

BERDEN HALL FARM SOLAR FARM, ESSEX: DESK STUDY AND HABITAT SURVEY

ECO02096-R-02b

Berden Hall Farm Solar Farm
Desk study & habitat survey

2

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BERDEN HALL FARM SOLAR FARM: DESK STUDY AND HABITAT SURVEY

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1 INTRODUCTION

Purpose and scope of this report

- 1.1 RPS was commissioned by Berden Solar Limited to produce an ecology chapter for an Environmental Statement (ES) assessing the impacts of a proposed solar farm at Berden Hall Farm, Berden, Essex ('the Site').
- 1.2 An Ecological Appraisal for the Site was undertaken by Cherryfield Ecology (Cherryfield Ecology, 2022), based on surveys undertaken in 2019, 2020 and 2022.
- 1.3 Given that the original appraisal including the desk study and Phase 1 habitat survey was undertaken in 2019, it was considered that these elements should be updated in support of the ES.
- 1.4 The habitat survey was undertaken using the UK-hab classification (Butcher *et al.*, 2020) to facilitate a Biodiversity Net Gain assessment of the development. The survey therefore included collection of information to assess habitat condition.
- 1.5 This report provides:
 - Results of the updated desk study; and
 - Results of the UK-hab habitat survey and condition assessment.

Survey area

- 1.6 The proposed development site is located on approximately 65.84 hectares of arable land between the villages of Berden and Stocking Pelham, south of Ginns Road in the district of Uttlesford, Essex. The site is centred on national grid reference 100m square TL461291.

Proposed development

- 1.7 The proposed development is for the development of a ground mounted solar farm with a generation capacity of up to 49.99MW, together with associated infrastructure and landscaping. It would comprise the following elements:
 - Approximately 91,056 photovoltaic solar panels
 - Nine inverter units
 - A small electrical substation
 - A reconfigured field access off Ginns Road to provide access to the site
 - Landscaping and deer fencing.

2 METHODS

Desk study

- 2.1 Essex Field Club (EFC) and the Hertfordshire Environmental Records Centre (HERC) were contacted for records of designated sites and protected or otherwise notable species within 2km of the site. Received data requests was filtered to exclude records for protected species older than 10 years.
- 2.2 A review of existing statutory sites of nature conservation interest, such as Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Special Area of Conservation (SACs) and National Nature Reserves (NNRs), and non-statutory sites, such as Sites of Importance for Nature Conservation (SINCs) was undertaken.
- 2.3 Locations of statutory designated sites were accessed via the government 'MAGIC' website (www.magic.gov.uk).
- 2.4 A 1:25,000 OS map was used to identify nearby features such as ponds or green corridors that could provide habitat or connectivity to other areas.

Habitat survey

- 2.5 A habitat survey was undertaken on 20th September 2022 by an appropriately experienced ecologist.
- 2.6 Habitats were mapped using the UK Habitat (UK-hab) Classification (Butcher *et al.*, 2020).
- 2.7 Condition of habitats was assessed using the criteria for Biodiversity Net Gain assessment published by Defra in April 2022 (Defra, 2022).

3 RESULTS

Desk study

Designated sites

- 3.1 No statutory designated sites are present within 2km of the site. The site is within an Impact Risk Zone for SSSIs that are > 2 km from the site boundary, but the development does not meet the criteria for likely impact on these SSSIs requiring consultation with Natural England and on this basis SSSIs are not considered further.
- 3.2 Fourteen non-statutory designated sites are located within 2 km of the site boundary. These sites are all Local Wildlife Sites (LWSs) and are summarised in Table 3.1. Their locations are shown on Figure 3.1.

Table 3.1. Designated sites within 2 km

Site Name	Status	Area (ha)	Description	Distance from site (m)
Park Green	LWS	3.2	Registered common supporting a range of grasses and herbs species.	0
Pelham Centre Meadow	LWS	2.5	Meadow grassland supporting a wide variety of grasses and herbs	5
Stocking Pelham Field Centre	LWS	7.87	A predominantly grassland site but with a variety of other habitats present. The grassland supports neutral grassland indicator species. There are small areas of broadleaf woodland A pond adjoins the hedgerow The site is locally important for birds and mammals and supports protected species.	58
Berways Meadow	LWS	0.74	Unimproved neutral grassland supporting a species-rich assemblage of grasses and herbs.	83
Arnold's Spring	LWS	1.24	Not supplied by EFC	186
Crabbs Green Common	LWS	0.67	Common land on the edge of a rural village; consisting of rough, unimproved, but species poor, Boulder Clay grassland.	195
Silla Farm Northern Meadows	LWS	2.25	Two fields of neutral grassland surrounded by thick hedges, mainly of Hawthorn.	911
Hall Wood (Stocking Pelham)	LWS	5.06	Ancient semi-natural woodland mainly of Ash (<i>Fraxinus excelsior</i>) standards and coppice with Hazel (<i>Corylus avellana</i>) and occasional Pedunculate Oak (<i>Quercus robur</i>) and Field Maple (<i>Acer campestre</i>).	973
East End Farm	LWS	0.00 ^a	Building and environs important for protected species.	1095
Battles's Wood LWS	LWS	9.5	Not supplied by EFC	1195
Shonk's Moat	LWS	1.81	Moated archaeological site supporting rough neutral grassland, scrub and ponds.	1326
Beeches Wood	LWS	17.09	Ancient semi-natural woodland of Ash (<i>Fraxinus excelsior</i>)/Field Maple (<i>Acer campestre</i>)/Hazel (<i>Corylus avellana</i>) coppice and Pedunculate Oak (<i>Quercus robur</i>)/Hornbeam (<i>Carpinus betulus</i>).	1578
Green Lane W. of Beeches Wood & Washall Green	LWS	0.99	Green lane partly bordered by part ancient hedges.	1602

