus w-album</i>
High Brown Fritillary	<i>Argynnis adippe</i>	Wood White	<i>Leptidea sinapis</i>
Knot Grass	<i>Acronicta rumicis</i>		

Field Survey Results

2.6.132 The mosaic of woodland, hedgerow, ditches and grassland margins were suitable for a range of widespread invertebrate species. However, the arable land comprising the majority of the Survey Area is of limited value for invertebrate assemblages, particularly pollinating insects.

2.6.133 Spring and summer surveys at the Site recorded the following species: small tortoiseshell *Aglais urticae*, meadow brown *Maniola jurtina*, painted lady *Vanessa cardui*, carder bee *Bombus pascuorum*, small heath *Coenonympha pamphilus*, large white *Pieris brassicae*, red-tailed bumblebee *Bombus lapidarius*, white-tailed bumblebee *Bombus lucorum* and small white *Pieris rapae*.

2.6.134 Small heath butterfly is a Species of Principal Importance and was recorded in good numbers in April 2021 in Fields 7 and 8 (semi-improved grassland).



2.6.135 When the semi-improved grassland fields on Site are used as horse pasture, moth, dung beetles and flies may be present as associated with horse grazing, which could provide foraging opportunities for other species such as bats.

Evaluation

2.6.136 Invertebrates are considered to be of **Site** importance

Other Protected Species and Species of Conservation Concern

Methods

2.6.137 Field signs indicating the presence of other species of conservation concern, such as hares *Lepus europaeus*, harvest mice *Micromys minutus* and hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act 2006) were noted where found. Habitats were also assessed for their potential to support such species.

2.6.138 Invasive species, such as Japanese knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera* were searched for and recorded where found.

Limitations

2.6.139 The initial Phase 1 survey was conducted late in the season for many flowering plants and some species of plant such as Himalayan balsam may not be visible and would not have been recorded. However, further visits to Site were undertaken during spring and summer within 2021.

Desk Study Information

2.6.140 Brown hare is designated as a priority species within the Essex BAP and under the NERC Act 2006.

2.6.141 One record of hedgehog was returned by EWTBRC in 2017 approximately 1.4km south-east of the Site. No records of other protected species and species of conservation concern were returned by HERC since 2010 within 1km of the Site.

Field Survey Results

2.6.142 Hedgehogs may be present at the Site, particularly given the woodland edges, scrub and hedgerow habitats, which provide good foraging, nesting and sheltering habitat. However, the arable fields themselves would be of low value for hedgehogs.

2.6.143 No invasive species were recorded within the Site.

2.6.144 Brown hares were frequently observed throughout the Site during surveys. The mosaic of woodland edges, arable fields and hedgerows likely support a small population of brown hares, in conjunction with the surrounding rural landscape.

2.6.145 Numerous rabbit warrens were recorded within the hedgerow network. Four muntjac deers *Muntiacus reevesi* were seen entering Battle's Wood LWS during the initial survey. Possible roe deer *Capreolus capreolus* droppings were also recorded near a wet ditch (Target Note 5, Figure 5).

Evaluation

2.6.146 The Site is considered to be of **Local** value for brown hares and of **Site** value for other notable species.



2.7 Summary of Ecological Importance

2.7.1 Table 14 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 in Section 5. Those coloured yellow will be included on the basis of their specific legal protection or applicable planning policies.

Table 14: Ecological Importance

Feature	Importance
Designated Sites	
Battle's Wood LWS Park Green LWS Pelham Centre Meadow LWS Stocking Pelham Field Centre LWS	Local
Habitats	
Arable	Site
Semi-Improved Grassland	Site
Hedgerows	Local
Woodland (Off Site)	Local
Watercourses	Local
Dense and Scattered Scrub	Site
Species	
Badgers	Local
Bats (roosting, foraging and commuting)	Local
Otters and Water Voles	Likely to be Local if present
Dormouse	Likely to be Local if present
Great Crested Newts	Local
Reptiles	Site
Birds	Local
Invertebrates	Site
Brown Hares	Local
Hedgehogs	Likely to be Site if present



3 ASSESSMENT OF EFFECTS

3.1 Methodology

- 3.1.1 Continuing from the valuation of Important Ecological Features (IEFs), this section lists each IEF in turn together with a characterisation of any potential impacts upon them likely to arise from the proposals. This takes into consideration any measures inherent to the designed scheme which seek to avoid such impacts altogether. Next, any agreed mitigation measures chosen to reduce likely impacts are then set out, along with the mechanism(s) through which these would be secured.
- 3.1.2 Residual effects, being those effects which would likely still arise despite any avoidance measures or agreed mitigation efforts, are subsequently discussed. Residual effects are determined to be either significant or not significant and any significant residual effects are given a geographical scale at which they might be felt. This assessment methodology is in accordance with that set out in the CIEEM Guidelines for Ecological Impact Assessment, 2018.
- 3.1.3 Where residual effects are identified compensatory measures may be proposed to make up for the loss or permanent damage to an IEF, as far as possible. Monitoring or management schemes which may be necessary to ensure the long-term achievement of all intended mitigation and compensation are discussed.
- 3.1.4 Where potential for cumulative impacts upon IEFs in association with other proposed or ongoing local development are identified these are described as appropriate for the affected IEF. The Zone of Influence for each IEF, together with their level of ecological importance will be of relevance when considering the scope of a cumulative impact assessment.

Ecological Enhancements

- 3.1.5 The revised National Planning Policy Framework¹⁶ (NPPF), issued in July 2021, states that the planning system should contribute to “minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures”. It also states that “while opportunities to improve biodiversity in and around developments should be integrated as part of their design”.
- 3.1.6 Enhancements for biodiversity are additional to specific mitigation measures mentioned, but the recommended enhancements will make a positive, permanent contribution to local biodiversity.

3.2 Summary of Development Proposals

- 3.2.1 The proposals comprise the construction of a photovoltaic solar farm. Panels will be fixed onto posts which are driven into the ground and connected via underground wiring to inverters. Each field will be surrounded with deer-proof fencing.
- 3.2.2 Inverters will be constructed in each field, with a DNO substation compound constructed within Field 8.
- 3.2.3 It is anticipated that most of the arable habitat and approximately 0.36ha of semi-improved grassland will be lost to accommodate the development. **The rest of the semi-improved grassland will be retained or enhanced.** Boundary habitat including hedgerows, ditches, trees, scrub and woodland will all be retained and adequately protected.
- 3.2.4 Habitat to be created:
- 1.6km of new native species-rich hedgerow with standard trees;
 - Enhancement of all existing defunct hedgerows;
 - **Tussocky grassland buffer for reptiles and meadow mixture suitable for clay soils, approximately 14.8ha; and**
 - **Grazing Seed Mix to Panel Compounds (within the array), approximately 43.5ha.**

¹⁶ MHGLC (2021). *National Planning Policy Framework*. www.gov.uk/guidance/national-planning-policy-framework



3.3 Designated Sites

- 3.3.1 Four LWSs are located within the Zol of the development, including two located immediately adjacent to the red line boundary (see Table 1 and Appendix C): Battle's Wood LWS and Park Green LWS. Any potential impacts upon Battle's Wood LWS are considered in the 'Woodland and Hedgerows' subheading in Section 3.4 Mitigation, Compensation, Enhancement and Monitoring below.
- 3.3.2 The proposed cable will be routed through Stocking Pelham Field Centre LWS and this is discussed under the 'Cable Route' in the 'Woodland and Hedgerows' subheading in Section 3.4.

Potential Impacts

- 3.3.3 Although Park Green LWS is situated adjacent to the Site boundary, it is approximately 40m away from the development footprint, with undeveloped land and a proposed new hedgerow between the local wildlife site and the site perimeter fencing. Given the distance from the construction zone, it is not anticipated to result in direct impacts on this wildlife site.
- 3.3.4 There is however the possibility of indirect impacts on this wildlife site as a result of dust deposition arising from construction traffic exiting the site. This could have detrimental impacts on the botanical flora of the roadside verges. Such effects would be temporary (during construction only) and reversible in the short-term.
- 3.3.5 Regarding the other two LWS (located 200m and 340m away from Site respectively), the proposed solar array will occupy existing arable fields, and is not anticipated to result in direct impacts on the identified LWS. Given that the Proposed Development is not residential, no indirect impacts resulting from an increase in recreational pressures are anticipated. As a result, it is unlikely that the proposed development will have any significant impacts, either directly or indirectly, on these non-statutory designated site identified during the desk study.

