BSG | ecology

Varley Farm Solar Site

Ecological Appraisal

BLANK PAGE

BSG ecology

Issuing office

Merlin House | No 1 Langstone Business Park | Newport | NP18 2HJ
T: 01633 509000 | W: www.bsg-ecology.com | E: info@bsg-ecology.com

Client	Renewable Energy Systems Ltd
Project	Varley Farm, Varley Farm Solar Site
Version	FINAL
Project number	P22-254

	Name	**Position**	**Date**
Originated	Rosie Sparks	Senior Ecologist	17 November 2022
Reviewed	Daniel Foster	Principal Ecologist	29 November 2022
Amended	Rosie Sparks	Senior Ecologist	07 August 2023
Reviewed	Daniel Foster	Principal Ecologist	09 August 2023
Amended	Rosie Sparks	Senior Ecologist	29 August 2023
Reviewed	Owain Gabb	Director	30 August 2023
Approved for issue to client	Owain Gabb	Director	30 August 2023
Issued to client	Rosie Sparks	Senior Ecologist	30 August 2023

Contents

1 Introduction 2
2 Methods 3
3 Results and Evaluation 8
4 Potential impacts and recommendations 23
5 References 26
6 Figures 28
7 Photographs 34
Appendix 1: Great Crested Newt Survey results 48
Appendix 2: Landscape Strategy 51
Appendix 3: Target notes from Extended Phase 1 survey 52
Appendix 4: Ground Level Tree Assessment for Bat Roost Potential 56
Appendix 5: Biodiversity gain headline results 59
Appendix 6: Summaries of Relevant Policy, Legislation and Other Instruments 60

1 Introduction

1.1 BSG Ecology have been commissioned by Renewable Energy Systems Ltd (RES Ltd) to complete an appraisal of the likely ecological impacts of a solar development at Varley Farm (the 'Site'). This appraisal has been informed by desk study and ecological survey, and includes a biodiversity gain assessment.

1.2 The Site is located to the south of Cromhall, South Gloucestershire. Ordnance Survey Grid Reference ST 70551 89905 is approximately central.

1.3 The Site boundary is shown on **Figures 1a and 1b** in **Section 7.**

Description of project

1.4 RES Ltd propose to develop a 25 MW solar farm on the Site.

1.5 The development will consist of solar photovoltaic (PV) panels and associated electrical infrastructure. The panels will be placed on metal frames and arranged in rows. They will have a maximum height of 3.5m and be spaced to avoid any shadowing effects. The Site will be surrounded by a deer fence. Main access to the Site will be obtained from Farleigh Lane to the north; for further information refer to the Construction Traffic Management Plan (CTMP).

1.6 Field boundary hedgerows and trees have been retained where possible and incorporated within the design of the Site. Minor amounts of hedgerow removal are required for facilitating access across the Site, with one new access point through hedgerow in the southern part of the Site and the removal of a small portion of the hedgerow along Farleigh Lane in the northern part of the Site required to re-open an old gateway.

1.7 It is anticipated that the development will be operational for 40 years.

Site description

1.8 The Site is subdivided into seventeen fields, separated by a network of hedgerows, and is approximately 126 hectares in size. The majority of the Site is modified grassland, with a few fields in arable land use. The hedgerows are largely intact and feature regular trees; gateways and gaps in the hedgerows provide access between the fields.

1.9 Seasonal field drains run alongside some of the hedgerows, and there are two 'permanent' ponds and six seasonal pools present, all of which have thick scrub or hedgerows around them. One pond, shown on OS mapping is no longer in existence in the north of the Site. There is no significant topography variation within the Site boundary.

1.10 Immediately surrounding habitats are generally similar in nature with the exception of an area of semi-natural broadleaved woodland which is excluded from the southern part of the site, and the Breedon Wickwar Quarry, which lies to the east, and is fringed by scrub.

1.11 The Site boundary is shown on **Figures 1a** and **1b**.

Purpose of this Report

1.12 The purpose of this report is to detail methods and results of survey, identify ecological features that could be impacted by a solar development at Varley Farm, set out measures to avoid and reduce impacts on them, and to identify opportunities for ecological enhancement.

2 Methods

2.1 A data request was made to the Bristol Regional Environmental Records Centre (BRERC) to obtain information on non-statutory designated sites and records of protected, invasive or otherwise notable species within 2 km of the central point of the Site. These data were received on 23 May 2022.

2.2 Publicly available aerial photography and mapping including the UK Government's MAGIC[1] website and 'Where's the Path'[2] was also reviewed. Data from both of these sources was initially accessed in April 2022 (when initially scoping survey work), and throughout the preparation of this ecological report.

- The MAGIC database was used to establish the presence of statutory designated sites of nature conservation interest in relation to the proposed development and European Protected Licences (EPSL) for bats and great crested newts (GCNs) granted within 2 km of the Site.
- Where's the Path was used to review Ordnance Survey (OS) data and Google Earth Pro[3] to obtain recent and historical aerial photography of the local area. This was used to understand landscape-scale connectivity and to identify any ponds (with potential to support great crested newt) in relation to the Site boundary.

2.3 An approach was also made to the operators of the Breedon Wickwar aggregates quarry to the east of the Site for ecological information relating to their land holding, but no information was received.

Field survey

UK habitat classification

2.4 A habitat survey of the Site was undertaken on 8th June 2022 and 1st July 2022 by Senior Ecologist Kirsty Rogers ACIEEM. A further habitat survey of the field in the north of the Site required for access off Farleigh Lane was undertaken on 19th October 2022 by Senior Ecologist Rosie Sparks ACIEEM. The weather conditions were optimal on all days[4].

2.5 The survey was undertaken with reference to the UK Habitat Classification (The UK Habitat Classification Working Group, 2018). During the survey, the Site was walked over and the species composition and condition of all habitats present recorded. Habitats were then classified and mapped in accordance with UK Habitat Classification nomenclature, photographs taken, and target notes (TN) made of features of specific interest. The results of UK Habitat Classification survey are readily compatible with the use of the Defra Metric (currently version 3.1), making a biodiversity gain calculation more straightforward to complete.

2.6 The survey was extended to make an assessment of the presence of, or potential for, protected or notable species to be associated with the habitats present on or close to the Site. Each tree on site was assessed for its potential to support roosting bats and classified as having "low, moderate or high" potential. The Site was also searched for the presence of invasive non-native plants, such as Japanese knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera*, as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Breeding bird survey

2.7 Three walkover breeding bird surveys of the Site were completed. All were undertaken by Senior Ecologist Joanne Conway, QualCIEEM.

[1] Available at www.magic.defra.gov.uk/magicmap.aspx

[2] Available at https://wtp2.appspot.com/wheresthepath.htm

[3] Google Earth Pro 7.3.4.8248 (64-bit)

[4] On 8 June the weather was sunny with broken cloud cover (4/8), 17°C and a mild breeze (Beaufort Force (BF) 4). On 1 July the weather was warm, 15°C, with broken cloud (6/8) and a mild breeze (BF 4). On 19 October the weather was warm, 14°C, with low cloud (3/8) and a light breeze (BF 2).

2.8 The objective of the surveys was to characterise the breeding bird community of the Site, and in particular to identify any evidence of ground-nesting birds likely to be breeding within the fields (as opposed to on their edges).

2.9 Each survey took two mornings to complete and commenced approximately 45 minutes after sunrise; the first survey was on 19 and 20 April, the second on 17 and 18 May and the third on 09 and 10 June 2022. The weather during each survey is summarised in **Table 1** below.

Table 1: Summary of the weather conditions during the breeding bird surveys

Survey date	Start time	End time	Cloud cover (Oktas)	Visibility	Temperature (°C)	Wind speed (Beaufort Scale)	Wind direction	Precipitation
19/04/22	07:00	11:00	1	200 m – 1 km	1	1	NE	None
20/04/22	06:45	09:15	1	1 km – 2 km	6	2	E	None
17/05/22	06:10	10:55	2	1 km – 2 km	13	0	SW	None
18/05/22	06:04	08:05	0	200 m – 1 km	10	1	SW	None
09/06/22	06:06	09:30	1	1 km – 2 km	13	1	SSW	None
10/06/22	06:07	08:18	5	1 km – 2 km	10	2	SSW	None

2.10 During the surveys all field boundaries were walked. Frequent stops were made to scan suitable habitats and to listen for singing and calling birds. Birds were recorded onto field maps using standard British Trust for Ornithology (BTO) 2-letter species codes and behavioural symbology, and a final territory map produced based on the result of the three visits.

Great crested newt survey

2.11 Initial desk study identified eight ponds within the Site boundary and a further nineteen ponds within 250 m of the Site (including the access road). The location of these ponds is shown on **Figure 4**.

2.12 Waterbodies within the Site were assessed for their potential to support great crested newt using the Habitat Suitability Index (HSI) scoring method on 20th April 2022 (Oldham *et al.,* 2000). This work was undertaken by Joanne Conway.

2.13 A HSI assessment is a quantitative means of evaluating habitat quality for great crested newt and is measured using ten indices (these are location, surface area, desiccation rate, water quality, percentage shade, waterfowl and fish presence, surrounding terrestrial habitat, other ponds within 1m, and macrophyte cover). The HSI provides an overall numerical index to indicate habitat suitability for great crested newt (ARG UK, 2010).

2.14 An environmental DNA (eDNA) survey for great crested newt of two on-site ponds (ponds 21 and 27) and one offsite pond (pond 6) was undertaken on 27th April 2022 by Joanne Conway (Natural England Class 1 licence no. 2022-10303-CL08-GCN). Other seasonal pools (10, 15, 16, 17, 18, and 19) on Site were either dry or too shallow for an eDNA sample to be taken.

2.15 Methods were based on industry standard techniques for survey and analysis (Biggs *et al*., 2014), and involved collecting water samples from around the perimeters of the ponds. Samples were then

sent for an analysis by a certified laboratory to identify the presence of absence of great crested newt DNA.

2.16 For ponds within the wider area (1, 2, 4, 5, 7, 8, 9, 11, 12, 20, 22, 23, 24, 25, and 26), the respective landowners, Breedon Quarries and the Tortworth Estate were contacted to request access to assess ponds and undertake eDNA surveys:

- Tortworth Estate did not allow access; however, on review of local OS maps, it was considered that pond one within their land would be visible from public footpaths. It was possible to check the continued existence and complete a HSI survey of this pond from the footpath on 27 June 2022. The remaining ponds on the Tortworth Estate were not visible and were not accessed.

2.17 A second Site visit was carried out on 16 May 2023 to check the status of the ponds on Site had not changed since the 2022 survey (in support of the District Licence Application).

2.18 A summary of the dates ponds were accessed, the HSI scores and any available DNA results have been included in Appendix 1.