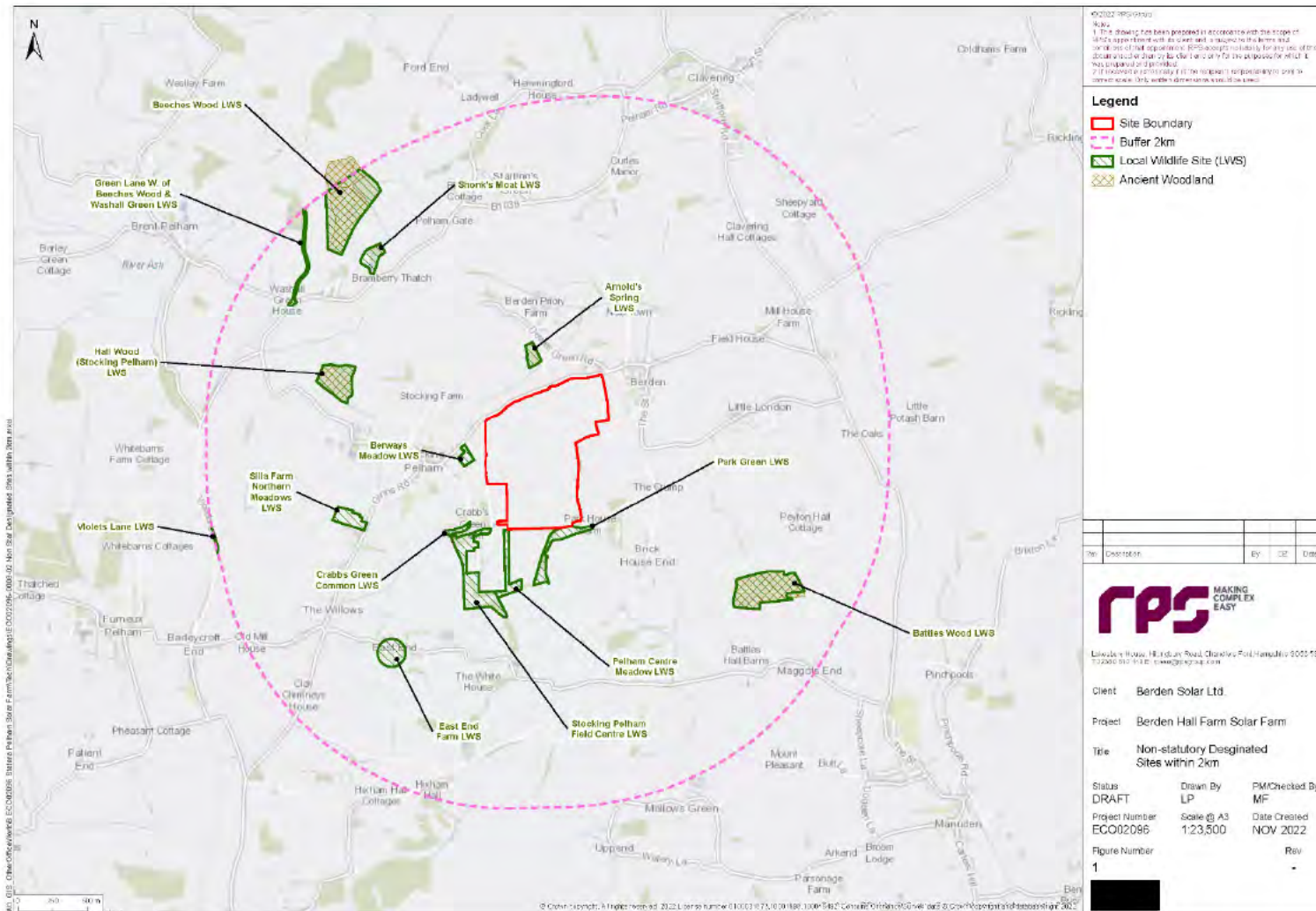
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Site Name	Status	Area (ha)	Description	Distance from site (m)
Violets Lane	LWS	0.42	Old lane that is also a sunken winterbourne (River Ash) with a gravel bed between steep chalk banks, which support long established woodland type community hedges.	1985

a) Area as supplied by HERC. Assumed to be rounded down to zero by their GIS software.

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Figure 3.1. Designated sites within 2 km



Species

- 3.3 Records of protected or otherwise notable species within 2 km of the site were obtained from the Hertfordshire Environmental Records Centre and the Essex Field Club. A summary of the data search results is provided below in Table 3.2.
- 3.4 In order to simplify the results, only records of species from the last 10 years with a resolution of 100 m or lower are shown since locations given at a lower resolution do not allow accurate calculation of distance to the Site boundary. In addition, where multiple records of the same species were provided, Table 3.2 lists the closest record to the site only.