Mitigation Measures

- 3.3.6 A **Biodiversity Protection Plan (BPP)** will be prepared to detail how the habitats within and surrounding the Site should be protected during the construction phase. The BPP should include details of appropriate fencing to restrict access into key ecological areas, information on any timing restrictions and measures including application of COSHH regulations, to prevent damage or pollution to water bodies and sensitive ecological habitats. The BPP will also prescribe measures to minimise dust deposition on surrounding road verges, including ensuring loads leaving site are securely covered. The wheels of all vehicles will be checked on leaving the site, and if necessary, will be cleaned by jet wash within a designated washing area. Typically the preparation of a BPP will be a conditional requirement of the planning permission.
- 3.3.7 Typically, the preparation of a BPP will be a conditional requirement of the planning permission.

Residual Effects

- 3.3.8 So long as good-practice measures are adopted to prevent dust deposition on habitats present along construction traffic routes, it is considered highly unlikely that the proposed development will have any significant impacts, either directly or indirectly, on the non-statutory designated sites identified during the desk study.

3.4 Habitats

- 3.4.1 An ecological clerk of works (ECOW) will be appointed at the outset of construction. They will provide toolbox talks and where appropriate directly oversee habitat clearance or site clearance activities in areas where ecological constraints are identified. The ECOW will be available via an 'on-call' basis throughout the construction phase. This will enable a prompt response for dealing with any habitat or protected species issues that could arise during the course of development.
- 3.4.2 A Landscape and Environmental Management Plan (LEMP) will be prepared for the operational site that will cover how retained habitats and newly planted areas should be managed so as to maximise their biodiversity value and achieve the objectives of ecological mitigation and compensation. The LEMP should also set out any measures necessary to ensure protected species are appropriately accommodated within the operational site.



- 3.4.3 Once grassland has become established, the biodiversity within the former arable areas will be considerably greater than that supported by the arable fields. Driven by an ecologically sensitive management regime, lack of disturbance and reduction in the inputs of fertilisers and herbicides, it is considered likely that the grassland beneath the array will have a significantly greater ecological value than the current arable habitats.

Biodiversity Net Gain Assessment

- 3.4.4 Baseline and proposed habitats were classified using The UK Habitat Classification (UK Hab) as set up within Box 3-2 of the Biodiversity metric 3.1 User Guide and areas were in-filled within the Metric. Condition assessments were undertaken for each habitat type in accordance with the Biodiversity Metric 3.1 - Technical Supplement document.
- 3.4.5 The Biodiversity Net Gain scores calculated for the Proposed Development were returned as +182.29 Habitat Units, and +24.15 Hedgerow Units. This constitutes a 104.84% net gain in Habitat Units, and a 56.91% net gain in Hedgerow Units within the Site.
- 3.4.6 In summary the main loss of habitat is almost entirely attributed to loss of arable vegetation. Loss of existing hedgerow and ditch is negligible. The main gains in vegetation in the proposals are for all arable land within the red line to be converted to grassland. Three different types of native grassland are to be introduced including a basic grazing grass mix within the perimeter fence, a species-rich wildflower meadow mix between the perimeter fence and the red line and some discrete areas managed as tussocks for reptiles between the perimeter fence and the red line. Extensive new hedgerow is to be planted and retained hedgerows will be subject to widespread infill planting with a diverse range of native species to consolidate those hedgerows.
- 3.4.7 The detailed BIA Assessment Sheet is provided as a separate active spreadsheet and a summary in Appendix B.

Woodland and Hedgerows

Potential Impacts

- 3.4.8 The development will result in the loss of approximately 5m of **defunct species-poor hedgerow with trees (H25)** for the creation of the access track towards the western field (Field 9) and 5m of **defunct species-poor hedgerow with trees (H14)** to allow for access into the Site (Field 4) from the farm track to the south. Any potential impacts upon protected species are considered in the relevant subheading in Section 3.5 below.
- 3.4.9 No other loss of hedgerows, scrub, woodland or trees are expected to occur, as the solar panels and associated infrastructure will be sited on existing arable land or semi-improved grassland. Site access will largely utilise existing tracks and gaps in the hedgerows. There is however the potential for hedgerows and other boundary habitats to become damaged or degraded during the construction phase, in the absence of mitigation.

Mitigation & Enhancement Measures

- 3.4.10 Perimeter security fencing will be installed at the commencement of construction and will be sited at least 5m from the edge of hedgerows/ditches, at least 10m from the edge of woodland (or further if root protection zones or specific mitigation requirements dictate - see Section 3.5: 'Badgers') and will be maintained throughout the construction phase. This fencing will function as adequate protective fencing for the field boundary habitats.
- 3.4.11 A minimum 15m undeveloped buffer will be maintained from the edge of Battle's Wood LWS, in line with Natural England standing advice for protection of Ancient Woodland¹⁷. Should panels be shaded by trees from the woodland, the panels will be distanced further away to avoid requirement for future woodland management to control shading.
- 3.4.12 Gaps in existing hedgerows will be infilled in order to strengthen the hedgerow network, improve connectivity and aid screening of the Site. The creation and ongoing management of hedgerows will be

¹⁷ <https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences>



prescribed as part of a LEMP prepared for the Site. Hedgerows maintained at a height of at least 3m is considered particularly important for encouraging use by native British wildlife.

- 3.4.13 Approximately 1.6km of new native species-rich hedgerow will be planted around the Site and this, in time, is anticipated to mitigate for the small amount of hedgerow removal. Hedgerows will be managed to encourage tall, bushy growth to a height of at least 2m.

Residual Effects

- 3.4.14 There will be a lag between the removal of the short section of hedgerow to facilitate the access track through H25 and H14 and the establishment of the new hedgerow and existing hedgerow enhancements. This will temporarily reduce the foraging and shelter opportunities this 5m stretch of hedgerow currently provides. Due to the additional hedgerow extent, the mitigation proposals will provide a greater area and enhanced quality of habitat in the long term.
- 3.4.15 It is anticipated, with the implementation of protection measures and favourable management during operation, that the ecological importance of the woodland and hedgerow network can be maintained throughout construction and operation of the proposed development with no significant effects on either habitat.

Ditches

Potential Impacts

- 3.4.16 In the absence of mitigation, the ditches have the potential to be adversely impacted during the construction phase of the development, predominately through an increase in run-off and sedimentation, as well as potential physical damage to the banks of the ditches by construction machinery.
- 3.4.17 The development will result in the damage of approximately 5m of ditch along (H14) to allow for access into the Site from the farm track to the south (Field 4). Any potential impacts upon protected species are considered in the relevant subheading in Section 3.5 below.

Mitigation Measures

- 3.4.18 The ditches (with the exception of a ~ 5m section) within the Site will be protected from damage and accidental pollution/runoff during construction by maintaining an undeveloped buffer. The buffer will be demarcated by perimeter security fencing installed at the commencement of type fencing, at least 5m from the banks of these features.
- 3.4.19 Works compounds will not be sited within at least 20m of watercourses, and contingency measures for unforeseen incidents such as spillages will be set in place prior to the commencement of construction works. This will be prescribed as part of the BPP.

Residual Effects

- 3.4.20 With the control measures detailed in the BPP, it is not anticipated that there will be adverse impacts upon the dry ditches during Site construction.
- 3.4.21 During Site operation, no adverse impacts upon the water courses are anticipated. Indeed it seems likely that with the reduction in disturbance and cessation of inputs of herbicides and fertilisers within the area that the scheme may result, in the long-term, in a beneficial impact upon water quality of watercourses within the Site and the local area.

Cable Route

Potential Impacts

- 3.4.22 No trees, hedgerow or scrub requires removal as part of the cable route proposals. The hedgerow, scrub and trees may be affected by direct collision/damage during excavation work as well as damage from storage of materials.
- 3.4.23 There will be short term damage to the species-rich meadow habitat due to the excavation and this habitat forms part of a LWS. The ditch habitat may also be damaged, depending on the methodology used to run the cable route across the ditch.



- 3.4.24 The potential impacts on species of conservation concern identified as being present, or potentially present, are set out in the relevant subheading in Section 3.5 below, along with appropriate mitigation measures.