Ground level tree assessment (GLTA)

2.19 A GLTA of all trees on Site was completed on 8 and 27 June 2022 by Rosie Sparks ACIEEM (Level 2 Natural England Survey Class Licence 2020-46325-CLS-CLS) based on industry standard guidance which aims to categorise trees based on their suitability for roosting bats (Collins, 2016). The survey was facilitated using a high-powered torch and binoculars.

2.20 The categories used to classify trees were as follows:

- **High:** Trees with multiple highly suitable features capable of supporting larger roosts.
- **Moderate:** Trees with multiple suitable features capable of supporting fewer bats than high potential trees and unlikely to support roosts of high conservation status.
- **Low:** Trees with few suitable features capable of supporting very low numbers of bats, or trees of a suitable size / age to support roosting features, but with no such features seen from the ground.
- **Negligible:** Trees with no suitable features. These were not recorded during the survey.

Biodiversity gain

Background to current policy and legislative status of biodiversity gain in England

2.21 The policy basis for securing measurable biodiversity (net) gain is already set out in the National Planning Policy Framework (NPPF) which states that planning policies and decisions should provide net gains for biodiversity. Paragraph 180 introduces the principle of measuring biodiversity gain in relation to developments, stating: '…*opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity...*'.

2.22 The Environment Act 2021 includes the provision of mandatory biodiversity gain[5] for developments in England; this will be mandated through an amendment to the Town and Country Planning Act 1990. The two-year transition period following Royal Assent (November 2021) means that mandatory biodiversity gain will become law in autumn 2023. This will require:

- The provision of a required percentage of biodiversity gain, currently set nationally to be at 10%.
- The use of the national Defra Biodiversity Metric to calculate the biodiversity gain, currently Metric 4.0.

[5] The Environment Act refers to biodiversity gain rather than biodiversity net gain.

- The provision of a biodiversity gain plan to demonstrate how biodiversity gain will be delivered on and or off-site; statutory instruments and regulations are in preparation by Defra and Natural England to provide templates for reporting.
- Biodiversity gain will be secured for a fixed period, currently nationally set at 30 years.
- Demonstration of how the biodiversity gain will be secured; conservation covenants will be used to deliver this which are in preparation by Defra and Natural England.
- A national register of land used for biodiversity gain will be established; this will involve setting up a new biodiversity credits market, the approach for which is in preparation by Defra and Natural England.

2.23 Until the end of the two-year transition period, the NPPF policy guidance and any relevant Local Plan policy applies in relation to biodiversity gain.

Stage 1 – site visit

2.24 An extended habitat survey of the Site was undertaken in June, July and October 2022 (refer to section 3.5 onwards). Habitat types and conditions were recorded with reference to Panks *et al*. (2022), to enable completion of the Defra Biodiversity Metric. This information has subsequently been used to inform the assessments of the condition of the habitats present (see Stage 2).

Stage 2 – biodiversity change assessment calculation

2.25 The Defra Biodiversity Metric 3.1 Calculation Tool (Defra, April 2022) was initially used to make the calculation using the Landscape Strategy.

2.26 The calculation was then updated in August 2023 due to a landscape change on Site, using Defra Biodiversity Metric 4.0 Calculation Tool (Defra, 2023). The updated Landscape Strategy (Drawing reference: P22-0915_09) can be found in Appendix 2.

2.27 Using the information obtained from the surveys the habitats present on Site and their condition were identified, with reference to the UK Habitat Classification (The UK Habitat Classification Working Group, 2018) and the Biodiversity Metric 3.1 Technical Supplement (Panks *et. al*., 2022), and inputted into the pre-development calculation. This provides an on-site baseline from which the biodiversity value of the Site may be derived, given by the number of biodiversity units.

2.28 The post-development calculation is based on the proposed development and landscape scheme, taking into account any habitat retention, enhancement and creation within the red line boundary and also taking into account any off-site (beyond the red line boundary) habitat enhancement and creation measures should these be required.

Assumptions and limitations

2.29 The biodiversity gain assessment is based on habitats only and does not take account of any required species actions, such as those for legally protected species which are addressed separately within the relevant sections of this report.

2.30 Professional judgement has been applied to identify realistic habitat type/s and area (in ha) of habitat/s could potentially be created, what condition they would need to achieve and how they would (broadly) be maintained. The outcome of the biodiversity gain assessment using the Defra Biodiversity Metric are illustrative and show in principle the extent and type of biodiversity improvements that can be achieved by the development.

Limitations to field methods

2.31 Off-site ponds 2, 4, 7, 8, 9, 20, 25 and 26 were not surveyed as access was denied. However, the lack of this data is unlikely to change the assessment of the potential impacts of the development on great crested newts. Where appropriate, recommendations have been made in relation to further great crested newt mitigation and therefore this limitation is not considered to be significant.

2.32 The land within the north of the Site to facilitate the access track was added to the application boundary after the bird survey work was complete. Due to the timing of this change, breeding bird survey of this land was not completed. This is not considered to be a significant constraint as the types of bird species expected in the hedgerows and fields along the access track are likely to be typical of those recorded on Site during the surveys of the main Site.

2.33 The survey of the northernmost field adjacent to Farleigh Lane was undertaken in October 2022 which is acceptable in terms of habitat classification but outside the optimum period for detailed botanical survey. The timing of the habitat survey is not considered to be a significant constraint on the commission as it has been possible to accurately identify habitat types.

Personnel

2.34 Personnel principally involved in the planning and implementation of field survey at the Site, and in the production of this report were as follows:

- Habitat survey work was completed by Kirsty Rogers, Senior Ecologist, ACIEEM. Kirsty has worked as a professional ecologist since 2013 and has experience in the delivery of numerous ecological assessments for projects of varying scale and complexity. Kirsty holds a Natural England survey licences for bats and GCN and has particular interest and expertise in botanical survey and data analysis.
- Joanne Conway QualCIEEM undertook the breeding bird survey work and eDNA survey of the on-Site ponds. Joanne is a Senior Ecologist at BSG Ecology, and has over four years' applied post graduate experience. Joanne is a Level 1 Natural England Class licence holder for great crested newts and is experienced in leading surveys for population assessments and undertaking eDNA surveys. She has undertaken walkover breeding and wintering bird surveys at numerous sites in South Wales and the west of England, and is familiar with all species likely to be encountered by sight and sound. Joanne also holds a bird ringing licence, a degree in Zoology and a Post Graduate Certificate in Ecological Survey Techniques from the University of Oxford.
- Rosie Sparks ACIEEM undertook the ground truthing of offsite ponds, assisted in the habitat survey work, and was the primary author of this report. Rosie has over five years of ecological consultancy experience and holds a Level 1 Natural England Survey Class licence for great crested newt, a Level 2 Natural England Survey Class Licence for bats and a Natural England Survey Class licence for barn owl. She has a BSc (Hons) degree in Conservation Biology and an MSc in Ecology and Conservation from Lancaster University.
- Owain Gabb (MCIEEM, CEnv), Director of Ecology, acted as technical director for the work. Owain has worked as a professional ecologist since 1999 and with onshore renewables projects since 2002. He typically co-ordinates and directs support to planning applications where birds, protected species and habitats require detailed consideration, and which are often subject to Environmental Impact Assessment and / or Habitats Regulations Assessment. He has worked throughout the UK and Ireland and has a well-developed understanding of legal and policy drivers.
- Daniel Foster (MCIEEM), Principal Ecologist has worked as a professional ecologist since 2005. He has experience in the preparation and review of Preliminary Ecological Appraisal and Ecological Impact Assessments for a range of developments in the UK, Daniel helped with the review of this report and review of the Biodiversity Net Gain assessment.

3 Results and Evaluation

3.1 In this section the results of fieldwork and desk study are brought together. Interpretation of the results and any proposed mitigation and enhancement measures are identified in Section 5. A summary of biodiversity legislation and policy relevant to designated areas, habitats and species is contained in Appendix 6.

Desk study

Statutory designated sites

3.2 There are no internationally designated statutory sites located within 2 km of the Site.

3.3 There is one Site of Special Scientific Interest (SSSI) within 2 km of the Site: Slickstones Quarry SSSI. The SSSI is approximately 517 m to the north-east of the Site, and is notified for its geological interest only. Slickstones Quarry SSSI is therefore scoped out of further ecological consideration and is not considered further in this assessment.

Non-statutory designated sites

3.4 There are two non-statutory designated sites of nature conservation interest within 2 km of the Site, details are provided in Table 2. No SSSIs within the search area have been notified for their nature conservation interest.

Table 2: Non-statutory designated sites within 2 km of the Site boundary

Site name and designation	Description	Location relative to Site
Harris's Wood and Bloody Acre Site of Nature Conservation Interest	Designated for a range of habitats important for nature, such as mixed woodland, open standing water, and scrub. The site contains species such as ramsons, wood melick, wood sedge and wood spurge.	582 m to the west of Site
Hammerley Wood Site of Nature Conservation Interest	Ancient and broadleaved woodland containing plant species such as ramsons, wood anemone, wood-sedge, giant fescue, yellow archangel, wood melick and wood millet.	717 m to the east of the Site

Onsite habitat data

3.5 The habitats present on Site are described below and illustrated in Figures 1a and 1b. Photographs are presented in Section 8 and target notes are included in Appendix 3.

3.6 The desk study identified the following priority habitats within 2 km of the Site boundary:

- A small area of traditional orchard priority habitat approximately 64 m north of the Site boundary.
- Three Priority Ponds within the 2 km buffer, the closest of which is 564 m to the east of the Site boundary which has a known population of great crested newts.
- A large area of wood pasture and parkland BAP Priority habitat 593 m to the northwest of the Site boundary.
- Deciduous woodland is present approximately 772 m to the northeast of the Site boundary.
- The nearest ancient woodland is Brand Wood approximately 878 m to the northeast of the Site boundary.

Modified grassland (G4)

3.7 Modified grassland is present within larger fields in the southern and eastern parts of the Site (photographs 25 and 26). The field in the north of the Site required for access of Farleigh Lane, is

also modified grassland (photographs 38 - 40). The sward is approximately 50 cm in height, uniform, lush and grass dominant with few herb species present. The fields appear to be managed rotationally with some evidence of cattle grazing noted (although none recently at the time of survey). Species present including abundant perennial rye grass *Lolium perenne* and Italian rye grass *L. multiforum*, with frequent timothy *Phleum pratense*, occasional cock's-foot *Dactylis glomerata*, rough meadow grass *Poa trivialis* and Yorkshire fog *Holcus lanatus*.

3.8 Herb species present are common for this habitat type and include occasional common nettle *Uritica diocia*, creeping buttercup *Ranunculus repens*, dandelion *Taraxacum officinale* agg., ribwort plantain *Plantago lanceolata* and white clover *Trifolium repens*.

3.9 This habitat does not meet the definition of any priority habitat (Maddock, 2011) or South Gloucestershire Local Priority Habitat (South Gloucestershire, 2016).