Table 3.2. Data search results

Scientific Name	Common Name	Year of most recent record	Distance from site (km)	Conservation Status
<i>Bombus ruderatus</i>	Large Garden Bumblebee	2019	1.80	UKBAP
<i>Coenonympha pamphilus pamphilus</i>	Small Heath	2020	0.35	Sect.41, UKBAP, RLGB.Lr(NT)
<i>Thymelicus sylvestris</i>	Small Skipper	2019	0.52	Herts Wide Decl (B)
<i>Bufo bufo</i>	Common Toad	2017	0.51	Sect.41, UKBAP
<i>Triturus cristatus</i>	Great Crested Newt	2018	0.10	HSD4, WCA5/9.4b, Sect. 41, UKBAP
<i>Natrix helvetica</i>	Grass Snake	2019	0.51	WCA5/9.1k/l, Sect.41, UKBAP
<i>Anguis fragilis</i>	Slow-worm	2018	0.51	WCA5/9.1k/l, Sect.41, UKBAP
<i>Tyto alba</i>	Barn Owl	2017	0.51	WCA1i, Bern2, Herts HR;Herts LD1, WCA9
<i>Pyrrhula pyrrhula</i>	Bullfinch	2015	0.51	BAmb
<i>Turdus pilaris</i>	Fieldfare	2015	0.51	WCA1i, Bred
<i>Perdix perdix</i>	Grey Partridge	2017	0.51	Sect.41, UKBAP, BRed, HSCC.RT;Herts LD3
<i>Delichon urbicum</i>	House Martin	2016	0.51	HSCC.RT
<i>Passer domesticus</i>	House Sparrow	2015	0.51	Sect.41, UKBAP, BRed, HSCC.RT
<i>Falco tinnunculus</i>	Kestrel	2014	0.51	BAmb
<i>Alcedo atthis</i>	Kingfisher	2015	0.51	WCA1i, Bamb, HSCC.RT
<i>Vanellus vanellus</i>	Lapwing	2012	0.51	Sect.41, UKBAP, BRed, HSCC.RT;Herts LD2
<i>Poecile palustris</i>	Marsh Tit	2013	0.51	BRed, HSCC.RT
<i>Milvus milvus</i>	Red Kite	2015	0.51	WCA1i
<i>Turdus iliacus</i>	Redwing	2014	0.51	WCA1i, Bred
<i>Alauda arvensis</i>	Skylark	2015	0.51	Sect.41, Bred
<i>Sturnus vulgaris</i>	Starling	2013	0.51	BRed, HSCC.RT
<i>Apus apus</i>	Swift	2016	0.51	BAmb
<i>Strix aluco</i>	Tawny Owl	2015	0.51	Bamb
<i>Passer montanus</i>	Tree Sparrow	2018	0.51	Sect.41, LBAP;UKBAP, BRed, HSCC.RT;Herts LD3
<i>Streptopelia turtur</i>	Turtle Dove	2017	0.51	Sect.41, UKBAP, BRed, HSCC.RT;Herts LD3
<i>Meles meles</i>	Badger	2017	0.61	PBA

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Scientific Name	Common Name	Year of most recent record	Distance from site (km)	Conservation Status
<i>Lepus europaeus</i>	Brown Hare	2015	0.51	Sect.41, UKBAP, HSCC.RT
<i>Micromys minutus</i>	Harvest Mouse	2013	0.24	Sect.41, UKBAP
<i>Erinaceus europaeus</i>	Hedgehog	2015	0.51	Sect.41, UKBAP, RLGB.VU, HSCC.RT
<i>Mustela nivalis</i>	Weasel	2019	0.20	HSCC.RT
<i>Plecotus auritus</i>	Brown Long-eared Bat	2013	1.26	HSD4, WCA5/9.4b, Sect. 41, UKBAP
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	2013	0.22	HSD4, WCA5/9.4b, CMS A2
<i>Myotis nattereri</i>	Natterer's Bat	2012	1.26	HSD4, WCA5/9.4b, LBAP
<i>Myotis nattereri</i>	Natterer's Bat	2013	1.26	HSD4, WCA5/9.4b, LBAP

Abbreviations used in Table 3.2: WCA1i: Wildlife & Countryside Act Schedule 1, part 1; WCA5: Wildlife & Countryside Act Schedule 5; WCA9: Wildlife & Countryside Act Schedule 9; NERC: Natural Environment & Rural Communities Act Species of Principal Importance; UKBAP: UK Biodiversity Action Plan priority species; LBAP: Local Biodiversity Action Plan; HSD4: Habitats Directive Annex 4; PBA: Protection of Badgers Act 1992; RLGB_Lr(NT): Red List for Great Britain IUCN – Lower risk – near threatened; RLGB_VU: Red List for Great Britain IUCN – Vulnerable; BRed: Birds of Conservation Concern Status Red; BAmb: Birds of Conservation Concern Status Amber; Herts Wide Decl (B): Butterflies – Widespread Declining; Herts HR: Birds: Hertfordshire rare breeding species with less than 25 breeding pairs based on the 1988-92 atlas or subsequent records; HSCC.RT: Herts Species of Conservation Concern based on rarity or decline; Herts LD1: Birds - Local Decline - Recent local decline. Hertfordshire breeding species with greater than 25% decline between 1994 and 2000 based on the Hertfordshire BBS data; Herts LD2: Birds - Recent local decline. Hertfordshire breeding species with greater than 25% decline between 1994 and 2000 based on the Hertfordshire BBS data; Herts LD3: Birds - Local decline based on records submitted to the county Bird Report or the results of specific Herts Bird Club surveys.

Habitat survey

- 3.5 The habitats present on site are shown on Figure 3.2. Photographs are provided in Appendix A. Full species lists are provided in Appendix B.