Mitigation Measures

- 3.4.25 A toolbox talk will be conducted to all personnel working in the installation of the cable route and measures set out within the BPP will be discussed and explained.
- 3.4.26 The BPP will also include a Method Statement for installing the cable through Stocking Pelham Field Centre LWS. The methodology will ensure that impacts on the habitat and species, which may be present are avoided.
- 3.4.27 Prior to construction of the cable route commencing, the route will be walked by an experienced ecologist and the contractor conducting the cable installation. A route will be planned that avoids any key habitats which could be avoided (such as ensuring buffers along hedgerows or avoiding more diverse areas of grassland).
- 3.4.28 Any heavy plant required for the works shall not track over ground beyond 5m either side of the cable route, and not before any required precautionary habitat clearance is conducted.
- 3.4.29 Where the route crosses the species-rich grassland, there will be temporary damage to the habitat, but it is likely to re-establish quickly given the presence of vigorous grasses and ruderal species.
- 3.4.30 A BPP will be prepared for the works detailing measures to prevent damage to the habitats within and adjacent to the route.
- 3.4.31 The excavated material will be sorted into topsoil and subsoil, so that it can be replaced in the same way when filling in the excavations. Where possible, turf will be retained to cap the excavation. If it is not possible to replace the turf, re-seeding will be considered, with a suitable seed mix identified including wildflowers, in order to enhance the Site.

Residual Effects

- 3.4.32 The BPP will ensure that the impacts of the cable route are minimised, therefore, no residual impacts are anticipated. This is considered Not Significant.

3.5 Protected Species and Species of Conservation Concern

Badgers

3.5.1

Potential Impacts

- 3.5.2 Badger setts may be damaged or destroyed during construction activities due to vehicle movement, piling activities or fence installation, which could also harm or disturb badgers occupying the setts at the time. Badgers may also become trapped in excavated trenches or pits overnight if they are left uncovered.
- 3.5.3 The grassland habitats beneath the array are highly likely remain conducive to foraging by badgers (whether grazed or cut) and access to other woodland and farmland likely to remain unimpeded.
- 3.5.4 Although no badger setts were identified that may be affected by the installation of the cable, badgers can excavate setts in a short space of time. Therefore, there is potential for new setts to be built (particularly given the close proximity of an existing sett) which could be damaged.

Mitigation, Compensation, Enhancement and Monitoring

- 3.5.5 The scheme has been carefully designed in order to ensure that badgers using the Site are adequately protected. A buffer of at least 10m has been allowed between all outlying badger setts and the construction zone. In addition, a larger buffer of at least 20m has been allowed between the main and subsidiary badger setts and the construction zone. No vehicles will be driven within these areas and no



construction materials stored within the buffers. The buffer areas will be delineated with Heras or security fencing by a suitably experienced ecologist and signs installed informing of the presence of the sett and buffer.

- 3.5.6 As badgers can dig new setts in a short amount of time and given the activity on the Site was high, a pre-construction badger survey (including the proposer cable route) will also be conducted by a suitably experienced ecologist in order to determine if any new setts have been excavated within 3 months of construction. If new sett entrances are found, these will also need adequate buffers during the construction period, or if within the construction area will need closure under licence from Natural England within the licensable period (July – November).
- 3.5.7 During construction, any trenches will be covered overnight to ensure badgers and other mammals or amphibians to not become trapped within them. If this is not possible, a plank will be used at an angle of no more than 45° to ensure there is a means of escape.
- 3.5.8 Post construction, the Site will remain suitable for commuting and foraging badgers, particularly where grassland is created on existing arable land. It is likely that natural undulations in the ground will be sufficient to enable badgers (and other small mammals such as brown hares) to pass underneath Site fencing and use the grassland for foraging. However, should the security fencing used be in a style that may prevent badgers from accessing the Site (i.e. rigid fencing that fits tightly to the ground), gaps of approximately 10cm will be provided to encourage badgers to excavate beneath the fence whilst ensuring that the fence remains livestock-proof.
- 3.5.9 Consideration might be given to the incorporation of fruiting trees (crab apple, apple and pear for example) within marginal areas as windfall fruits provide an important foraging resource in the autumn when badgers are looking to build weight for the winter period.

Residual Effects

- 3.5.10 No residual adverse effects are anticipated and it is likely that the cessation of arable farming and the introduction of landscape enhancements set out in this report, will allow badgers to thrive during the operational phase of the development.

Bats

- 3.5.11 The Site was considered to be of Local value to roosting, foraging and commuting bats given that several mature trees with PRFs were identified and that the Site and immediate surroundings comprised a network of mature hedgerows, watercourses and areas of woodland.

Potential Impacts

Roosting Bats

- 3.5.12 Trees may be damaged during construction, which may affect roosting bats should they be present. This would constitute an offence under the Conservation of Habitats and Species Regulations 2017 (as amended).
- 3.5.13 Trees adjacent the proposed cable route may be damaged during the excavation, which may affect roosting bats should they be present.

Foraging and Commuting Bats

- 3.5.14 The effects of solar array development on foraging/commuting bats is poorly understood. However, a study involving Clarkson & Woods¹⁸, found that there was no statistically significant difference between bat activity recorded within solar farms when compared to similar undeveloped sites. There is evidence that smooth surfaces may confuse bats by reflecting calls away from them, so these solid surfaces may not be detectable, causing collision¹⁹. However, other research undertaken under naturalistic conditions indicated that bats were able to quickly learn the difference between water and smooth surfaces in the

¹⁸ http://www.clarksonwoods.co.uk/projects/projects_solarresearch.html

¹⁹ Grief *et al.* (2017). Acoustic mirrors as sensory traps for bats. SCIENCE; 357(6355): 1045-1047



wild and modify their behaviour²⁰. Overall, the current, albeit limited, research indicates that although bats may confuse smooth flat surfaces with water bodies, it seems unlikely that this would have direct detrimental effects on bat populations.

- 3.5.15 The proposals will result in a loss of approximately 0.36ha of semi-improved grassland (occasionally horse-grazed) in order to accommodate the DNO substation compound, which in turn could reduce the number of night flying insects associated with pasture that are available to foraging bats.

Lighting Impacts

- 3.5.16 Minimal requirements for artificial lighting are expected to be required during the operation of the development. However, where construction takes place during winter, artificial lighting may be required within the construction zone due to the short day lengths. If this is the case, light may spill onto hedgerows, woodland etc. in discrete areas. However, as bats are in hibernation during the winter months, they are unlikely to be affected by this activity. Any lighting required will be directed away from hedgerows. Therefore, it is anticipated that fragmentation of habitat for bats as a result of light spill will not occur.

Mitigation, Compensation, Enhancement and Monitoring

Roosting Bats

- 3.5.17 The layout proposals have been carefully designed to ensure that any trees with PRF are sufficiently protected from impacts. A buffer of minimum 5m (10m for woodland trees edge and 15m for Battle's Wood LWS tree edge) is included within the scheme around any trees with PRFs. The trees within and bounding the Site will therefore remain unaffected by the development of the solar array.
- 3.5.18 Where the cable route runs in close proximity to any trees identified as being potentially suitable for use by roosting bats, care will be taken to avoid works which risk damage to the tree, including ensuring cabling does not take place within the root protection zone. Due to the temporary and short-term nature of the works impacts associated with disturbance of bats within the roost are not considered to be significant. Further surveys (such as tree climbing or emergence surveys) are not considered necessary and would be disproportionate to the potential for impact. Where damage to the tree cannot be avoided further surveys may however be essential.
- 3.5.19 The BPP will comprise measures to protect the trees, watercourses and hedgerows on the Site during construction, as well as the retained habitats off-site which are likely to be utilised by foraging and commuting bats. This will ensure that trees, watercourses and hedgerow habitat will be protected and retained for the use by bats both during construction and operation.
- 3.5.20 Should any trees on or directly adjacent the Site require removal or de-limbing, this will first be discussed with a suitably qualified ecologist. Further surveys may be required to ensure bat roosts are not present; this would entail a visit to the Site by the ecologist to check the tree for features which may be suitable for roosting bats. Should no features be identified, works can go ahead. However, if there are suitable features either a tree climbing inspection or emergence survey will be required (emergence surveys can be conducted between May and August inclusive). Where bat roosts are found, a licence from Natural England must be obtained or order to damage/destroy the roost.

Foraging and Commuting Bats

- 3.5.21 Buffer zones between the arrays and all of the hedgerows/woodland/watercourses have been incorporated into the design. These will be 5m minimum around hedgerows/watercourses habitat, 10m minimum around woodland edge habitat and 15m minimum around ancient woodland edge habitat (Battle's Wood LWS). Therefore, habitats considered to be of highest importance for foraging/commuting bats will be retained and protected in full and will not be directly affected by the development. No further surveys to ascertain the baseline use of the Site by foraging/commuting bats are recommended, as impacts will be avoided.