Other neutral grassland (G3c)

3.10 Three fields in the north of the Site (at the proposed access track and to the north of the solar array area) are indicative of other neutral grassland. The section of the Site north of Talbots End (at the proposed access track), the sward is 30 – 40 cm long, grass dominant, dense and lush (photograph 2). Evidence of recent cattle grazing was noted.

3.11 Further south within the proposed solar array, the larger field had a much shorter sward, notably grazed to 20 cm, with a band of unmanaged vegetation along its southern edge (see TN 2). The smaller field to the immediate east is again longer, dense, with no obvious grazing or recent management.

3.12 Species present are similar to those found within the modified grassland with a grass dominant sward containing frequent false oat *Arrhenatherum elatius*, meadow foxtail *Alopecurus pratensis* and couch grass *Elymus repens* also. Herbaceous species recorded contained fewer "undesirable species" (see footnote 4), with red clover *Trifolium pratense,* meadow buttercup *Ranunculus acris,* groundsel *Senecio vulgaris*, forget-me-not *Myosotis arvensis*, cut-leaved cranesbill *Geranium dissectum*, field bindweed *Convolvulus arvensis* and common vetch *Vicia sativa.* The grassland is considered to be "other neutral grassland" due to the number of species per metre squared.

3.13 This habitat does not meet the definition of any priority habitat (Maddock, 2011) or South Gloucestershire Local Priority Habitat (South Gloucestershire, 2016).

Cereal crops (c1c7)

3.14 Fields along the westernmost edge of the Site are planted with barley *Hordeum vulgare* crops (photograph 26).

3.15 Field margins are narrow, approximately 1 – 1.5 m in width with no obvious management noted. Densely vegetated, field margins contain an equal proportion of grass and herb species including those found in commonly disturbed, cultivated habitats, such as occasional hairy tare *Vicia hirsuta*, scarlet pimpernel *Anagallis arvensis*, mouse-ear *Pilosella officinarum*, goosefoot *Chenopodium album*, spurge *Euphorbia peplus*, cow parsley and meadow vetch *Lathyrus pratensis*.

3.16 Meadow sweet *Filipendula ulmaria*, hemp-agrimony *Eupatorium cannabinum*, water avens *Geum rivale,* common reed *Phragmites australis* and field horsetail *Equisetum arvense* were also present in damper areas and along field / hedge ditches.

3.17 South Gloucestershire Local Priority Habitat includes arable farmland, particularly cereal field margins[6] (South Gloucestershire, 2016 and 2006).

[6] No specific criteria provided.

Hedgerows (priority habitat) (h2a)

3.18 The Site is bisected by a largely continuous and species rich hedgerow network (averaging 6-7 woody native species per 30 m). Hedgerows are typically box cut, averaging 2 m in height and 3 m in width, with continuous canopy layer (photographs 1, 25, 26 and 28). Several hedges throughout the centre of the Site have associated features including banks or ditches (see **Figure 1**). Mature trees were present within several hedgerows, these were wildly spaced (averaging > 30 m apart), comprising ash *Fraxinus excelsior*, crack willow *Salix fragilis* and pedunculate oak *Quercus robur.*

3.19 Species present throughout the canopy layer include abundant hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*¸ frequent hazel *Corylus avellana*, field maple *Acer campestre* and elder *Sambuca nigra* and occasional dogwood *Cornus sanguinea*, pedunculate oak, ash, elm *Ulmus minor*¸ dog rose *Rosa canina* and ivy *Hedera helix.* Spindle *Euonymus europaeus* and buckthorn *Rhamnus cathartica* also occurred rarely.

3.20 The hedgerow understory was dense, stock proof and comprised grassland species, including commonly occurring species such as occasional hedge woundwort *Stachys sylvatica*, wood avens *Geum urbanum*, black bryony *Tamus communis*, rough chervil *Chaerophyllum temulum*, hedge mustard *Sisymbrium officinale*, hedge bindweed *Calystegia sepium*, bittersweet *Solanum dulcamara* and honeysuckle *Lonicera periclymenum*.

3.21 The hedgerows on Site for the most part meet moderate condition criteria including for height (> 1.5 m average), width (> 1.5 m average), canopy gaps (< 10 % of total length), no non-native / neophyte species and no current damage (> 90 % of hedgerow is undisturbed / free of damage by human activities).

3.22 The hedgerows also meet criteria that would qualify them as a Habitat of Principal Importance hedgerows (Maddock, 2011) (i.e., more than 20 m long and comprising > 80 % native woody species) and as hedgerow biodiversity action plan habitats (South Gloucestershire, 2006).

Ponds

3.23 All ponds on Site and within 250 m of the Site boundary, are shown on Figure 2 (as recorded during 2022, photographs 10 - 24). OS mapping and aerial imagery shows that there are eight waterbodies within the Site boundary (shown as ponds 10, 15-19, 21 and 27) and nineteen waterbodies outside the Site boundary.

3.24 The waterbodies on Site are a mix of seasonal waterbodies and ponds but for ease are all labelled as ‘ponds’ on Figure 2.

3.25 Ponds are a Priority Habitat, however, the ponds on Site do not meet the description of Habitats of Principal Importance in Maddock (2011), failing to meet criteria such as containing species of high conservation importance, being of high ecological quality and are not recognised as important because of their age, rarity of type or landscape context.

Scrub

3.26 A parcel of unmanaged grassland and scrub over a large depression located in the north of the Site (see TN3 and Figure 1a) On the southern edge is a small south facing embankment with rough grassland and patches of bare ground and stone (offering suitable invertebrate habitat in otherwise poor surrounding habitat).

3.27 Bordering scrub is formed of dominant blackthorn *Prunus spinosa* and hawthorn *Crataegus monogyna* with elder *Sambuca nigra*, bramble *Rubus fruticosus* agg. and alder *Alnus glutinosa*.

Standard trees

3.28 A number of mature trees are present on Site within the fields and hedgerows, mostly consisting of English oak *Quercus robur* and common ash *Fraxinus excelsior.*

3.29 All trees were assessed to be in 'good' condition, all meeting five or six of the criteria described in the Defra biodiversity metric.

Offsite habitat data

Woodland

3.30 Two areas of woodland are present adjacent to the Site (both offsite). These include an area of mixed woodland located adjacent to the easternmost Site boundary, and a parcel of mixed plantation woodland located towards the south of the Site.

Other lowland mixed deciduous woodland (w1F7)

3.31 A band of scrubby / immature woodland (circa 20 years old) forms a screen between the Site and the adjacent quarry.

3.32 Species present within the canopy layer include frequent field maple, ash, and crack willow, and occasional mature oak. The scrub layer is dense towards the centre of the woodland parcel, comprising bramble, hawthorn, hazel, and blackthorn. The understory, particularly along the habitat margins is open, with dominant, scattered common nettle throughout.

3.33 This woodland habitat scored 28 points within the condition assessment indicating moderate condition. The criteria the habitat scored highly on included criteria 2 (no significant wild, domestic, and feral herbivore damage), 3 (no invasive species), 4 (number of native tree species), 5 (cover of native tree and shrub species) and 6 (open space within woodland).

3.34 This habitat meets the definition for Lowland Mixed Deciduous Woodland priority habitat (Maddock, 2011) and broadleaf woodland biodiversity action plan habitat (South Gloucestershire, 2006).

Mixed plantation woodland (w1H5)

3.35 The parcel of plantation woodland comprises a mixture of Norway spruce *Picea abies* and Lawson's Cypress *Chamaecyparis lawsoniana*, bordered by broadleaved species including pedunculate oak ash, hazel, field maple and horse-chestnut *Aesculus hippocastanum*. The shrub layer is open with small, isolated patches of holly *Ilex aquifolium* and elder. The understory comprises a dense carpet of dog's mercury *Mercurialis perennis* with occasional nipplewort *Lapsana communis*, hedge woundwort and hedge mustard. Common nettle is locally abundant along the woodland edge.

3.36 This woodland habitat scored 21 points within the condition assessment (a low score). The criteria the habitat scored poorly on include 1 (age distribution of trees), 4 (number of native tree species), 7 (woodland regeneration), 9 (vegetation and ground flora) and 11 (veteran trees).

3.37 This habitat does not meet the definition of any priority habitat (Maddock, 2011) or South Gloucestershire Local Priority Habitat (South Gloucestershire, 2016) (photograph 29).

Biodiversity net gain assessment

Current habitat condition

3.38 Table 3 presents the existing habitat types, their conditions and the justifications.

Table 3: Existing area-based habitat types and condition

Defra Metric 4.0 Habitat	Habitat Condition	Condition assessment rationale
Modified grassland	Moderate	Following the condition criteria for modified grassland (of low distinctiveness), this grassland is in moderate condition, meeting five of the seven condition assessment criteria (Panks *et al*,

		2022). These include criteria A (a range of species between 6-8 species per m^2), C (ratio of scrub < 20 % cover), E (bare ground between 1 – 5 %), F (bracken < 20 % cover) and G (undesirables[7] making up < 5 % cover). The grassland did not meet criteria 2 (requiring a variable sward height) and 4 (physical damage present in < 5 %).
Other neutral grassland	Poor	This habitat type meets two of five criteria resulting in a poor condition assessment score; criteria C (cover of bare ground between 1 – 5 %) and D (cover of bracken and scrub < 5 % and < 20 %, respectively). The appearance and composition of this habitat best fits the description for "other neutral grassland" but does not closely match the characteristics of this specific habitat type therefore does not meet criteria A. Additionally, this habitat did not meet criteria B (varied sward height), or criteria E (combined cover of species indicative of sub-optimal condition and physical damage is < 5 %).
Cereal crops - arable	N/A	No condition assessment is required for this habitat type and this habitat does not meet the definition of any priority habitat (Maddock, 2011).
Blackthorn scrub	Moderate	This meets four of the five condition assessment criteria. These are conditions A, B, C and D. The scrub failed criteria E.
Native species rich hedgerows with trees	Moderate	There are more than 50 hedgerows on Site, all of which are very similar in condition. All hedgerows on Site pass condition assessment criteria A1, A2, B2 and D1. As all hedgerows fail condition assessment criteria C1, C2 and D2 all hedgerows on Site are considered to be moderate condition. Some hedgerows additionally fail condition assessment criteria B1 and E1.
Rural trees	Good	38 individual trees have been assessed as part of the condition assessment. As all trees have passed either five or six of the condition assessment criteria, all trees are considered to be in good condition. A summary of each tree's condition can be found in Table 4 below.
Wet ditch (D1)	Poor	This meets four of the eight condition assessment criteria. These include criteria A, C, F and H. The ditch did not meet criteria B, D, E or G.
Non-woodland pond (pond 10)	Poor	This meets five of the nine condition assessment criteria. These include criteria B, D, E, F and G.

[7] Undesirables in this instance are defined as "invasive non-native species (as listed on Schedule 9 of WCA, 1981".