Broadleaved woodland

- 3.6 Two compartments of broadleaved woodland occurred on, or immediately adjacent to the Site. These were mapped as the uk-hab category 'other broadleaved woodland' w1g.
- 3.7 The western compartment (photo 1) comprised a canopy of frequent Oak *Quercus robur*, Ash *Fraxinus excelsior* and Field Maple *Acer campestre*, with occasional Hawthorn *Crataegus monogyna*, Beech *Fagus sylvatica* and non-native Oak *Quercus* sp. Ground layer species included Wilson's Honeysuckle *Lonicera nitida*, Dog Rose *Rosa canina* and Bramble *Rubus fruticosus* agg.
- 3.8 The eastern compartment (photo 2) was dominated by abundant Ash, with frequent non-native Oaks, Hazel *Corylinus avellana* and Beech with occasional non-native Alder *Alnus* spp. Ground layer species included Wilson's Honeysuckle *Lonicera nitida*, Dog Rose *Rosa canina* and Bramble *Rubus fruticosus* agg.

Grassland

- 3.9 Some field margins comprised grassland mapped as 'other neutral grassland' g3c or the subcategory '*Arrhenatherum* neutral grassland' g3c5.
- 3.10 Neutral grassland g3c areas (Photo 3) comprised a grass sward with abundant Yorkshire-fog *Holcus lanatus* with frequent Cock's-foot *Dactylus glomerata* and occasional False Brome *Brachypodium sylvaticum*. Herb species included Bird's-foot Trefoil *Lotus corniculatus*, Self-heal *Prunella vulgaris*, Oxeye Daisy *Leucanthemum vulgare* and Creeping Thistle *Cirsium arvense*.

- 3.11 *Arrhenatherum* grassland (Photo 4) was less diverse, dominated by False Oat-grass *Arrhenatherum elatius* and frequent Creeping Thistle.

Arable and field margins

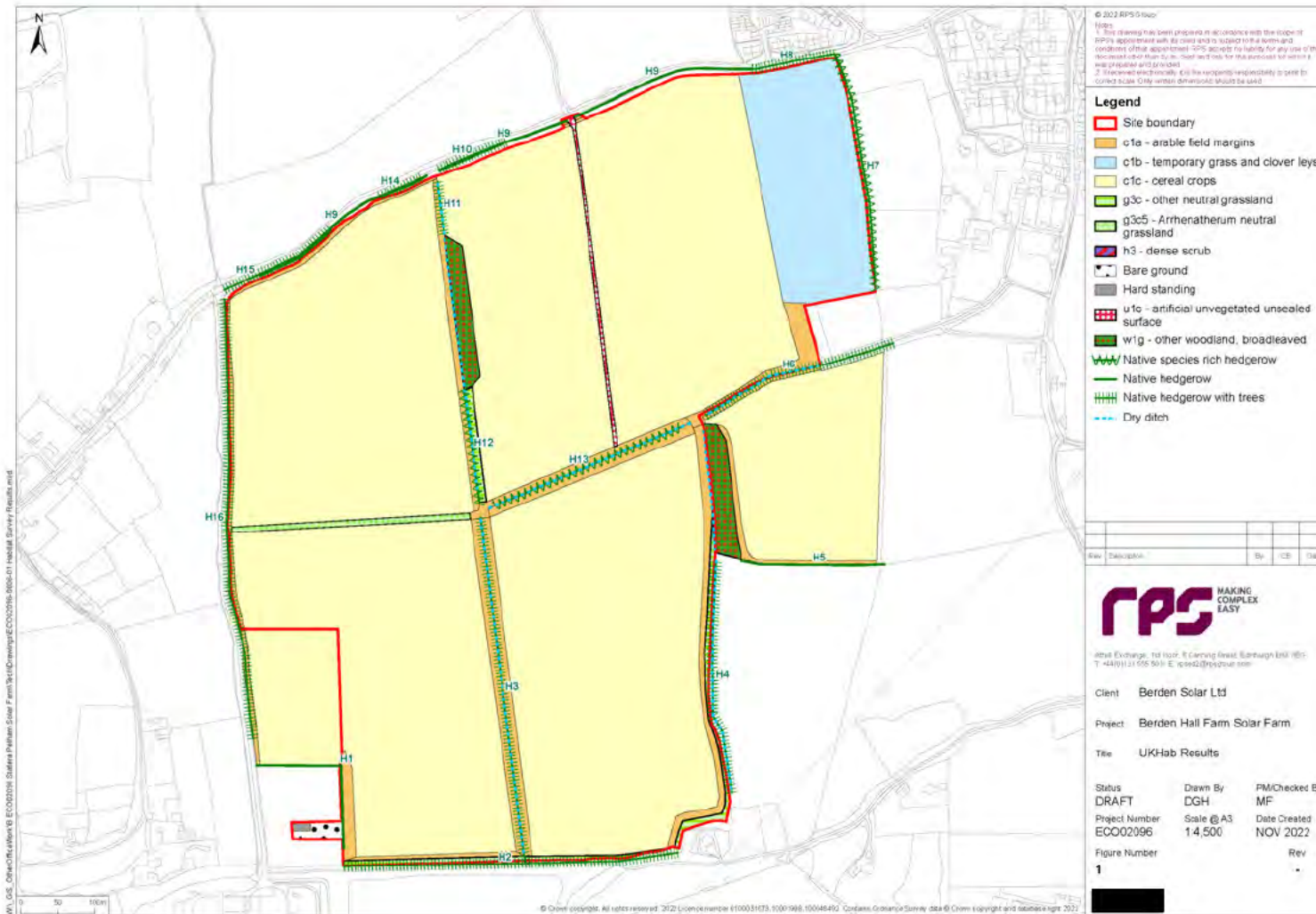
- 3.12 The majority of the Site comprised cereal cropland (uk-hab category c1c) (e.g. Photo 5). At the time of survey these were recently cropped but not yet ploughed or re-sown.
- 3.13 Some arable field margins have been sown with herbaceous strips of uk-hab category c1a, and comprised strips of dominant Bristly Oxtongue *Helminthotheca echioides* (Photo 6) or Lucerne *Medicago sativa* (Photo 7).
- 3.14 Some field margins were further distinguished as subcategories c1a5 (Arable margins sown with tussocky grassland) (e.g. Photo 8), dominated by abundant Cock's-foot with herb species Oxeye Daisy, or c1a6 (Arable margins sown with wild flowers or a pollen and nectar mix) (e.g. photo 9), characterised by herb species including Chicory *Cichorium intybus*, Oxeye Daisy, Bird's-foot trefoil and Yarrow *Achillea millefolium*.
- 3.15 In addition, one field on the eastern edge of the site was sown with a temporary grass ley with an agricultural cultivar species, and mapped as c1b accordingly (Photo 10).