²⁰ Russo, D., Cistrone, L., and Jones, G. (2012) Sensory ecology of water detection by bats: a field experiment. *PLoS ONE*. **7**(10): e48144



- 3.5.22 Approximately 1.6km of new, native hedgerow planting is to be created at the Site. This increase in connectivity will improve the accessibility for bats to navigate across the Site, as well as increasing foraging opportunities for this species. The maintenance of the most important features at the Site for foraging/commuting bats will mitigate for the temporary loss of suboptimal habitat across the arable fields.
- 3.5.23 Any gaps in hedgerows will be infilled using local, native species. The hedgerows will be allowed to grow to a height of at least 3m (taller where this does not impact on shading of the panels).
- 3.5.24 The area within the security fence will be sown with a native grassland mix and managed as grassland either by annual cutting or by grazing. If this grassland is sheep grazed the droppings support several species of dung beetle, which are a valuable potential food source for some of the large bat species.
- 3.5.25 The buffer areas between the security fence and the boundary hedgerows will be seeded with a species-rich wildflower grassland mix as described above. It is anticipated that once established the species-rich grassland buffers will support a good range of invertebrates including various species of noctuid moths and important prey species for bats. This is likely to be cut on an annual basis. The management requirements are set out in the LEMP. The buffer area amounts to 14.8ha, which amounts to over 22% of the area of replaced arable land.

Lighting Impacts

- 3.5.26 Should construction activities occur during the winter months and it is necessary to install lighting, this will be discussed with an ecologist. Depending on timing, steps may need to be taken to ensure that lighting does not impact on the boundary habitats such as the preparation of a sensitive Lighting Strategy and/or a toolbox talk to contractors and operatives on Site.

Enhancement

- 3.5.27 A total of ten bat boxes will be installed on mature trees within the Site in order to increase roosting opportunities. Details of the boxes will be given in the LEMP produced for the Site and the positioning agreed on Site with the input of an ecologist. The boxes will be regularly monitored subsequent to the completion of construction to evaluate the effectiveness of the enhancement and provide new bat records for the area. Details of monitoring will be set out within the LEMP.

Residual Effects

- 3.5.28 There is currently some uncertainty around how bats use solar farms due to the relatively new creation of these features, although studies are ongoing. The arable land is currently intensively managed but will be converted to a more diverse grassland, which is likely to be an important habitat for invertebrates. This will increase the foraging resources on Site for local bats. The trees will be retained and protected, therefore, impacts on roosting bats will be avoided.

Otters and Water Voles

- 3.5.29 No signs of water voles or otters were recorded on Site or in the wider Survey Area during the survey. In addition, only one historic record of water vole was returned by the data search and is dated 1987. However, the Site has potential to support otters and/or water voles within the high quality ditches network and their presence cannot be ruled out.

Potential Impacts

- 3.5.30 The development will result in the damage of approximately 5m of ditch along (H14) to allow for access into the Site from the farm track to the south (Field 4). Should water voles or otters be present in the ditch habitat, there is the potential to kill/injure animals or damage burrows, which would result in an offence being committed.
- 3.5.31 There is some limited potential for temporary noise/human disturbance during construction to any otters or water voles utilising the waterways on Site during the daytime. The construction Site will not be operational at night-time when otters would more likely be active. Maintenance of the array would also occur solely during daytime hours. The risk of disturbance is on that basis not considered not significant.



- 3.5.32 Other measures described in Section 3.4 designed to protect the ditch habitat at the Site would also ensure that these species would be protected from temporary impacts during the construction phase of the proposed development.

Mitigation, Compensation, Enhancement and Monitoring

- 3.5.33 The small section of ditch to be affected along H14 was wet in the winter (February 2021) but found to be dry in the summer (June 2021) which makes this habitat suboptimal for otters and water voles. As a precaution, a prior survey of the affected area for signs of water voles and otters and its suitability should be undertaken at an appropriate time (between mid-April and September) to ascertain if water voles or otters are present prior to any works occurring close to the ditch. If the results are inconclusive, a second survey may be required, as per current survey guidelines for water voles. In the event that evidence of any burrows is discovered (either in advance through a specific water vole survey or during supervised works), works may require a licence from Natural England in order to proceed. In the absence of water voles signs, the potential for minor disturbance or damage to habitat should be mitigated for by carrying works out under an Ecological Watching Brief attended by an experienced ecologist.
- 3.5.34 The cessation of intensive agriculture and the continued maintenance of waterways are likely to lead to improved quality of riparian and terrestrial habitats. This is likely to lead to a slight but not significant increase in the suitability of the Site to support water voles and otters.
- 3.5.35 A buffer zone of 5m minimum has been established in the design between the ditches and the array. This will ensure that, should water voles or otters be present within the Site, no direct impacts upon the habitat within or adjacent to the ditches would occur as a result of either the construction or operation and management of the array.
- 3.5.36 So long as the ditch habitats are adequately protected through fencing and implementation of a BPP, no further surveys or specific mitigation for water voles and otters are recommended, as impacts on these species (*if present*) can be avoided.

Residual Effects

- 3.5.37 With the measures above put in place, there is not likely to be any residual effect on these species, should they be present.

Dormouse

- 3.5.38 Although no evidence of dormouse activity was recorded during the survey, the hedgerows and woodland are considered suitable to support dormice. If present, the Site would likely be of Local level importance for dormice. The anticipated impacts to the hedgerows are considered to be low with a 5m section due for removal out of H25 and H14.

Potential Impacts

- 3.5.39 The removal of a 5m gap from H25 and H14 has the potential to disturb or injure dormice if present within this short section.
- 3.5.40 In the absence of mitigation, there is the potential for impacts upon dormice to arise during the construction phase, through the inadvertent damaging of hedgerows and/or woodland fringe habitats within the Site.

Mitigation, Compensation, Enhancement and Monitoring

- 3.5.41 To ensure dormice are not harmed by the proposal, prior to the removal of vegetation the hedgerow will be thoroughly inspected by an appropriately experienced ecologist who holds a dormouse survey licence.
- 3.5.42 The methodology for hedgerow removal will follow the single stage habitat removal procedure outlined as part of the methodology associated with a dormouse class licence²¹. This can be undertaken at any time of the year but due to nesting bird and hibernating reptiles/amphibians conflicts it is advised the removal is undertaken between September and October. The removal of the hedgerow will be preceded

²¹ <https://www.gov.uk/guidance/hazel-or-common-dormice-surveys-and-mitigation-for-development-projects>



by a fingertip search of the hedgerow and the base of the hedgerow for dormice and dormice nests. If dormice or signs of dormice are encountered, the vegetation clearance must be stopped and it is likely that a dormouse licence would be required before further vegetation removal can take place.

- 3.5.43 The vegetation clearance will initially be undertaken with hand tools (chainsaw and brushcutter) with woody vegetation removed to 30cm above ground level. Once the ecologist is satisfied that no dormice are present, the base of the hedgerow can be removed using an excavator in the presence of the ecologist. This methodology will be set out within the BPP.
- 3.5.44 As detailed in the habitat mitigation Section, the proposals will enhance the existing hedgerows infilling existing gaps, which will mitigate for the loss of 10m of hedgerow. The proposals will also include the creation of 1.6km of new native species-rich hedgerow which will enhance the Site for dormice.
- 3.5.45 20 dormouse boxes will be installed to the hedgerow network within the Site and a check included as part of the monitoring in order to allow the opportunity to gain new records for this species, which has a patchy distribution in Essex. Should dormouse be present, another 30 boxes will be installed within the woodland and hedgerows bordering the Site for the Site to be set up as a dormouse monitoring site for the National Dormouse Monitoring Programme (NDMP)²².

Residual Effects

- 3.5.46 Clearance of this very small area of habitat is unlikely to result in significant fragmentation of dormouse habitat. Additionally, the enhancement of existing hedgerows within the Site and creation of new hedgerow planting will enhance the Site for dormouse. No significant residual effects upon dormouse as a result of the construction or operation of the array are anticipated.

Great Crested Newts

- 3.5.47 Great crested newts have been confirmed as present in five ponds within 250m of the Site boundary through eDNA sampling. Individuals are likely only present within the boundary habitats of the Site, such as the hedgerows and woodland which border the arable fields, as the arable fields are considered to offer sub-optimal habitat for this species. Nevertheless, individual newts may occasionally be present within the arable fields when dispersing.