		The pond was dry at the time of inspection and failed criteria 1, C, H and I.
Non-woodland pond (pond 15)	Poor	This meets five of the nine condition assessment criteria. These are criteria B, C, E, F and G. The pond failed to meet criteria A, D, H and I.
Non-woodland pond (pond 16)	Poor	This meets five of the nine conditions assessment criteria. These are criteria C, D, E, F and G. The pond failed to meet criteria A, B, H and I.
Non-woodland pond (pond 17)	Poor	This meets five of the nine conditions assessment criteria. These are criteria C, D, E, F and G. The pond failed to meet criteria A, B, H and I.
Non-woodland pond (pond 18)	Poor	This meets five of the nine conditions assessment criteria. These are criteria C, D, E, F and G. The pond failed to meet criteria A, B, H and I.
Non-woodland pond (pond 19)	Poor	This meets five of the nine conditions assessment criteria. These are criteria C, D, E, F and G. The pond failed to meet criteria A, B, H and I.
Non-woodland pond (pond 21)	Poor	This meets five of the nine conditions assessment criteria. These are criteria C, D, E, F and G. The pond failed to meet criteria A, B, H and I.
Non-woodland pond (pond 27)	Poor	This meets five of the nine conditions assessment criteria. These are criteria C, D, E, F and G. The pond failed to meet criteria A, B, H and I.

Table 4: Overview of the individual tree conditions to be input into the calculator.

Tree number	Number of individuals	Diameter (cm)	Criteria met	Overall Condition
21	1	900	Six of six condition assessment criteria met	Good
22	1	700	Six of six condition assessment criteria met	Good
23	1	970	Six of six condition assessment criteria met	Good
33	1	780	Six of six condition assessment criteria met	Good
48	1	900	Six of six condition assessment criteria met	Good
49	1	950	Six of six condition assessment criteria met	Good
50	1	900	Six of six condition assessment criteria met	Good
79	1	610	Six of six condition assessment criteria met	Good

G4	12	380*	Five of six condition assessment criteria met	Good
G7	10	80*	Five of six condition assessment criteria met	Good
G12	6	130*	Five of six condition assessment criteria met	Good
Total trees	**38****			

*N.B. the measurement states the maximum diameter of the trees in the group
**N.B. Please note that only freestanding trees are considered within Table 4. Trees within the hedgerows are accounted for within the hedgerow habitat types.

Biodiversity calculation results

Post-development habitats calculation

3.39 Table 5 shows the proposed post-development habitat types and conditions. Appendix 5 and Figure 5 shows the Biodiversity Gain Headline Results.

3.40 To deliver the target condition, it is proposed that the habitat will be created, managed and monitored through the preparation of a Landscape Ecological Management Plan (LEMP).

Table 5: Proposed post-development habitat types and target conditions

Proposed habitat	**Proposed habitat condition**	**Condition assessment rationale**
Other neutral grassland	Poor	To be created on arable and modified grassland following suitable ground preparation. The solar array areas will be sown with wildflower species (such as Emorsgate EM2F Standard General Purpose Wild Flowers) and will be managed through low intensity grazing by sheep. It is considered that the grassland will develop a level of species diversity and sward variation but assumed Poor condition on a precautionary basis due to overshading from solar panels
Retained other neutral grassland	Poor	Current neutral grassland in buffer areas of the access track. No planned enhancements, no specific management proposed to retain current condition
Retained modified grassland	Moderate	Current modified grassland in buffer areas of the access track. No planned enhancements, no specific management proposed to retain current condition
Retained modified grassland	Poor	Current modified grassland in buffer areas of the access track. No planned enhancements, no specific management proposed to retain current condition
New planting mixed scrub	Moderate	To be created on arable and modified grassland. Will be a mix of native species of local provenance that will develop into a varying age range in time and through appropriate management. The presence of undesirable species (such as thistles and nettle) will be controlled through management

Retained blackthorn scrub	Moderate	Current area of blackthorn scrub. No planned enhancements, no specific management proposed to retain current condition
New planting native species rich hedgerows	Moderate	New hedgerows will be managed to become tall, wide and dense with a wide margin of grassland on at least one side. Negative impacts from nutrient enrichment, invasive species and damage from human activities is unlikely to occur. A precautionary condition of moderate is assumed.
Retained native species rich hedgerows with trees	Moderate	No specific management proposed to retain current condition
Retained species rich hedgerows with trees	Good	Enhanced through planting up of gaps using native species and changing damaging management practices. Spot treatment to reduce undesirables will increase the condition to good.
New pond creation	Moderate	New pond will be managed to become of good water quality, not overly dominated with plants or algae, to allow oxygen transfer and light to enter the pond and not stocked with fish. Continued management to ensure the pond is free from non-native species will ensure moderate condition.
Retained non-woodland pond (Ponds 15 -18)	Moderate	Enhancement of existing ponds to increase the water quality and increase the habitat distinctiveness from 10m surrounding the pond will increase the condition of the ponds to good.
Retained non-woodland pond (ponds 10, 19 21 and 27)	Poor	No planned enhancements, no specific management proposed to retain current condition
Sustainable urban drainage system	Moderate	The new SUDS feature will be managed so that the vegetation structure is varied, providing opportunities for a wide variety of animals, but preventing the spread of invasive non-native species. A precautionary condition of moderate is assumed.
Artificial unvegetated unsealed surface	N/A	No condition assessment required
Developed land sealed surface	N/A	No condition assessment required

Lowland mixed deciduous woodland	Poor	To be created on modified grassland and other neutral grassland. Will use a mix of native tree and shrub species to create an understory and canopy layer. It is considered that the woodland will develop features such as deadwood, but it will lack age diversity, veteran trees and ancient woodland species so the woodland is assumed Poor condition on a precautionary basis.
Rural trees	Moderate	Native trees to be planted on Site. Trees will be oversailing vegetation and managed so that there will be no adverse impact on tree health by human activities.

Results of the Biodiversity Calculation

3.41 Key results of the calculation are shown in Table 6 and Table 7 below.

Table 6: Calculator outputs showing the biodiversity net gain habitat units on Site

On-site baseline	238.13
On-site post-intervention	270.10
On-site net % change	13.42%

Table 7: Calculator outputs showing the biodiversity net gain hedgerow units on Site

On-site baseline	128.24
On-site post-intervention	172.89
On-site net % change	34.83%

3.42 There is no net loss or net gain of River units.

3.43 The current layout provides a net gain in area habitats of 31.96 (13.42%).

3.44 The current layout provides a net gain in hedgerows of 44.66 (34.83%)

3.45 There is a slight decrease in net % change from the Defra Metric 3.1 to version 4.0. This difference in value relates to changes within the metric between versions and the values attributed to certain habitats.

3.46 Details of the habitat creation and ongoing management should be included in the LEMP.

Protected and notable species

3.47 Bristol Regional Environmental Records Centre (BRERC) returned 1609 records of 203 species within 2 km of the Site. The results are summarised in **Table 8**; consideration is given to these records and to the habitats present on Site when determining the potential for the Site to support protected and priory species.

3.48 Species data received from BRERC is incorporated into the species accounts in Table 8 below.

Table 8: Summary of species and habitat data on Site.

Summary of Important Species and Habitats. Further information regarding relevant legislation and policy can be found in **Appendix 6**	**Data search results**	**Survey results and habitat suitability**
Bats Bats, their roosts and resting places are protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Several species of bats are also Species of Principal Importance (SPI) and are listed as Priority Species under Sections 40/41 of the Natural Environment and Rural Communities (NERC) Act 2006.	Six species of bat were recorded within 2 km of the Site: common pipistrelle *Pipistrellus pipistrellus,* soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, serotine *Eptesicus serotinus,* Natterer's bat *Myotis nattereri*, and an unidentified *Myotis* species. Of a total of 18 records, 15 refer to confirmed bat roosts. Roosts recorded were for common pipistrelle, soprano pipistrelle, brown long-eared bat, serotine and Natterer's bat. There were also two previously issued bat mitigation licences within 2 km of the Site. One of these was for common and soprano pipistrelles and brown long-eared day roost, and the second was for a common pipistrelle day roost. The closest roost was recorded 77 m to the south of the Site boundary. This record shows five roosts (brown long eared, two common pipistrelle roosts, a Natterer's roost and a soprano pipistrelle roost) recorded at this point from 2018.	The Site is largely arable farmland and grassland with intact hedgerows and several ponds and drainage ditches. Connectivity to the wider environment is considered to be good, due to the continuous hedgerows leading to high value habitats such as pockets of semi-natural deciduous woodland and water bodies such as flooded quarries which are likely to provide a valuable foraging resource. The arable fields and modified grassland are likely to be of low value to foraging and commuting bats. The modified grassland fields are grown for silage and cut several times a year. The northern most other neutral grassland field is occasionally cattle grazed. Overall, the Site was considered to have moderate value to commuting and foraging bats. Numerous mature trees across the Site have potential roost features (PRFs) that could support roosting bats such as T26 and T30 (see Section 7, Figure 2). There are no buildings on Site. Full results of the ground level tree assessment can be found in Appendix 4.
Badger Badgers *Meles meles* are protected under the Protection	Seven records of badger *Meles meles* were returned from the BRERC. None of the records were from within the Site. The closest was a road casualty approximately 75 m west of the Site from 2001.	Badger tracks were noted on Site on the access track just south of Talbot's End (photograph 32). No other evidence of badger presence such as setts or latrines was found during the surveys.