Hedgerows

- 3.16 Sixteen hedgerows were mapped during the survey (Figure 3.2), although not all of these hedgerows are within the red line application boundary.
- 3.17 The hedges included some with and without standard or large trees, but all comprised native species including Hawthorn, Field Maple, Blackthorn *Prunus spinosa* and a range of other species. Refer to Appendix B for detailed species lists for each hedgerow.
- 3.18 Some hedges were associated with dry ditches. None of the ditches contained plant species suggestive of prolonged wet conditions, and it is therefore considered that these ditches are dry for the majority of the year. Hedgerows that have associated ditches are indicated in Appendix B.

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Figure 3.2. UK Habitat Classification survey map



Habitat condition assessment

- 3.19 Condition of habitats and hedgerows were assessed against the criteria for poor, moderate or good condition as defined by Defra (2022).
- 3.20 No condition assessment is required for habitat types associated with cropland (arable fields, temporary grass leys, arable field margins).
- 3.21 A summary of the results of the condition assessment is presented below in Table 3.3. Surveyed hedgerows that are outside the application boundary are excluded from this table as they are not part of the BNG baseline.
- 3.22 Condition assessment criteria for the assessed habitats are provided in Tables 3.4-3.6.

Table 3.3. Summary of condition assessment for habitats and hedgerows

Habitat	Uk-hab code	Condition
Eastern woodland	w1g	Moderate
Western woodland	w1g	Moderate
Other neutral grassland	g3c	Poor
<i>Arrhenatherum</i> grassland	g3c5	Moderate
Arable fields	c1c	N/A
Arable field margins	c1a	N/A
Arable margins sown with tussocky grassland	c1a5	N/A
Arable margins sown with wild flowers or a pollen and nectar mix	c1a6	N/A
Temporary grass ley	c1b	N/A
Hedgerow 1		Moderate
Hedgerow 3		Good
Hedgerow 4		Good
Hedgerow 5		Poor
Hedgerow 6		Moderate
Hedgerow 11		Poor
Hedgerow 12		Good
Hedgerow 13		Moderate

Table 3.4. Habitat condition criteria for other neutral grassland

Criterion no.	Criterion
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type. Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of species indicative of sub-optimal condition ¹ and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.
6	There are greater than 9 species per metre squared. NB - This criterion is essential for achieving good condition (non-acid grassland types only).

Table 3.5. Habitat condition criteria for woodland

Indicator		Good (3 points)	Moderate (2 points)	Poor (1 point)
1	Age distribution of trees	Three age classes present	Two age classes present	One age class present
2	Wild, domestic and feral herbivore damage	No significant browsing damage evident in woodland	Evidence of significant browsing pressure is present in 40% or less of whole woodland	Evidence of significant browsing pressure is present in 40% or more of whole woodland
3	Invasive plant species	No invasive species present in woodland	Rhododendron or laurel not present, other invasive species < 10% cover	Rhododendron or laurel present, or other invasive species > 10% cover
4	Number of native tree species	Five or more native tree or shrub species found across woodland parcel	Three to four native tree or shrub species found across woodland parcel	None to two native tree or shrub species across woodland parcel
5	Cover of native tree and shrub species	> 80% of canopy trees and >80% of understory shrubs are native	50-80% of canopy trees and 50-80% of understory shrubs are native	< 50% of canopy trees and <50% of understory shrubs are native
6	Open space within woodland	10 – 20% of woodland has areas of temporary open space, unless woodland is <10ha in which case lower threshold of 10% does not apply	21- 40% of woodland has areas of temporary open space	More than 40% of woodland has areas of temporary open space
7	Woodland regeneration	All three classes present in woodland; trees 4-7cm dbh, saplings and seedlings or advanced coppice regrowth	One or two classes only present in woodland	No classes or coppice regrowth present in woodland
8	Tree health	Tree mortality less than 10%, no pests or diseases and no crown dieback	11% to 25% mortality and/or crown dieback or low risk pest or disease present	Greater than 25% tree mortality and or any high risk pest or disease present
9	Vegetation and ground flora	Ancient woodland flora indicators present	Recognisable NVC plant community present	No recognisable NVC community
10	Woodland vertical structure	Three or more storeys across all survey plots or a complex woodland	Two storeys across all survey plots	One or less storey across all survey plots
11	Veteran trees	Two or more veteran trees per hectare	One veteran tree per hectare	No veteran trees present in woodland
12	Amount of deadwood	50% of all survey plots within the woodland parcel have standing deadwood, large dead branches/ stems and stumps	Between 25% and 50% of all survey plots within the woodland parcel have standing deadwood, large dead branches/ stems and stumps	Less than 25% of all survey plots within the woodland parcel have standing deadwood, large dead branches/ stems and stumps
13	Woodland disturbance	No nutrient enrichment or damaged ground evident	Less than 1 hectare in total of nutrient enrichment across woodland area and/or less than 20% of woodland area has damaged ground	More than 1 hectare of nutrient enrichment and/or more than 20% of woodland area has damaged ground