Potential Impacts

- 3.5.48 Great crested newts may be found up to 250m from ponds (and up to 500m from ponds in exceptional circumstances²³); however studies by Jehle²⁴ and Cresswell & Whitworth²⁵ have demonstrated that the habitat within 50m of the pond is the most important to great crested newts and supports the majority of a great crested newt population within its terrestrial phase.
- 3.5.49 Although great crested newts may commute across arable fields to reach breeding ponds, they are unlikely to forage, shelter or hibernate within these habitats due to lack of cover from dense vegetation, and likely low populations of invertebrates for foraging. If great crested newts are present on Site, they are likely to forage and shelter within the hedgerows, woodland and field margins. These more suitable habitats are due to be retained and will be protected from damage during construction. However, the risk of individual newts being present within the arable fields during their active terrestrial phase cannot be ruled out, and therefore there is a low risk that individuals may be injured or killed within the arable fields during the construction phase in the absence of mitigation.
- 3.5.50 The scrub and grassland habitat recorded along the proposed cable route is suitable for reptiles and amphibians, which could be killed/injured during installation of the cable.

²² <https://ptes.org/wp-content/uploads/2020/09/NDMP-2020.pdf>

²³ Great Crested Newt Mitigation Guidelines. 2001. Natural England

²⁴ Jehle R (2000) The terrestrial summer habitat of radio- tracked great crested newts (*Triturus cristatus*) and marbled newts (*T. marmoratus*). *Herpetological Journal* 10: 137-142

²⁵ Cresswell W and Whitworth R (2004) An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt *Triturus cristatus*. English Nature Research Report 576. English Nature, Peterborough

Mitigation, Compensation, Enhancement and Monitoring

3.5.51 As shown in Figure 10 below, the Site is located within the Essex area eligible under GCN District Level Licensing (DLL) administered by Natural England and is covered by areas of green and amber Risk Zones. The risk zone definitions are as follows:

- Red = key populations of GCN, which are important on a regional, national or international scale and include designated Sites of Special Scientific Interest for GCN
- Amber = main population centres for GCN and comprise important connecting habitat that aids natural dispersal
- Green = sparsely distributed GCN and are less likely to contain important pathways of connecting habitat for this species
- White = no population of GCN

3.5.52 This scheme permits all but the most damaging impacts to breeding ponds and habitat in return for a tailored and proportionate financial contribution to local great crested newt conservation schemes.



Figure 10: GCN Risk Zones (Essex) across the Site (Natural England Open Data Publication)

3.5.53 Under this scheme, a payment will be made to the licensing body Natural England, which funds the provision of GCN habitats elsewhere (off-Site). **An Impact Assessment & Conservation Payment Certificate has been accepted and counter-signed by Natural England on 11/11/2021. The certificate will be issued to the LPA as evidence of the Site's registration under the DLL scheme.**

3.5.54 As an enhancement for amphibians and reptiles, three hibernaculum will be created in the retained boundary habitats outside of the security fence. Hibernaculum will be a minimum of 1m tall (with at least 30cm of this buried in the substrate), 1m wide and 2m in length. These will be created from a mix of soft and hardwood logs and rubble and will be covered with soil to increase internal thermal stability.

3.5.55 General mitigation proposals including the creation of tussocky grassland, species rich swards along with the planting of hedgerows and trees habitat will enhance the Site significantly for amphibians and reptiles allowing a far greater proportion of the Site to be used by foraging and sheltering individuals.

3.5.56 The cable route through the species-rich grassland will be subject to a phased cut (allowing for the cable excavation, an area to lay the soil and the movement of machinery) to displace any reptiles and amphibians present. This will be carried out in the active herptile season between April and September inclusive. The vegetation will be cut to approximately 10cm, then to ground level 24-48hrs later (with a fingertip search by an experienced ecologist prior to the cut). This will displace any herptile present out of the area of works into adjacent retained habitat. Prior to the cut, an experienced ecologist will check



the area for ground nesting birds to ensure no active nests are present within the area to be cut. A method statement covering this work will be included within the BPP.

Residual Effects

- 3.5.57 Providing the measures set out above are put in place the proposals are not anticipated to result in any residual adverse impacts of amphibians including great crested newts (or reptiles). The mitigation proposals are likely to result in an enhancement for amphibians in terms of habitat quality during the operational phase.

Birds

- 3.5.58 The Site supports a moderately diverse range of commonly occurring breeding and wintering birds, typical of an intensive arable farming landscape. The boundary hedgerows and trees supported the greatest number of bird species. Open arable land also supported a limited range of species.

Potential Impacts

- 3.5.59 The notable birds utilising the Site can be split into two categories: those which were recorded predominately within open habitats and those recorded foraging predominately in boundary habitats such as woodland and hedgerows.

Birds of Open Farmland

- 3.5.60 The species within open habitat are more likely to be directly impacted by the installation of a solar array. In particular, ground-nesting species such as skylarks may potentially be impacted most significantly by the proposed development.
- 3.5.61 Habitat for ground-nesting birds would be lost at least temporarily during Site clearance and construction activities. Furthermore, these species need to monitor surrounding habitat for potential predators, and as a result, the area within the solar array is unlikely to offer such optimal habitat for nesting post-development given the presence of panels which may disrupt sightlines within the fields.
- 3.5.62 There is a general lack of scientific evidence as to how ground-nesting birds such as skylark use solar arrays, although there is emerging evidence which indicates that solar arrays provide valuable foraging habitat for birds, including skylarks and other species, which may boost breeding success for pairs nesting in adjacent land.
- 3.5.63 Skylarks have been recorded using land within solar arrays for both foraging and possibly for nesting. A study lead by Clarkson and Woods ecologists identified skylarks using land within solar arrays for foraging during the summer months, at comparative (and sometimes higher) levels to that of control sites²⁶. Similar findings have also been reported by the RSPB²⁷. Other incidental observations of various ground-nesting bird species (including skylarks) foraging within solar arrays have been recorded by Clarkson and Woods ecologists whilst undertaking monitoring of solar arrays on various sites around the country. Skylark have also been recorded using land within solar arrays potentially for nesting. At least three sites are known where nesting behaviour by skylark have been observed, however, these nesting sites were located within easement areas and so were not located within the footprint of the array itself. In site monitored (Clarkson and Woods have monitored in excess of 100 large scale solar arrays), skylark have regularly been seen foraging within or perching on array panels. Therefore, the construction of the array is considered unlikely to result in the total exclusion of farmland birds from the habitat within the array.
- 3.5.64 However, it should be pointed out that the above observations are generally derived from early-stage monitoring following completion of construction and as such, the effects of strong nest-site fidelity within skylarks cannot be ruled out. Such an effect may explain why a small proportion of birds remain within seemingly sub-optimal habitat following an abrupt change in suitability, and therefore further monitoring data will be essential to determine long-term effects within these developments. Consequently, it is

²⁶ H. Montag, G Parker & T. Clarkson. 2016. The Effects of Solar Farms on Local Biodiversity; A Comparative Study. Clarkson and Woods and Wychwood Biodiversity.

²⁷ Rob Shotton MRes Research - <https://community.rspb.org.uk/ourwork/b/biodiversity/posts/bird-use-of-solar-farms-interim-results>



necessary to adopt a precautionary principle and so it is reasonable to assume that the Site will support a reduced number of birds of open farmland than the Site currently supports.

- 3.5.65 It is likely that at least some farmland birds will continue to utilise the strips between the panel strings, and at field margins, at least for foraging. If such habitats are assumed to be used, the creation of a low intensity sheep-grazed grassland will benefit these species by increasing the quality of foraging habitats, primarily due to the anticipated boost in abundance and diversity of invertebrate prey species. It is noted that there is an abundance of open, arable farmland within the surrounding 5km, which would be expected to absorb a proportion of the breeding skylark population that would be displaced from the Site.
- 3.5.66 As a result of the development, it is anticipated that, without mitigation, approximately 11 breeding skylark territories will be lost.
- 3.5.67 Other species such as kestrel are regularly seen hunting within solar arrays and are unlikely to be negatively impacted by the proposals.

Other Bird Species

- 3.5.68 The hedgerows, woodland, trees and scrub on Site provided suitable nesting/foraging habitat for bird species such as passerines and thrushes. It is understood that these areas will largely remain unaffected by development proposals and maintained as per the existing management regime. No net loss of nesting habitat in hedgerows and trees is anticipated. However, should isolated sections of hedgerow or individual trees require removal between the period of March – August inclusive, this has the potential to impact nesting birds, should they be present within the habitat to be removed.