of Badgers Act (1992) and Schedule 6 of the W&CA 1981 (as amended).		A mammal track was noted on Site (photograph 27), however this could not be attributed to badger use. The arable fields provide poor foraging opportunities for badger, however the grassland and hedgerows provide optimal habitat to house setts and for foraging.
Birds All nesting birds are protected under Section 1 of the W&CA 1981 (as amended). Greater protection is afforded to species listed on Schedule 1 of the W&CA 1981 (as amended).	BRERC returned records for 79 species of bird; of these three species are listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) including barn owl *Tyto alba*, redwing *Turdus iliacus* and peregrine *Falco peregrinus* although none of these were recorded within the Site boundary. 470 of 1113 records are Birds of Conservation Concern 5 (BoCC5) Red or Amber Listed species, the most recent of which was published in 2019. Two species of red-listed bird associated with farmland, yellowhammer *Emberiza citrinella* and linnet *Linaria cannabina* are among the species found within the 2 km search radius. The nearest record of yellowhammer is located 500 m to the south of the Site boundary in 2004; however this species has been more recently recorded in 2012, 1.4 km south of the Site. A total of eight records of linnet were also returned by the data search; the most recent record is from 2019, located approximately 1.7 km south of the Site boundary.	Three breeding bird surveys were undertaken between April and June of 2022. Figure 3 showing the summary of the red and amber listed species on Site can be found in Section 7. The surveys identified 35 species on, adjacent to or flying over the Site. Of those, 30 species exhibited behaviour indicative of potential breeding on or adjacent to the Site. Two species featuring on the Birds of Conservation Concern 5 red list (skylark and yellowhammer) and seven Amber-listed species (bullfinch, dunnock, sedge warbler, stock dove, whitethroat, woodpigeon, and wren) were noted during the surveys. These species (with the exception of skylark) are all likely to have bred in field boundary hedgerows, trees or areas of scrub. There was no clear evidence of skylark or any other species of open ground breeding on Site; one bird was recorded singing over a field within the Site boundary during the first survey visit, but there was no evidence a territory persisted in this location. Seven skylark territories were recorded in off-Site fields. Of the species recorded, the majority of activity was associated with the hedgerows adjacent to and within Site. The bird assemblage is considered typical for the habitats and location of the Site.
Great crested newt Great crested newts (GCN) *Triturus cristatus* are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and under Schedule 5 of the Wildlife and Countryside Act (W&CA) 1981 (as amended)	The data search returned thirteen records for great crested newt *Triturus cristatus* within 2 km of the Site ranging between 2010 and 2020. The closest of these was a record of ten great crested newts found 166 m to the northeast in 2017 (within pond 25) which is well connected to the Site by woodland habitat. The most recent record was of six great crested newts 1.2 km to the southwest in 2020. The remaining twelve records are separated from Site by significant barriers to dispersal, such large arable fields without connecting hedgerows.	Eight waterbodies were found on Site, and a further eleven ponds are located within 250m of the Site boundary. Pond 1 was only accessed in June 2022. The pond returned an HSI score of below average and was dry at the time of inspection, though it was evident that it had recently held water. The pond is surrounded by good quality terrestrial habitat and connected to the wider landscape through hedgerows. Ponds 3, 10-12, 19, 22 and 23 have been classified as seasonal waterbodies. All were found to be dry on inspection of 20 April 2022. These are all small depressions within hedgerows and scrub which are overgrown and heavily shaded.

	There have also been two great crested newt mitigation licences issued within a 2 km search radius of the Site, the most recent of which was in 2020. Both of these are for areas within Wickwar Quarry and are 754 m and 794 m east of the Site boundary respectively.	Ponds 15–18 were found to be holding shallow water on the initial Site visits in April 2022, however these were all too shallow to subject to an eDNA survey. All four waterbodies returned an HSI score of average or below (full results available in Appendix 1). All four waterbodies were found to be dry on second inspection in June. Pond 24 was only accessed in June 2022 when it was found to be holding water, and aquatic plants were noted. The pond is heavily shaded and surrounded by scrub meaning that it was not possible to access for an eDNA survey. Ponds 6, 21 and 27 were subject to an eDNA survey in April 2022. All three returned a negative result. The ponds all contained aquatic flora and were considered to have potential to support breeding great crested newts. There is no data relating to ponds, 2, 4, 7, 8, 9, 20 and 26 as these could not be accessed for survey. Pond 25 could not be accessed for survey, however the desk study showed this pond to contain a small population of ten great crested newts in 2017. A further Site visit in May 2023 checked the status of the accessible on-Site ponds to add detail to the GCN District Licence Application. Ponds 1, 15, 16, 17, 18 and 19 were all found to be holding water. Ponds 10, 22 and 23 were found to be dry at the time of survey. The off-Site ponds (2-4, 7-9, 11, 12, 20, and 24-26) were not accessible. Ponds 6, 21 and 27 were not checked due to the eDNA negative result in 2022.The scrub, hedgerows and field margins on Site provide suitable terrestrial habitat including areas of cover for shelter, foraging and connective habitat for great crested newts to disperse through the landscape. However, the vast majority of the Site is considered sub-optimal terrestrial habitat for great crested newts. There are no significant barriers to dispersal between known records and the Site, therefore great crested newts could be present on Site. Full details on the survey effort and his scores for each pond are available in Appendix1 and Section 7, Figure 4.
Reptiles All reptiles are afforded protection under Schedule 5 of	There were three records returned by the data search: two slow worm *Anguis fragilis* and one grass snake *Natrx helvetica* the closest of these was 981 m to the west of the Site within a field margin of similar agricultural land.	The majority of the Site comprises low value habitat for reptiles as the limited vegetation cover does not provide suitable basking or foraging opportunities. The hedgerows and field margins provide some habitats suitable to support reptiles.

the W&CA 1981 (as amended).		The small area of scrub in the northern part of the Site provides a wider variety of vegetation presenting more opportunity for sheltering and foraging reptiles. There are several areas of rubble and wood piles in the north of the Site which would also offer shelter to over wintering reptiles. A number of potential hibernacula were identified on Site (photographs 3 and–5 - 9). No reptiles have been observed during any of the surveys on Site. On the basis that suitable reptile habitat is very limited, the Site is considered unlikely to support more than very low numbers of common reptile species which would, if present, be restricted to the field boundary hedgerows and the area of scrub.
Invertebrates Protection is afforded to species listed on Schedule 5 of the W&CA 1981 (as amended) and / or Section 41 of the NERC Act 2006.	The data search returned 42 records of invertebrates within 2 km of the Site boundary dating between 1949 and 2013. The data returned records of several species listed as species of principal importance under the NERC Act including pearl-bordered fritillary *Bolora euphrosyne* (1.73 km south of the Site), dingy skipper *Erynnis tages* (1.73 km south of the Site), and small heath *Coenonympha pamphilus* (1.48 km south of the Site).	The Site is heavily agriculturally improved with pesticides likely applied to the arable fields, and therefore is unlikely to be suitable to support a diverse or notable invertebrate community. Invertebrates noted on Site during the survey were red admiral *Vanessa atalanta,* white-tailed bumblebee *Bombus leucorum* and red-tailed bumblebee *Bombus lapidarius.* Pearl-bordered fritillary can be found in woodland clearings or rough hillsides where is occurs in association with its larval foodplants, *Viola* species; therefore it is unlikely to be present on Site. Dingy skipper can be found on a wide range of open sunny habitats such as chalk downland, woodland rides and heathland where foodplants (common bird's-foot-trefoil *Lotus corniculatus*, greater bird's-foot-trefoil *Lotus pedunculatus* and horseshoe vetch *Hippocrepis comosa*) grow in a sparse sward with bare ground. No habitat meeting this description was found on Site; therefore the Site is unlikely to support dingy skipper. Small heath occurs on grassland where there are fine grasses, especially where the sward is short and sparse. The habitats on Site are unlikely to support small heath.
Water vole Water vole is protected from intentional or reckless disturbance, damage to a resting place and intentional	The data search returned no records for water vole *Arvicola amphibius* within the desk study area.	The Site is a mix of arable farmland and grassland with limited habitat available for water vole. The majority of ditches on Site were dry (photograph 30) at the time of assessment, with the exception of one ditch on the southern boundary of the Site (photograph 31). The on-site ponds are also considered unsuitable to support water vole given the lack of banks and vegetation for foraging. They are also

killing or injuring of a water vole under the Wildlife and Countryside Act 1981 (as amended) and is an SPI		isolated and small, making it unlikely that water vole would be supported by these waterbodies. No evidence of water vole was found during the extended habitat surveys. The Site is not connected to other habitats capable of or known to support water vole, making it unlikely that water vole would be able to disperse on to Site.
Otter Otter *Lutra lutra* is protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and Schedules 5 & 6 of the W&CA 1981 (as amended).	The data search returned two records for otter *Lutra lutra* from 2008. Both were records of spraint along an unnamed stream 1.1 km west of the Site boundary.	The habitats on Site are not suitable for otter and no evidence of otter was recorded during the habitat survey work. There are five large waterbodies within 2 km of the Site which are potentially capable of supporting otter, however these are separated from the Site by terrestrial habitats which are of low value to otter. Given the lack of suitable habitat on Site it is considered unlikely that otter would disperse onto the Site.
Hazel dormouse Hazel dormouse *Muscardinus avellanarius* is protected under the Conservation of Habitats and Species Amendment) (EU Exit) Regulations 2019 and under Schedule 5 of the W&CA 1981 (as amended).	Three records for dormouse *Muscardinus avellanarius* were returned from between 1993 and 2003. The closest of a nest, 2.1 km south-west of the Site boundary in 2003. The other two records are 2.5 km south of the Site boundary from 1993. There are no dormouse mitigation licences visible on MAGIC within 2 km of the Site boundary. Connectivity between the location of these record and the Site is limited due to the lack of continuous hedgerows and presence of roads between the records and the Site.	The Site is in a geographical area known to have supported dormice. The extended habitat survey found that the hedgerows on Site are species rich and therefore suitable for dormice as they contain a variety of woody species capable of providing food sources all year round. Hedgerows are well connected throughout the Site and will provide shelter suitable for both summer and winter nests. However, connectivity between the Site and suitable habitat and known records of dormice in the wider environment is limited.
Invasive species Invasive species are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). It is an offence to facilitate the spread of these species in the wild.	A number of invasive species (both flora and fauna) have been noted within 2 km of the Site boundary. These include Canadian waterweed *Elodea canadensis* (606 m west) giant knotweed *Reynoutria sachalinensis* (772 m west and 1.06 km south) and giant hogweed *Heracleum mantegazzianum* (1.5 km southwest).	No invasive species (flora or fauna) were noted on Site during the survey.
Protected plants Including species protected under the Conservation of Habitats and Species (Amendment) (EU Exit)	BRERC returned no records of protected plant species within the search radius.	No protected flora species were recorded during the surveys. Protected plants are not considered further within this report.

Regulations 2019, Schedules 8 of the W&CA 1981 and / or Section 41 of the NERC Act 2006		
Other protected / notable species Including other species protected under Schedules 5 & 6 of the W&CA 1981 and / or Section 41 of the NERC Act 2006.	BRERC returned one record of brown hare *Lepus europaeus*. This record is from 500 m to the north of the Site boundary, recorded in 1996. BRERC returned three records of hedgehog *Erinaceus europaeus*. The nearest record is from 1.24 km south of the Site boundary, recorded in 2019. BRERC returned one record of weasel *Mustela nivalis* within the 2 km search area. The record is 563 m east of the Site boundary, recorded in 2002.	No field evidence or sightings of species were noted during any of the survey visits to Site. Habitats across the Site are common within the wider locale. Hedgerow and arable habitats on Site and the adjacent offsite woodland provide suitable habitat for all three species.

4 Potential impacts and recommendations

Designated sites

4.1 The development is unlikely to impact any statutory or non-statutory designated sites due to the location of the Site and the nature of the development in relation to them. No direct or indirect effects are anticipated, and no further assessment or mitigation is required.

Habitats

4.2 The development will result in the loss of arable land and the creation of further areas of neutral grassland. The type of grassland created, and the management regime implemented will need to ensure the delivery of biodiversity enhancement on Site during the operational phase of development. The DEFRA Biodiversity Metric 4.0 was used to quantify the biodiversity enhancement of the Site through biodiversity net gain.