Table 3.5. Habitat condition criteria for hedgerows

Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition')	Description
A1.	Height	>1.5 m average along length	<p>The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees.</p> <p>Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).</p> <p>A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).</p>
A2.	Width	>1.5 m average along length	<p>The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees.</p> <p>Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height.</p> <p>Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice⁴).</p>
B1.	Gap - hedge base	Gap between ground and base of canopy <0.5 m for >90% of length (unless 'line of trees')	<p>This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth.</p> <p>Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).</p>
B2.	Gap - hedge canopy continuity	Gaps make up <10% of total length and No canopy gaps >5 m	<p>This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small).</p> <p>Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).</p>

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Attributes and functional groupings (A, B, C, D & E)		Criteria (the minimum requirements for 'favourable condition')	Description
C1.	Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: - measured from outer edge of hedgerow, and - is present on one side of the hedge (at least)	<p>This is the level of disturbance (excluding wildlife disturbance) at the base of the hedge.</p> <p>Undisturbed ground should be present for at least 90% of the hedgerow length, greater than 1m in width and must be present along at least one side of the hedge.</p> <p>This criterion recognises the value of the hedge base as a boundary habitat with the capacity to support a wide range of species. Cultivation, heavily trodden footpaths, poached ground etc. can limit available habitat niches.</p>
C2.	Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (<i>Urtica</i> spp.), cleavers (<i>Galium aparine</i>) and docks (<i>Rumex</i> spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.
D1.	Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.
D2.	Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	<p>This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes.</p> <p>This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).</p>
For hedgerows with trees only			
E1.	Tree age	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.
E2.	Tree health	At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.

REFERENCES

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APPENDIX A: PHOTOGRAPHS



Photo 1: Western woodland compartment



Photo 2 eastern compartment



Photo 3: Neutral grassland field margin



Photo 4: *Arrhenatherum* grassland field margin



Photo 5: Arable field



Photo 6: Bristly Oxtongue arable field margin



Photo 7: Lucerne-dominated field margin



Photo 8: Arable margin with tussocky grasses



Photo 9: Arable margins sown with wild flowers or pollen/nectar mix



Photo 10: Temporary grass ley

APPENDIX B: HABITAT SURVEY SPECIES LISTS

Woodland

See Fig. 3.1 for locations	Scientific name	Common name	Frequency
Western woodland	<i>Malus sp.</i>	Apple	Rare
	<i>Quercus sp.</i>	Oak (non-native)	Occasional
	<i>Fagus sylvatica</i>	Beech	Occasional
	<i>Acer campestre</i>	Field Maple	Frequent
	<i>Crataegus monogyna</i>	Hawthorn	Occasional
	<i>Lonicera nitida</i>	Wilson's Honeysuckle	Frequent
	<i>Rosa canina agg.</i>	Dog rose	Occasional
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent
	<i>Quercus robur</i>	Pedunculate Oak	Frequent
	<i>Fraxinus excelsior</i>	Ash	Frequent
Eastern woodland (Outside Site boundary)	<i>Malus sp.</i>	Apple	Occasional
	<i>Prunus spinosa</i>	Blackthorn	Occasional
	<i>Quercus</i>	Oak (non-native)	Frequent
	<i>Alnus cordata</i>	Italian Alder	Occasional
	<i>Crataegus monogyna</i>	Hawthorn	Occasional
	<i>Corylus avellana</i>	Hazel	Frequent
	<i>Fraxinus excelsior</i>	Ash	Abundant
	<i>Rosa canina agg.</i>	Dog rose	Occasional
	<i>Rubus fruticosus agg.</i>	Bramble	Occasional
	<i>Fagus sylvatica</i>	Beech	Frequent
<i>Lonicera nitida</i>	Wilson's Honeysuckle	Frequent	

Grassland

Type	Scientific name	Common name	Frequency
Other neutral grassland	<i>Pulicaria dysenterica</i>	Common Fleabane	Occasional
	<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	Frequent
	<i>Prunella vulgaris</i>	Selfheal	Occasional
	<i>Brachypodium sylvaticum</i>	False-brome	Occasional
	<i>Dactylis glomerata</i>	Cock's-foot	Frequent
	<i>Lathyrus pratensis</i>	Meadow Vetchling	Occasional
	<i>Cirsium arvense</i>	Creeping Thistle	Occasional
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent
	<i>Leucanthemum vulgare</i>	Oxeye Daisy	Frequent
	<i>Holcus lanatus</i>	Yorkshire-fog	Abundant
	<i>Achillea millefolium</i>	Yarrow	Abundant
	<i>Centaurea nigra</i>	Black knapweed	Frequent
	<i>Tanacetum vulgare</i>	Tansy	Occasional
	<i>Plantago lanceolata</i>	Ribwort Plantain	Abundant
	<i>Arrhenatherum</i> grassland	<i>Dactylis glomerata</i>	Cock's-foot
<i>Daucus carota</i>		Wild Carrot	Rare