Mitigation, Compensation, Enhancement and Monitoring

Birds of Open Farmland

- 3.5.69 With the extent of the arrays within the proposals, it is not possible to entirely mitigate for the loss of large open areas of habitat for all of the ground nesting birds recorded using the construction zone. It is likely that at least some skylark will continue to utilise the strips between the panel strings and field margins at least for foraging. If such habitats are assumed to be used, the creation of a diverse grassland with low management input will benefit these species by increasing the quality of foraging habitats, primarily due to the anticipated boost in abundance and diversity of invertebrate prey species.
- 3.5.70 As shown on Figure 3, portion of Fields 1, 2, 4 and 8 will remain outside of the construction area, and designated and managed as skylark mitigation areas, as shown in the Landscape Strategy prepared for the scheme (Figure 4 refers). When combined these areas measure approximately 11ha in total. In order to mitigate for the expected loss of habitat for birds species of open farmland, these areas will revert from intensive arable to non-rotational set-aside or meadow for the greatest capacity to absorb displaced territories. This area will be managed for the lifespan of the array to provide conditions suitable for nesting and foraging. It is expected that approximately five skylarks territories can be accommodated within the skylark mitigation area, should it be appropriately managed. The management of this land will be prescribed in this way as part of a LEMP prepared for the Site. It is anticipated that the skylark mitigation areas will also benefit the small numbers of foraging yellowhammer and foraging (and potentially breeding) yellow wagtails recorded within the open habitat at the Site.
- 3.5.71 The remaining six breeding territories will be mitigated for the provision of two 'bird foraging plots' per lost territories, therefore 12 plots. These plots will be created in arable fields in the local area. The plots will comprise between 5x5m squares and 10x10m squares of unsown land are introduced at a rate of at least 2 per hectare into fields by temporarily halting the seed drill during sowing. This has the effect of increasing invertebrate food item abundance, improving the breeding success, number of young reared and densities of territories able to be supported. These plots will be either provided by the solar farm landowner or via a payment scheme arranged with a broker (such as Whirledge and Nott who operate in Essex: <https://www.whirledgeandnott.co.uk/habitat-bank>). Any off-site mitigation would need to be secured via a Section 106 agreement. Two of these plots will be provided within the red line boundary in the south of Field 2, area which is to remain as agricultural.



- 3.5.72 The lack of regular disturbance (e.g. ploughing) of land within the array site will help to ensure those birds that occupy both the array and the retained open areas are more likely to successfully forage and rear broods without risk of damage/disturbance by agricultural activity as per the existing regime.
- 3.5.73 Foraging and nesting behaviour displayed by bird species of open farmland has been observed within solar arrays by Clarkson and Woods, and therefore the increase in quality of foraging opportunities within the array will be expected to lead to an increased survival of over-wintering birds as well as the success of brood rearing at any nests within the Site as well as within the nearby landscape off-site. As such, potential adverse effects upon birds of open farmland can be reduced with the mitigation measures proposed.

Other Bird Species

- 3.5.74 A buffer of at least 5m will be maintained from all boundary features, to be delineated using security or temporary fencing. This buffer will be larger alongside woodland areas. This will prevent damage to this habitat during construction. Details to protect these features can be prescribed within the BPP prepared for the construction phase of the development.
- 3.5.75 Should the removal of short (~5m) section of hedgerow be required during the main nesting season (March to August inclusive), these will first be subject to a nesting bird check by an experienced ecologist no more than 48hrs prior to the work being done to ensure no active bird nests are present. This will also be the case in the event that any other isolated sections of hedgerow or individual trees / shrub need to be removed, including along the proposed cable route. This inspection would identify individual nests and the life stages of the occupants (eggs, chicks, fledglings). Any active nests found would need to be appropriately protected until eggs have hatched and young fledged. Until the young have fledged, the nest should be subject to regular monitoring to ensure that a second brood is not raised once the first brood has fledged. Otherwise, alternative locations for breaches will be identified and the same check undertaken. This can be prescribed within the BPP prepared for the Site.
- 3.5.76 Significant enhancement by the seeding of native grassland throughout the Site including extensive areas of diverse wildflower seeded areas will provide significant habitat to support a wide range of birds. In addition, the association of hedgerows bordered by species-rich grassland provides a significant enhancement that is greater than the sum of two habitats separately. Examples of bird species that benefit from this meeting of the two habitats include reed bunting, linnet, dunnock, whitethroat, lesser whitethroat and yellowhammer which are all red or amber listed species that occur on Site.
- 3.5.77 As an enhancement, 20 bird boxes of a range of designs will be installed on trees and in hedgerows on Site. These will improve the nesting opportunities for a wide range of bird species including birds of prey. This will be detailed in the LEMP produced for the Site.

Residual Effects

- 3.5.78 The improvement in habitat quality for foraging birds would also be expected to boost the breeding success rates of birds nesting within the Site and nearby farmland. A residual adverse impact on the population of skylark is expected as the Site may not continue to support the current numbers using the Site due to loss of open habitat. However, the retention of suitable nesting habitat at open space within the Site, combined with the anticipated improvement in foraging quality and off-Site provision of skylark plots, will mitigate this impact to acceptable levels.
- 3.5.79 Very few detrimental impacts are likely to occur on birds breeding within the boundary features. With appropriate mitigation in place, as well as the expected increase in foraging value of the Site and new nesting opportunities within newly planted hedgerows, a residual beneficial impact is expected for these species.

Brown Hare

- 3.5.80 Two brown hares were recorded within Field 3 during the initial Phase 1 survey.

Potential Impacts

- 3.5.81 Brown hares are unlikely to be affected by the development, although there may be temporary loss of habitat during construction.



Mitigation, Compensation, Enhancement and Monitoring

- 3.5.82 Brown hares have been found to particularly favour solar farms (from Clarkson and Woods' observations) and are often seen resting beneath panels. Therefore, it is anticipated that the proposed development may enhance the Site for this species, through the establishment of a diverse grassland sward and the retention of long grassland margins.
- 3.5.83 Implementing access measures for badgers (see recommendations for gaps in fencing under the 'Badgers' subheading above) will ensure that hares can also continue to access the Site, and therefore no significant impacts upon this species are anticipated.

Residual Effects

- 3.5.84 A minor positive effect on the suitability of the Site for these species is anticipated, although not significant.

3.6 Cumulative Effects

- 3.6.1 Two forthcoming or recently approved application for solar farms were identified within 10km of the Site:
- 3.6.2 One application (Land At Wickham Hall Estate Hadham Road Bishops Stortford Hertfordshire CM23 1JG Reference 3/21/2601/FUL) was submitted in October 2021 and is awaiting decision. The application site is located approximately 4km south-west of the Site. The plans have been revised in July 2022 showing a change in red line boundary and an overall size reduced from 49MW to 35MW.
- 3.6.3 A Biodiversity Impact Assessment Calculator has been submitted as part of the application and indicates that the development will result in a net gain of 100.67 Habitat Units and in a net gain of 12.89 Hedgerow Units. Should the BIA be approved by the LPA and followed, no significant cumulative effects on habitats are anticipated as a result.
- 3.6.4 A number of skylark breeding territories have been identified during surveys conducted by Aspect Ecology, but no mitigation measures for the impact of the construction of solar panels on breeding skylarks have been recommended.
- 3.6.5 The second application (Berden Hall Farm, Ginns Road, Berden Reference S62A/22/0006) was submitted in July 2022 and is awaiting decision. The application site is located approximately 700m north-west of the Site. The development is of a ground mounted solar farm with a generation capacity of up to 49.99MW, together with associated infrastructure and landscaping.
- 3.6.6 A Biodiversity Impact Assessment Calculator has been submitted as part of the application and indicates that the development will result in a net gain of 129.53 Habitat Units and in a net gain of 31.24 Hedgerow Units. Should the BIA be approved by the LPA and followed, no significant cumulative effects on habitats are anticipated as a result.
- 3.6.7 A number of skylark breeding territories have been identified during Cherry Field Ecology surveys but no mitigation measures for the impact of the construction of solar panels on breeding skylarks have been recommended.
- 3.6.8 Overall, a minor negative cumulative impact on breeding birds of open ground (particularly skylarks) is anticipated, as a result of loss of nesting habitat as well as unmitigated direct impacts of construction associated with both of the above schemes.