4.3 Hedgerows will be retained where possible however, some removal will be required to facilitate access across the Site. The amount of hedgerow to be removed is unlikely to have a significant impact on the hedgerows, however the loss of this habitat has been mitigated for by hedgerow planting and enhancement. Hedgerow management will continue in line with the current management and gaps will be infilled elsewhere, mitigating for the minor hedgerow loss.

4.4 Landscape Mitigation Strategy Plan (Appendix 2) shows that the grassland under and around the solar arrays in the two arable fields will be sown to a mixed native grassland with wildflower species and will be managed through low intensity grazing by sheep. The existing grassland beneath the solar arrays will be managed through low intensity grazing by sheep; this will result in a more structured sward height than is currently present.

4.5 The buffers and other retained areas outside the solar arrays will be enhanced for wildlife. These will be seeded with wildflower mix and managed through rotational cutting every two to three years.

4.6 This will provide an increase in area habitat for small mammals, amphibians, reptiles, invertebrates and foraging habitat for birds and bats.

4.7 Given the extent of the habitat creation and enhancement measures including wildflower grassland, scrub and hedgerow planting it is considered that there will be beneficial effects on habitats.

Protected and notable species

4.8 The analysis of the desk study and field survey results have identified the potential for roosting and foraging bats and breeding birds to use the Site regularly. Great crested newts are present in the area surrounding the Site, and as several ponds in the wider area have not been accessed, it is possible that great crested newts use terrestrial habitats on Site. There is no evidence of reptiles on Site and the habitats present are sub-optimal, however their presence in the field margins surrounding the Site cannot be ruled out. Impacts on these species could occur unless steps are taken to avoid them.

4.9 It is assumed that the trees are being retained, and the existing field access points will also be retained and incorporated into the design of the Site where possible. Some widening of existing access points and removal of discrete areas of hedgerow may be required to facilitate access across the whole Site.

Bats

4.10 Trees and hedgerows and a perimeter buffer of at least 4 m around them will be largely retained. Hedgerow management will be implemented to enhance connectivity, shelter and foraging

opportunities for a range of species. The replacement of the arable fields to grassland is expected to increase the foraging opportunities across the Site.

4.11 The removal of hedgerow will be limited to the widening of several existing gateways and the removal of two sections to create new access points. It is considered that the limited hedgerow removal will avoid direct and indirect impacts on bats. If further tree or hedgerow removal is required, then further bat surveys to characterise the bat species on Site will be recommended.

4.12 The proposed development does not feature any operational phase lighting and any indirect impact on foraging and commuting bats will be limited to light pollution during the construction phase. It is anticipated that construction will be limited to daylight hours, so artificial lighting is unlikely. If temporary lighting is required, it should be designed to avoid spill onto hedgerows and mature trees. Control measures should be outlined in a CEMP pre-construction.

4.13 Provided that these avoidance and enhancement actions are followed, the development is expected to have a potentially positive impact on bats.

Birds

4.14 The hedgerows on Site are to be retained in the design, with the exception of small areas of removal to create and expand new / existing access points. Current nesting and foraging habitat will be available for a number of the species noted Site, such as linnet, yellowhammer and bullfinch.

4.15 The conversion of the current hedgerow margins to rough grassland also has the potential to result in more seeds and invertebrates for small passerines, and also to positively impact other bird species such as kestrel *Falco tinnunculus* and barn owl *Tyto alba*, due to increased foraging opportunities. It is recommended that nesting boxes for kestrel and barn owl are installed on Site.

4.16 Any removal of habitat with the potential to support breeding birds should be undertaken outside of the breeding bird season which is taken to be from March to August inclusive. The vegetation should be maintained in a suboptimal condition to discourage breeding activity throughout the construction period.

4.17 A method statement should be produced detailing measures to avoid impacts on nesting birds (as outlined above) and included in a CEMP pre-construction.

4.18 Provided that the avoidance and enhancement measures, the development is expected to have a beneficial impact on the bird populations on Site.

Great crested newts and amphibians

4.19 The results of the eDNA surveys suggest that GCN are absent from the ponds that were surveyed. GCN presence was confirmed in offsite pond 25 by the desk study. There is a possibility that GCN are present within other ponds adjacent to the Site and within the surrounding area. Whilst the fields on the Site itself provide poor terrestrial habitat for GCN, boundary features including hedgerows, woodland and the pond network provides some connectivity through the Site and wider landscape. Pond 25 is connected to the Site through good quality terrestrial habitats such as woodland and hedgerows which may allow dispersal on to Site.

4.20 Depending on the distribution of habitats, some individuals may range some distance from ponds to forage and hibernate. Natural England advise that '*as a general guide, suitable habitats within 250 m of a breeding pond are likely to be used most frequently'* (English Nature, 2001).

4.21 It is recommended that ponds 15, 16, 17 and 18 are enhanced to benefit GCN and a range of other species. Clearing some of the scrub surrounding the ponds will allow more light to reach them and increase their suitability for GCN. A working method statement will be required to minimise the impacts of works on GCN present.

4.22 The proposed habitat creation and enhancement will likely be of benefit to GCN during their terrestrial phase by increasing opportunities for shelter and foraging.

4.23 A District Licence enquiry has been submitted to Natural England for the proposed development and an Impact Assessment and Conservation Payment Certificate has been accepted by both parties. As is required under District Licencing, a separate habitat management and monitoring plan will be prepared that includes details of onsite habitat creation, management and monitoring specifically for GCN. This will be supported by the LEMP.

Reptiles

4.24 Although there is no identified reptile use of the Site their presence cannot be discounted. A construction phase working method statement for reptiles should be produced to help protect any reptiles present in the scrub, field margins and hedgerows during the construction phase.

4.25 The proposed habitat creation and enhancement will likely be of benefit to reptiles by increasing opportunities for shelter and foraging. reptiles.

Dormice

4.26 Although there is no identified dormouse use of the Site, their presence cannot be discounted due to the geographical location and the quality of the habitat on Site.

4.27 The small-scale removal of the hedgerows is unlikely to impact the favourable conservation status of this species.

Other Species

4.28 Impacts on other species in the vicinity that were identified from the BRERC data are likely to be neutral due to the mitigation and enhancement ongoing for other species present on Site.

5 References

ARG UK, (2010). *Advice Note 5: Great Crested Newt Habitat Suitability Index*.

Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett. A., Williams, P., and Dunn, F. (2014). *Analytical and methodological development for improved surveillance of the Great Crested Newt*. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

Collins, J. (ed.) (2016). *Bat surveys for professional ecologists: good practice guidelines (3rd edn).* Bat Conservation Trust, London.

English Nature (2001) Great crested newt mitigation guidelines [online] https://cieem.net/resource/great-crested-newt-mitigation-guidelines/.

Gov.uk. (2021). National Planning Policy Framework - Publications - GOV.UK. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf. Accessed 12 July 2021.

JNCC (2010) Handbook for Phase 1 habitat survey. A technique for environmental audit. Joint Nature Conservancy Council. Peterborough.

Maddock, A. (2011). UK Biodiversity Action Plan Priority Habitat Descriptions. [online] https://data.jncc.gov.uk/data/2728792c-c8c6-4b8c-9ccd-a908cb0f1432/UKBAP-PriorityHabitatDescriptions-Rev-2011.pdf. Accessed 05/07/2022.

Natural England Joint Publication (2023) *Defra Biodiversity Metric 4.0.* Natural England

Oldham, R.S., Keeble, J., Swan, M.J.S., and Jeffcote, M. *(*2000) Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*) The Herpetological Journal, Vol. 10, pp. 143-155. Available online at https://www.thebhs.org/publications/the-herpetological-journal/volume-10-number-4-october-2000/1617-03-evaluating-the-suitability-of-habitat-for-the-great-crested-newt-triturus-cristatus/file

Panks, S., Potter, J., Nick White, N., Newsome, A., Nash, M., Russell, T., Heydon, M., Mayhew, E., Alvarez, M., Heaver, M., Cashon, C., Goddard, F., Scott, S.J., Stone, A., Scott, S.H., Treweek, J., Butcher, B. (2022) *Biodiversity metric 3.1: Auditing and accounting for biodiversity –User Guide*. Natural England.

South Gloucestershire Council (2006). South Gloucestershire Biodiversity Action Plan 2006-2016 [online]. Available at: https://www.southglos.gov.uk/documents/South-Gloucestershire-BAP-2006_15.pdf. Accessed on 06/07/2022.

South Gloucestershire Council (2016). South Gloucestershire Biodiversity Action Plan 2016-2026 [online]. Available at https://www.southglos.gov.uk/documents/Biodiversity-Action-Plan-2016-26.pdf. Accessed on 07/07/2022

South Gloucestershire Council (adopted 2017). *South Gloucestershire Local Plan: Policies, Sites and Places Plan* [Online]. Available at https://www.southglos.gov.uk/documents/PSP-Plan-Interim-Web-Version.pdf. Access on 6 July 2022

South Gloucestershire Council (2022). *Phase 2 Planning Policies* [Online]. Available at: https://beta.southglos.gov.uk/publications/local-plan-2020-phase-2-urban-rural-and-key-issues/phase-2-planning-policies#working-policy-title-biodiversity-net-gain. Accessed on 6 July 2022

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List

assessment of extinction risk for Great Britain. British Birds 114: 723-747. Available online https://britishbirds. co.uk/content/status-our-bird-populations

UKHab Ltd (2023). *UK Habitat Classification Version 2.0.* Available online https://www.ukhab.org. Accessed on 8 August 2023.