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Type	Scientific name	Common name	Frequency
	<i>Dipsacus fullonum</i>	Wild Teasel	Occasional
	<i>Cirsium arvense</i>	Creeping Thistle	Frequent
	<i>Arrhenatherum elatius</i>	False Oat-grass	Dominant

Cropland

Type	Scientific name	Common name	Frequency
c1a Arable field margins	<i>Medicago sativa</i>	Lucerne	Dominant
	<i>Helminthotheca echinoides</i>	Bristly oxtongue	Abundant
c1a6 Arable field margins sown with wild flowers or a pollen and nectar mix	<i>Cichorium intybus</i>	Chicory	Frequent
	<i>Leucanthemum vulgare</i>	Oxeye daisy	Frequent
	<i>Lotus corniculatus</i>	Birds-foot trefoil	Frequent
	<i>Achillea millefolium</i>	Yarrow	Frequent
c1a5 Arable field margins sown with tussocky grasses	<i>Festuca rubra</i>	Red fescue	Frequent
	<i>Leucanthemum vulgare</i>	Oxeye daisy	Frequent
	<i>Brumus sp.</i>	Brome	Occasional
	<i>Sanguisorba officinalis</i>	greater burnet	Occasional
	<i>Dactylis glomerata</i>	cock's-foot grass	Abundant

Hedgerows

Number (Fig. 3.1)	Scientific name	Common name	Frequency	Notes
Hedgerow 1	<i>Rosa sp.</i>	Rose	Occasional	Newly planted (2-5 years old)
	<i>Carpinus betulus</i>	Hornbeam	Frequent	
	<i>Crataegus monogyna</i>	Hawthorn	Frequent	
	<i>Acer campestre</i>	Field Maple	Occasional	
	<i>Corylus avellana</i>	Hazel	Frequent	
Hedgerow 2	<i>Quercus robur</i>	Pedunculate Oak	Rare	Hedge with trees Associated with dry ditch. Outside application boundary
	<i>Salix</i>	Willow	Occasional	
	<i>Malus</i>	Apple	Rare	
	<i>Clematis vitalba</i>	Traveller's-joy	Occasional	
	<i>Acer pseudoplatanus</i>	Sycamore	Occasional	
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	
	<i>Rosa</i>	Rose	Frequent	
	<i>Crataegus monogyna</i>	Hawthorn	Frequent	
	<i>Acer campestre</i>	Field Maple	Frequent	
	<i>Prunus spinosa</i>	Blackthorn	Abundant	
	<i>Dioscorea communis</i>	Black Bryony	Frequent	
	<i>Cornus sanguinea</i>	Dogwood	Frequent	
Hedgerow 3	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	No standard trees Associated with dry ditch.
	<i>Cornus sanguinea</i>	Dogwood	Frequent	
	<i>Prunus spinosa</i>	Blackthorn	Abundant	

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Number (Fig. 3.1)	Scientific name	Common name	Frequency	Notes
	<i>Crataegus monogyna</i>	Hawthorn	Abundant	
	<i>Malus</i>	Apple	Frequent	
	<i>Rosa canina</i>	Dog-rose	Frequent	
	<i>Salix</i>	Willow	Occasional	
	<i>Acer campestre</i>	Field Maple	Frequent	
Hedgerow 4	<i>Fraxinus excelsior</i>	Ash	Frequent	Occasional standard trees Associated with dry ditch.
	<i>Corylus avellana</i>	Hazel	Frequent	
	<i>Carpinus betulus</i>	Hornbeam	Occasional	
	<i>Quercus robur</i>	Pedunculate Oak	Occasional	
	<i>Rosa</i>	Rose	Frequent	
	<i>Crataegus monogyna</i>	Hawthorn	Abundant	
	<i>Sambucus nigra</i>	Elder	Rare	
	<i>Acer campestre</i>	Field Maple	Frequent	
	<i>Clematis vitalba</i>	Traveller's-joy	Occasional	
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	
	<i>Prunus spinosa</i>	Blackthorn	Frequent	
Hedgerow 5	<i>Ulmus</i>	Elm	Frequent	Occasional standard trees
	<i>Cornus sanguinea</i>	Dogwood	Frequent	
	<i>Sambucus nigra</i>	Elder	Occasional	
	<i>Salix</i>	Willow	Rare	
	<i>Rubus fruticosus agg.</i>	Bramble	Occasional	
	<i>Rosa canina agg.</i>	Dog rose	Occasional	
	<i>Fraxinus excelsior</i>	Ash	Occasional	
	<i>Crataegus monogyna</i>	Hawthorn	Frequent	
	<i>Prunus spinosa</i>	Blackthorn	Frequent	
	<i>Acer campestre</i>	Field Maple	Frequent	
Hedgerow 6	<i>Cornus sanguinea</i>	Dogwood	Occasional	Occasional gaps, regular standard trees Associated with dry ditch.
	<i>Sambucus nigra</i>	Elder	Occasional	
	<i>Crataegus monogyna</i>	Hawthorn	Frequent	
	<i>Rubus fruticosus agg.</i>	Bramble	Abundant	
	<i>Prunus spinosa</i>	Blackthorn	Frequent	
	<i>Fraxinus excelsior</i>	Ash	Frequent	
	<i>Corylus avellana</i>	Hazel	Abundant	
	<i>Dioscorea communis</i>	Black Bryony	Frequent	
	<i>Clematis vitalba</i>	Traveller's-joy	Abundant	
	<i>Acer campestre</i>	Field Maple	Dominant	
Hedgerow 7	<i>Populus tremula</i>	Aspen	Rare	Overgrown, several trees Outside application boundary
	<i>Hedera helix</i>	Ivy	Frequent	
	<i>Prunus</i>	Cherry	Occasional	
	<i>Rhamnus cathartica</i>	Buckthorn	Occasional	
	<i>Fraxinus excelsior</i>	Ash	Frequent	
	<i>Corylus avellana</i>	Hazel	Frequent	