3.7 Decommissioning

- 3.7.1 The solar array will be decommissioned at the end of lifespan of development panels and returned to agricultural land. It is not known what the ecological value of the Site will be at this point, but if the LEMP is followed it seems likely that the habitat within the area will be considerably more ecologically diverse than at present and protected species may be present within the area.
- 3.7.2 Pre-decommissioning ecological surveys will be required in line with guidance, legislation and planning policy available at the point of decommissioning, to ascertain the nature of ecological impacts and what, if any, mitigation measures will be required. This is likely to comprise an extended Phase 1 survey followed by species specific surveys (for example, great crested newt surveys, bird surveys, badger survey etc.). A full mitigation plan will be prepared and submitted to the LPA prior to decommissioning.



3.8 Summary of Assessment of Effects

- 3.8.1 The assessment of effects is summarised in Table 15 overleaf, which also outlines the proposed method to secure any relevant mitigation associated with reducing impacts.



Table 15: Summary of Assessment of Effects

Feature	Importance	Mitigation/Compensation Proposed	Residual Effect and Significance	Proposed Mechanism to Secure	Monitoring Required?
Designated Sites					
Battle's Wood LWS	Local	<ul style="list-style-type: none"> Permanent buffer zones, minimum 15m 	No residual effect	BPP	Yes
Habitats					
Hedgerows	Local	<ul style="list-style-type: none"> Protection during construction Permanent buffer zones, 5m minimum Infill planting 1.6km new diverse native hedgerow planting 	Significant positive effect	BPP LEMP	Yes
Woodland	Local	<ul style="list-style-type: none"> Protection during construction Permanent buffer zones, 10m minimum 	No residual effect	BPP	Yes
Ditches	Local	<ul style="list-style-type: none"> Protection during construction Permanent buffer zones, 5m minimum 	No residual effect	BPP	Yes
Species					
Badgers	Local	<ul style="list-style-type: none"> Pre-construction badger check (including along proposed cable route) Permanent buffer zones, 10m minimum around outlying setts and 20m around main/subsidiary setts Measures to prevent accidental harm when using construction Site 	No residual effect	BPP	Yes



Feature	Importance	Mitigation/Compensation Proposed	Residual Effect and Significance	Proposed Mechanism to Secure	Monitoring Required?
Bats	Local	<ul style="list-style-type: none"> Any tree removal/limbing to be first be discussed with a suitably qualified ecologist Buffer zones around boundary habitat Hedgerow infill planting 1.6km new hedgerow Installation of 10 bat boxes 	No residual effect	BPP LEMP	Yes
Otters and Water Voles	Likely to be Local if present	<ul style="list-style-type: none"> Buffer zones around waterways 	No residual effect	BPP	No
Dormouse	Likely to be Local if present	<ul style="list-style-type: none"> Sensitive clearance methodology to hedgerow removal Buffer zones around boundary habitat Hedgerow infill planting 1.6km new hedgerow Installation of 20 dormouse boxes within Battle's Wood 	Minor positive effect	BPP LEMP National Dormouse Monitoring Programme	Yes
Great crested newts	Local	<ul style="list-style-type: none"> GCN DLL application submitted Tussock grassland in buffer Installation of 3 hibernaculum 	No residual effect	District Level Licensing Scheme	No



Feature	Importance	Mitigation/Compensation Proposed	Residual Effect and Significance	Proposed Mechanism to Secure	Monitoring Required?
Birds	Local	<ul style="list-style-type: none"> • No tree removal without pre-consultation with ECoW • No cutting back of hedgerow between March-August without pre-consultation with ECoW and nesting bird check. • Permanent buffer zones • Hedgerow infill planting • 1.6km new hedgerow • Installation of 20 bird boxes • On Site skylark mitigation area • On-Site provision of 2 skylark plots and Off-Site provision of 10 skylark plots 	Minor residual adverse impact on ground-nesting birds of open habitat	BPP LEMP	Yes
Brown hares	Local	<ul style="list-style-type: none"> • Species-rich seeded grassland buffers outside array • Hedgerow infill planting. • 1.6km new hedgerow 	Minor positive effect	LEMP	No



4 CONCLUSIONS

- 4.1.1 The majority of the Survey Area comprises large arable fields with little ecological importance. The installation of panels into these areas is unlikely to result in any long-term adverse impacts upon biodiversity and, subject to the establishment of grassland beneath and around the panels, the scheme is likely to result in a positive impact upon biodiversity within the local area.
- 4.1.2 The Site was considered suitable for a number of protected or notable species, particularly associated with the boundary features but also associated with the open fields.
- 4.1.3 The design of the scheme has been modified at an early stage to ensure that the most ecologically valuable habitats within the Survey Area are retained within the development, and recommendations have been provided to ensure that these habitats and the species, which may be present within them are adequately protected. This will be secured through the production of a BPP.
- 4.1.4 In order to mitigate for impacts on great crested newts, the scheme will be registered under the GCN DLL scheme and **an Impact Assessment & Conservation Payment Certificate has been accepted and counter-signed by Natural England on 11/11/2021.**
- 4.1.5 **As currently proposed, the proposals will achieve a 104.84% net gain in Habitat Units, and a 56.91% net gain in Hedgerow Units within the Site.**
- 4.1.6 Several areas at the Site have been retained for wildlife mitigation and enhancement purposes. These areas will lie outside of the solar array construction area, and will be managed for the benefit of biodiversity, including providing habitat for farmland breeding birds such as skylarks.
- 4.1.7 Post-construction, the creation of new habitats and ongoing management of retained/newly created habitats will result in a net positive benefit to local wildlife. The creation and management of these habitats will be secured through the production of a LEMP.
- 4.1.8 By adhering to the recommended avoidance, mitigation and enhancement measures, the development will be in line with relevant local and national planning policy, and the implementation of the recommended ecological enhancements would provide a positive, permanent contribution to biodiversity on the Site.



APPENDIX A: WILDLIFE LEGISLATION & SPECIES INFORMATION

BADGERS

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.

DORMICE

Dormice and their nests are protected in England and Wales 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 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 Regulations 2017. 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.

GREAT CRESTED NEWTS

Great crested newts are protected in England and Wales 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 great crested newt, or to deliberately disturb a great crested newt 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 for great crested newts. Intentional or reckless disturbance of great crested newts in places of shelter (ponds or terrestrial refuges), and damage to or obstruction of places of shelter are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against great crested newts 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 ponds or terrestrial habitat, or which could result in killing of or injury to great crested newts, need to take place under licence. Works which could disturb great crested newts may also be licensable, though this is rarely the case unless loss of great crested newt habitat is also proposed, and should be assessed on a case by case basis. In practice this means that works involving any removal of or significant modification to ponds or terrestrial habitats (typically rough grassland, scrub, hedgerow bases and woodland) supporting great crested newts 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 great crested newts in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

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.

OTTERS

Otters and their holts are protected in England and Wales under the Conservation of Habitats and Species Regulations 2017, 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.

WATER VOLES

Water voles *Arvicola amphibius* receive protection under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to: intentionally kill, injure, or take a water vole; intentionally or recklessly disturb a water vole whilst in its place of shelter; intentionally or recklessly damage, obstruct or destroy a water vole's place of shelter; or intentionally or recklessly obstruct access to a place of shelter. Penalties for offences against water voles include fines of up to £5,000 and/or up to six months in prison.

Works such as watercourse re-profiling, installing culverts, or topsoil stripping close to watercourses and ponds which could result in destruction or obstruction of burrows could be considered reckless, and/or could be considered intentional if water voles are killed or injured, unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on water voles 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.

In practice, mitigation for impacts of development on water voles generally comprise one or more of the following techniques: displacement, in which water voles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where water vole-resistant fencing is provided between a development site and suitable retained habitat allowing animals 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. Water vole mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with Natural England or Natural Resources Wales.

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.

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 reasons⁶ and a suitable compensation strategy exists; and
- (d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

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 177 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".

ECOLOGICAL ENHANCEMENTS

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 can include restoring or enhancing a population or habitat".

In England, the National Planning Policy Framework (NPPF), issued in July 2018, states that the planning system should contribute to "minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;. It also states that "opportunities to incorporate biodiversity in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity".