6 Figures

(overleaf)

Figure 1a: Varley Farm Extended Phase 1 – Phase 1 habitat plan

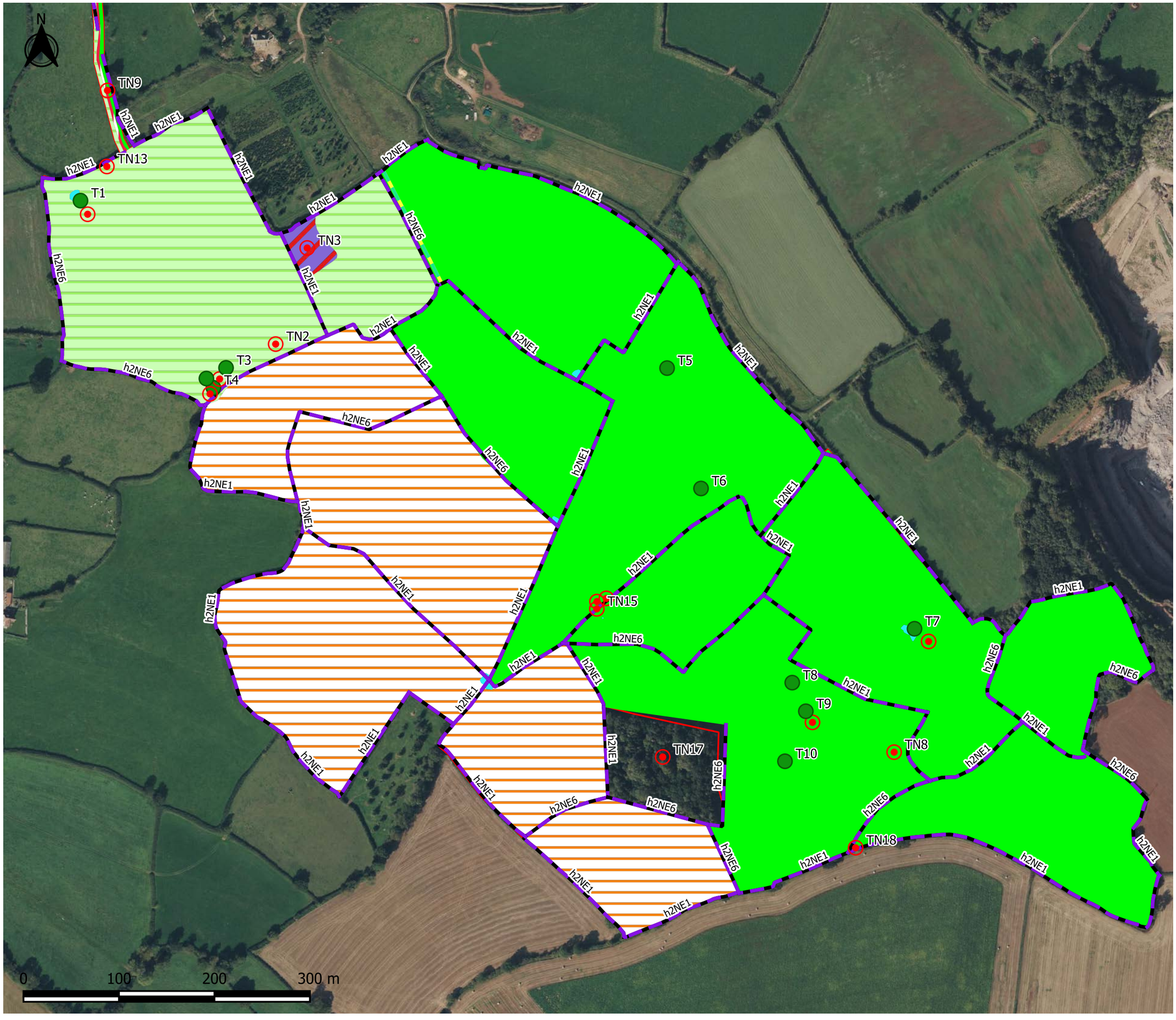
Figure 1b: Varley Farm Extended Phase 1 – Phase 1 habitat plan

Figure 2: Bat potential trees

Figure 3: Breeding bird summary

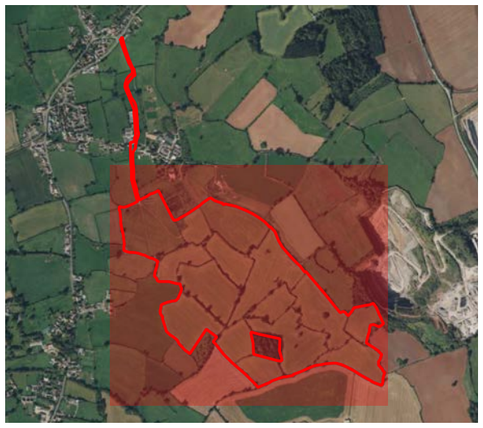
Figure 4: Varley Farm ponds - Pond status

Figure 5: Varley Farm proposed habitat plan



Legend

- Broadleaved Trees
- Target note
- Native Species Rich Hedgerow with trees (h2NE1)
- Native Species Rich Hedgerow with trees - Associated with bank or ditch (h2NE6)
- Ditches
- Blackthorn scrub
- Cereal crops
- Developed land; sealed surface
- Modified grassland
- Other neutral grassland
- Ponds (Non- Priority Habitat)
- Site boundary



BSG | ecology

OFFICE: NEWPORT
T: 01633 509000

JOB REF: P22-254

PROJECT TITLE

VARLEY FARM SOLAR SITE

DRAWING TITLE

Figure 1a: Varley Farm Extended Phase 1 - Phase 1 habitat plan

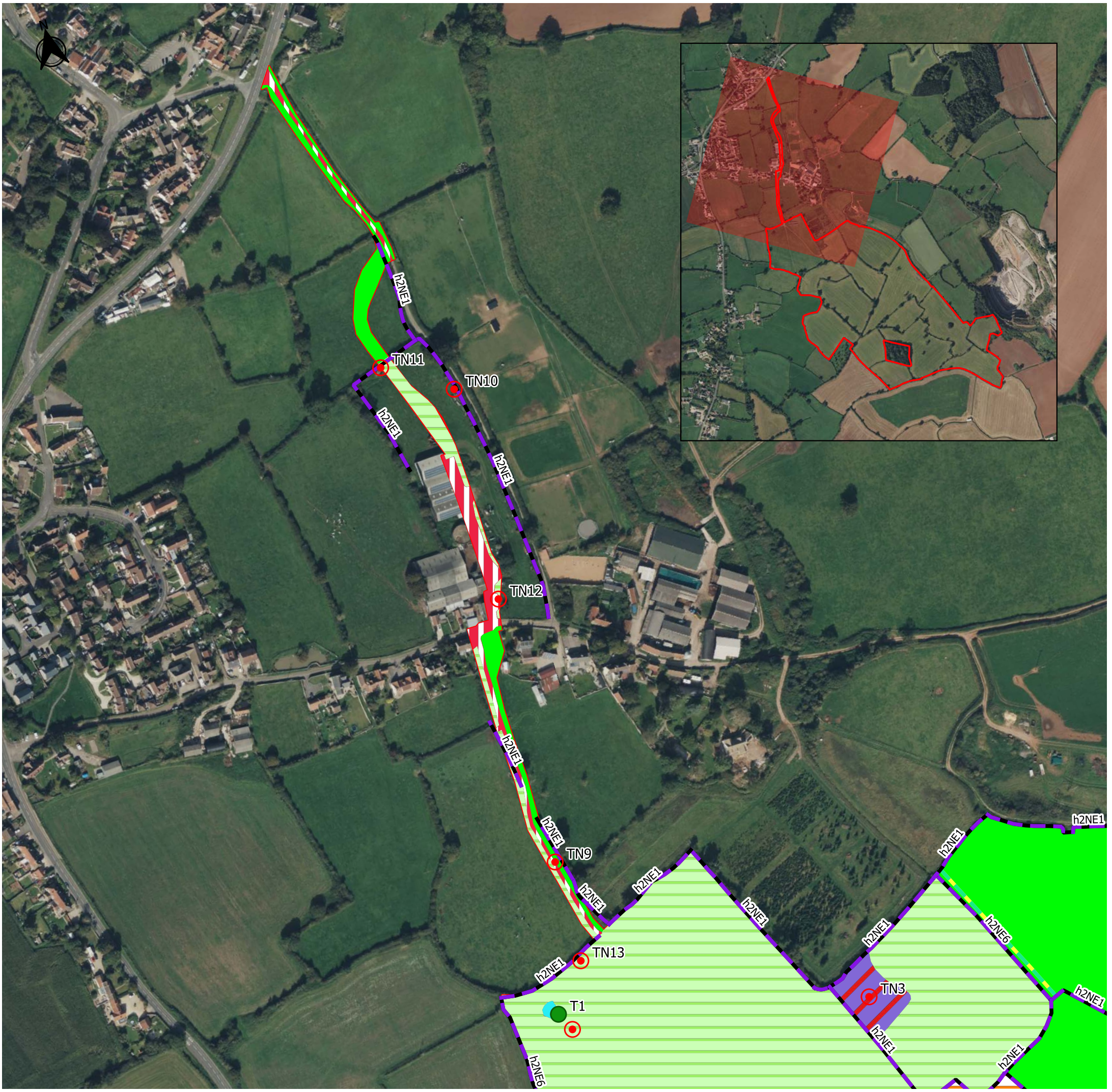
DATE: 11/07/2022 CHECKED: RS SCALE: 1:

DRAWN: SL APPROVED: RS VERSION:1.1

Projection: OSGB 1936/British National Grid - EPSG 27700

Sources: BSG Ecology survey data

Graphics Ref. No.: 01061



0 100 200 300 m

BSG | ecology

OFFICE: NEWPORT
T: 01633 509000

JOB REF: P22-254

PROJECT TITLE

VARLEY FARM SOLAR SITE

DRAWING TITLE

Figure 1b: Varley Farm Extended Phase 1 - Phase 1 habitat plan

DATE: 11/07/2022	CHECKED: RS	SCALE: 1:
DRAWN: SL	APPROVED: RS	VERSION:1.1

Projection: OSGB 1936/British National Grid - EPSG 27700
Sources: BSG Ecology survey data

Legend

- Broadleaved Trees
- Target note
- Native Species Rich Hedgerow with trees (h2NE1)
- Native Species Rich Hedgerow with trees - Associated with bank or ditch (h2NE6)
- Ditches
- Blackthorn scrub
- Cereal crops
- Developed land; sealed surface
- Modified grassland
- Other neutral grassland
- Ponds (Non- Priority Habitat)
- Site boundary