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Number (Fig. 3.1)	Scientific name	Common name	Frequency	Notes
	<i>Clematis vitalba</i>	Traveller's-joy	Frequent	
	<i>Prunus spinosa</i>	Blackthorn	Abundant	
	<i>Crataegus monogyna</i>	Hawthorn	Abundant	
	<i>Sambucus nigra</i>	Elder	Frequent	
	<i>Rubus fruticosus agg.</i>	Bramble	Abundant	
	<i>Acer campestre</i>	Field Maple	Frequent	
	<i>Ulmus</i>	Elm	Frequent	
	<i>Ulmus procera</i>	English Elm	Occasional	
Hedgerow 8	<i>Rubus fruticosus agg.</i>	Bramble	Occasional	Overgrown, several trees Outside application boundary
	<i>Acer campestre</i>	Field Maple	Abundant	
	<i>Prunus spinosa</i>	Blackthorn	Occasional	
	<i>Corylus avellana</i>	Hazel	Occasional	
	<i>Fraxinus excelsior</i>	Ash	Occasional	
Hedgerow 9	<i>Carpinus betulus</i>	Hornbeam	Frequent	Very newly planted Outside application boundary
	<i>Ligustrum vulgare</i>	Wild Privet	Frequent	
	<i>Crataegus monogyna</i>	Hawthorn	Frequent	
	<i>Rosa</i>	Rose	Frequent	
	<i>Acer campestre</i>	Field Maple	Frequent	
Hedgerow 10	<i>Pachycnemias hippocastanaria</i>	Horse Chestnut Moth	Rare	Overgrown, several trees Outside application boundary
	<i>Acer pseudoplatanus</i>	Sycamore	Rare	
	<i>Quercus</i>	Oak	Rare	
	<i>Hedera helix</i>	Ivy	Occasional	
	<i>Corylus avellana</i>	Hazel	Frequent	
	<i>Acer campestre</i>	Field Maple	Abundant	
Hedgerow 11	<i>Crataegus monogyna</i>	Hawthorn	Occasional	Overgrown, several trees Associated with dry ditch.
	<i>Rosa canina agg.</i>	Dog rose	Occasional	
	<i>Cornus sanguinea</i>	Dogwood	Frequent	
	<i>Viburnum lantana</i>	Wayfaring-tree	Rare	
	<i>Dioscorea communis</i>	Black Bryony	Occasional	
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	
	<i>Clematis vitalba</i>	Traveller's-joy	Occasional	
	<i>Fraxinus excelsior</i>	Ash	Dominant	
Hedgerow 12	<i>Acer pseudoplatanus</i>	Sycamore	Occasional	Overgrown with several trees > 5m height, no mature tree standards Associated with dry ditch.
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	
	<i>Cornus sanguinea</i>	Dogwood	Abundant	
	<i>Rosa canina agg.</i>	Dog rose	Frequent	
	<i>Prunus</i>	Cherry	Occasional	
	<i>Crataegus monogyna</i>	Hawthorn	Abundant	
Hedgerow 13	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	No standards Associated with a dry ditch
	<i>Rosa canina agg.</i>	Dog rose	Occasional	
	<i>Crataegus monogyna</i>	Hawthorn	Abundant	
	<i>Cornus sanguinea</i>	Dogwood	Abundant	

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Number (Fig. 3.1)	Scientific name	Common name	Frequency	Notes
Hedgerow 14	<i>Quercus robur</i>	Pedunculate Oak	Frequent	Overgrown, several trees Outside application boundary
	<i>Fraxinus excelsior</i>	Ash	Occasional	
	<i>Prunus spinosa</i>	Blackthorn	Frequent	
	<i>Corylus avellana</i>	Hazel	Occasional	
	<i>Acer campestre</i>	Field Maple	Frequent	
Hedgerow 15	<i>Fraxinus excelsior</i>	Ash	Frequent	Overgrown, several trees Outside application boundary
	<i>Prunus</i>	Cherry	Frequent	
	<i>Acer campestre</i>	Field Maple	Abundant	
	<i>Betula pendula</i>	Silver Birch	Occasional	
	<i>Corylus avellana</i>	Hazel	Frequent	
Hedgerow 16	<i>Quercus robur</i>	Pedunculate Oak	Frequent	Overgrown, several trees Outside application boundary
	<i>Crataegus monogyna</i>	Hawthorn	Frequent	
	<i>Acer campestre</i>	Field Maple	Frequent	
	<i>Fraxinus excelsior</i>	Ash	Occasional	
	<i>Rubus fruticosus agg.</i>	Bramble	Frequent	
	<i>Prunus spinosa</i>	Blackthorn	Frequent	
	<i>Rosa canina agg.</i>	Dog rose	Frequent	
	<i>Clematis vitalba</i>	Traveller's-joy	Frequent	