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: BIODIVERSITY METRIC 3.1 – CALCULATIONS HEADLINE RESULTS

Pelham Spring Solar Farm		Return to results menu	
Headline Results			
On-site baseline	<i>Habitat units</i>	173.88	
	<i>Hedgerow units</i>	42.33	
	<i>River units</i>	8.20	
On-site post-intervention <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	356.18	
	<i>Hedgerow units</i>	66.41	
	<i>River units</i>	8.20	
On-site net % change <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	104.84%	
	<i>Hedgerow units</i>	56.91%	
	<i>River units</i>	0.00%	
Off-site baseline	<i>Habitat units</i>	0.00	
	<i>Hedgerow units</i>	0.00	
	<i>River units</i>	0.00	
Off-site post-intervention <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	0.00	
	<i>Hedgerow units</i>	0.00	
	<i>River units</i>	0.00	
Total net unit change <small>(including all on-site & off-site habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	182.29	
	<i>Hedgerow units</i>	24.09	
	<i>River units</i>	0.00	
Total on-site net % change plus off-site surplus <small>(including all on-site & off-site habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	104.84%	
	<i>Hedgerow units</i>	56.91%	
	<i>River units</i>	0.00%	
Trading rules Satisfied?	Yes ✓		



Appendix C: Designated Sites Maps

Essex Wildlife Trust Records Centre - designated sites within 1km search boundary for Spring Solar Farm, Dunmow area

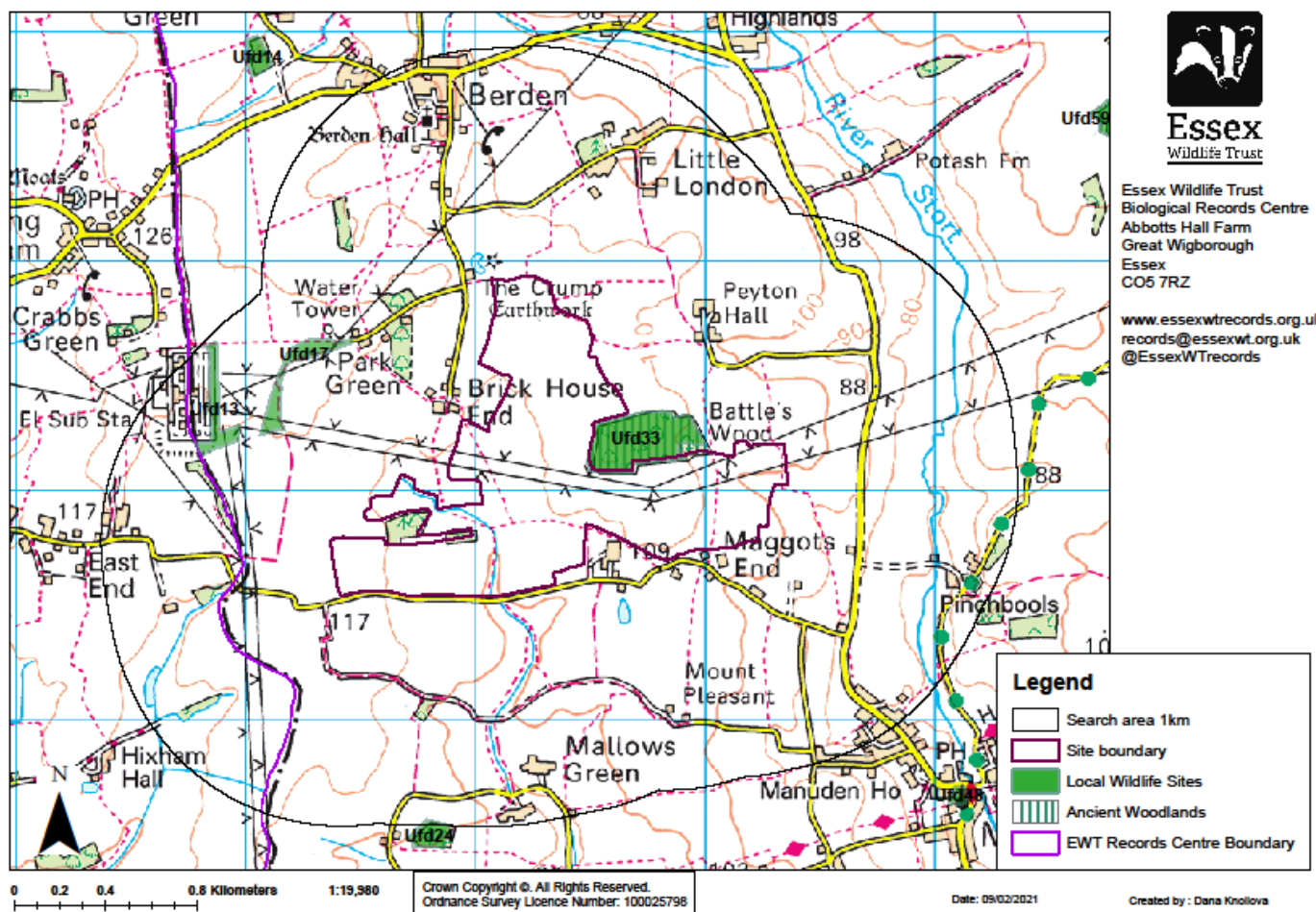


Figure C1: EWTEC Data Search



Local Sites Map 1

Search Information
Search boundary
Search area

Local Sites
Local Wildlife Sites

Administrative Area
Herts County Boundary

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09/02/2021

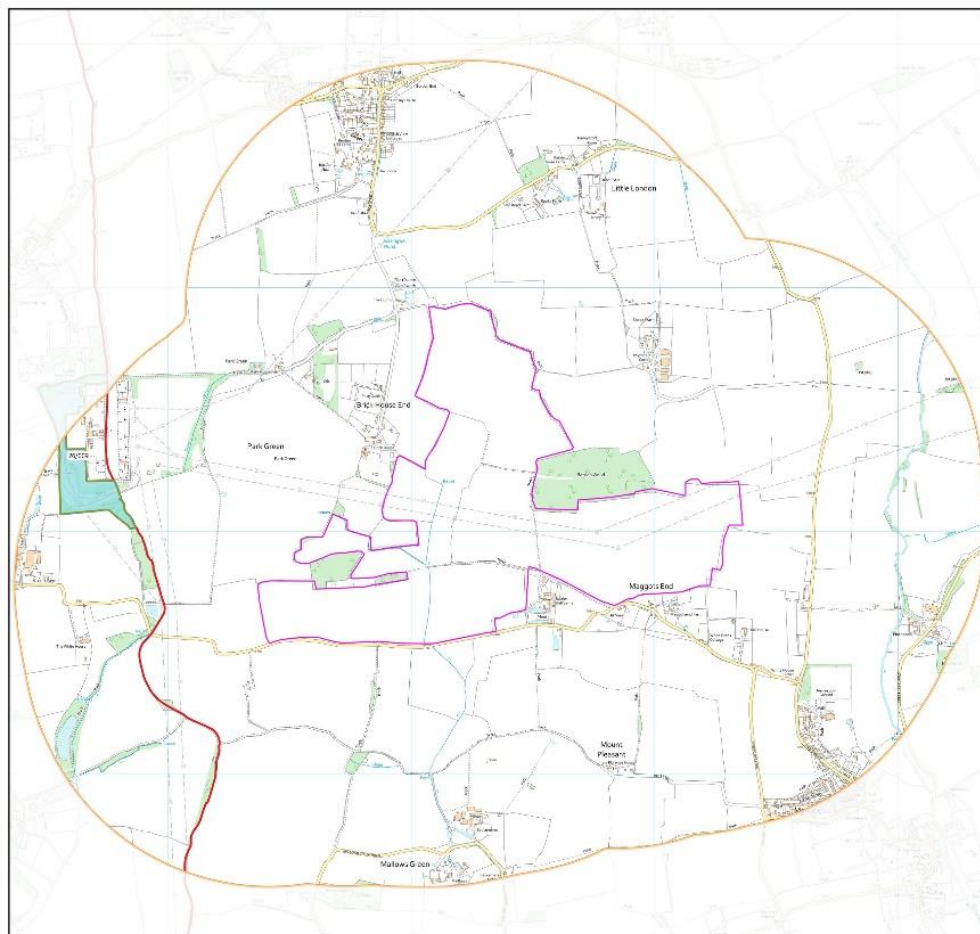


Figure C2: HERC Data Search

Clarkson and Woods Ltd.

Overbrook Business Centre,
Poolbridge Road, Blackford,
Somerset BS28 4PA



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