Graphics Ref. No.: 01121

0 200 400 600 m

BSG | ecology

OFFICE: NEWPORT
T: 01633 509000

JOB REF: P22-254

PROJECT TITLE

VARLEY FARM SOLAR SITE

DRAWING TITLE

Figure 2: Varley farm: Bat potential trees

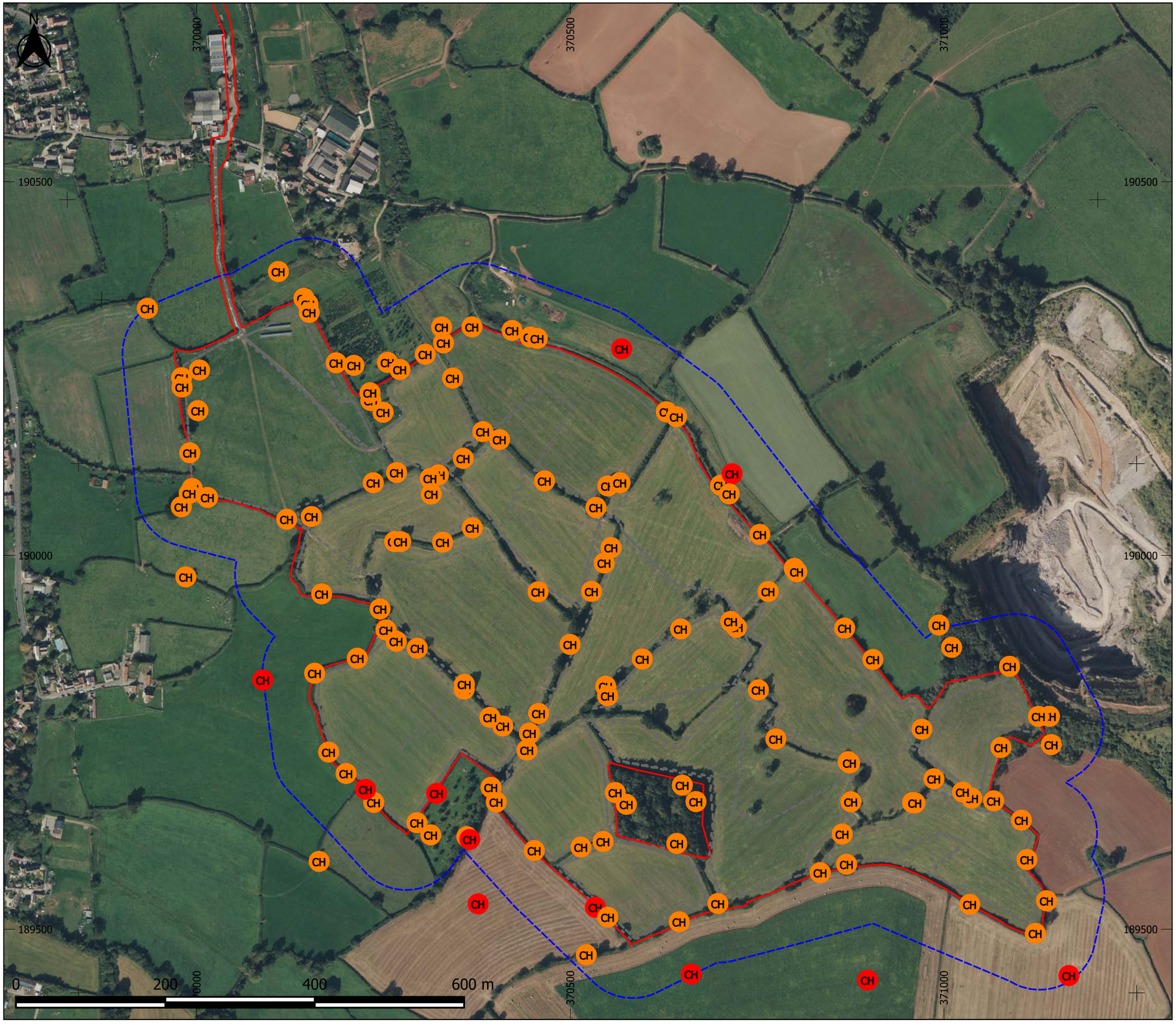
Legend

- High
- Low
- Moderate
- Survey boundary
- Site boundary

DATE: 11/07/2022	CHECKED: RS	SCALE: 1:
DRAWN: SL	APPROVED: RS	VERSION:1.2

Projection: OSGB 1936/British National Grid - EPSG 27700
Sources: BSG Ecology survey data

Graphics Ref. No.: 01125



Legend

BBS Territory by BoCC Status

- Red
- Amber
- Green
- Survey boundary
- Site boundary

BSG | ecology

OFFICE: NEWPORT
T: 01633 509000

JOB REF: P22-254

PROJECT TITLE

VARLEY FARM SOLAR SITE

DRAWING TITLE

Figure 3: Breeding Bird Summary

DATE: 01/12/2022 CHECKED: OG SCALE: 1:4,822

DRAWN: RS APPROVED: RS VERSION:1.1

Projection: OSGB 1936/British National Grid - EPSG 27700

Sources: BSG Ecology survey data

Graphics Ref. No.: 0174

0 300 600 900 m

BSG | ecology

OFFICE: NEWPORT
T: 01633 509000

JOB REF: P22-254

PROJECT TITLE

VARLEY FARM SOLAR SITE

DRAWING TITLE

Figure 4: Varley Farm ponds: Pond status

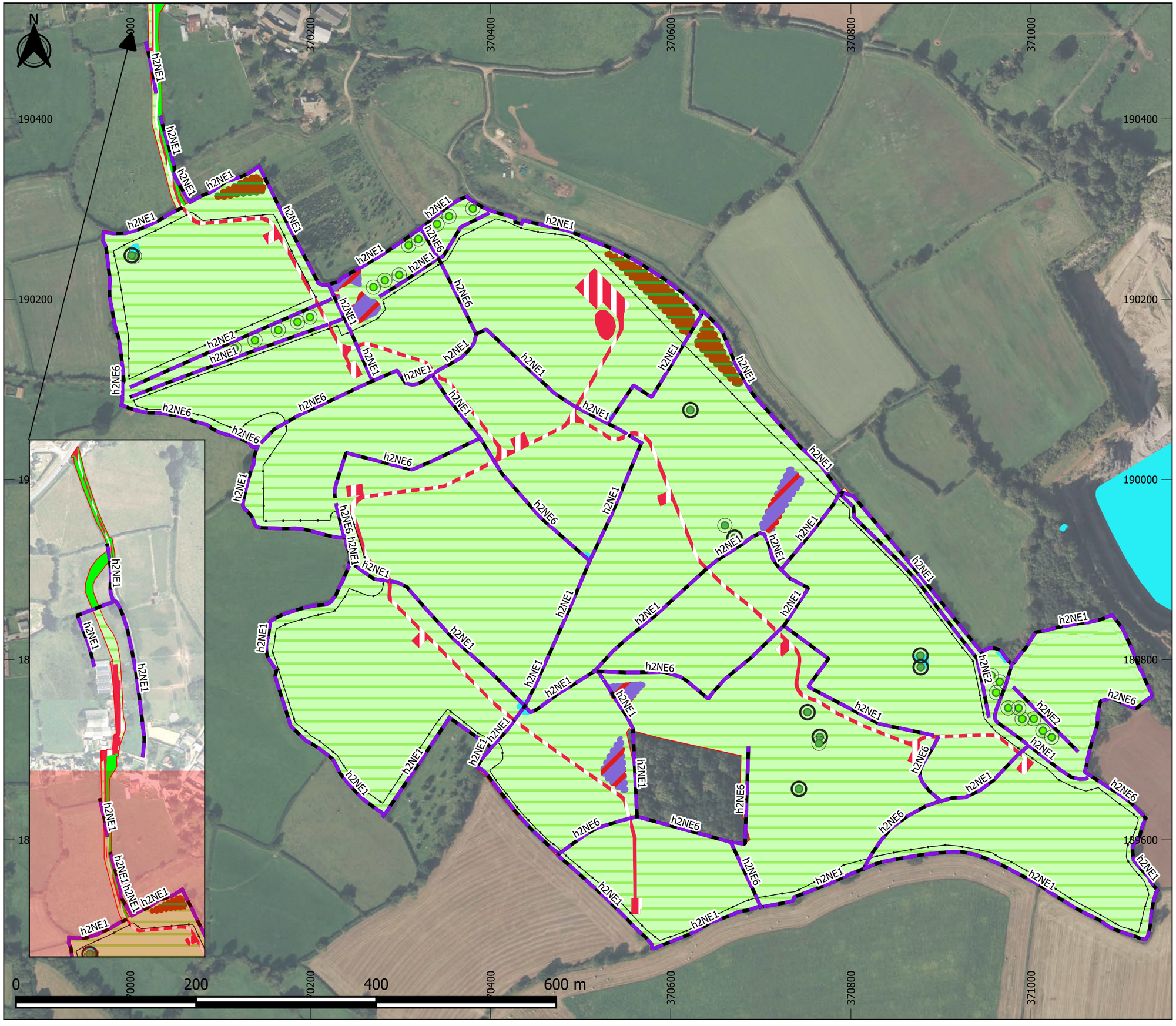
DATE: 01/12/2022	CHECKED: RS	SCALE: 1:
DRAWN: SL	APPROVED: RS	VERSION:1.2

Legend

- Dry
- eDNA negative
- GCN present (from desk study)
- Holding water
- No data available
- Scoped out
- Survey boundary
- Site boundary

Projection: OSGB 1936/British National Grid - EPSG 27700
Sources: BSG Ecology survey data

Graphics Ref. No.: 01124



Legend

- Existing large tree
- Existing medium tree
- Existing small tree
- Proposed small tree
- Native Species Rich Hedgerow (h2NE2)
- Native Species Rich Hedgerow with trees (h2NE1)
- Native Species Rich Hedgerow with trees - Associated with bank or ditch (h2NE6)
- Built linear features (u1e)
- Blackthorn scrub
- Developed land; sealed surface
- Lowland mixed deciduous woodland
- Mixed scrub
- Modified grassland
- Other neutral grassland
- Ponds (Non- Priority Habitat)
- Sustainable urban drainage feature
- Temporary lakes, ponds and pools
- Site boundary

BSG | ecology

OFFICE: NEWPORT
T: 01633 509000

JOB REF: P22-254

PROJECT TITLE

VARLEY FARM SOLAR SITE

DRAWING TITLE

Figure 1: Proposed Site Layout

DATE: 07/08/2023 CHECKED: RS SCALE: 1:4,000

DRAWN: CS APPROVED: RS VERSION:1.0

Projection: OSGB 1936/British National Grid - EPSG 27700

Sources: BSG Ecology survey data

Graphics Ref. No.: 04112

7 Photographs

Photograph reference	Photographs and description	Description
1		Looking north along Farleigh Lane which will be used as the main access track.
2		Looking northeast across the field where part of the access track will be built.

3		TN–0 - piles of building rubbish piled on pallets and being encroached by scrub. Suitable for some hibernating reptiles, amphibians and invertebrates.
4		TN–1 - Stone hut found within the northern part of the Site. Examined for bat and barn owl potential and found to be negligible potential to support both.

5		TN11 – Interior of the Stone hut found on Site, filled with sleepers and wood, partially covered in brambles. Has the potential to support hibernating reptiles and amphibians.
6		TN12 – Building materials stacked above ground on pallets. Limited potential for hibernating reptiles or amphibians.

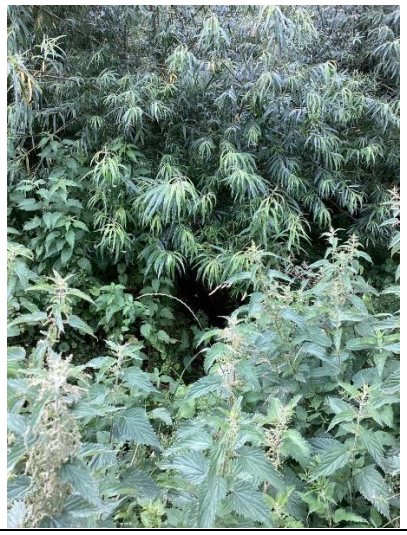
7		TN12 – Gravel pile immediately adjacent to the building materials at the northern end of the Site. The slabs of concrete and paving slabs partially within the undergrowth. Suitable for hibernating reptiles and amphibians.
8		TN13 – Gravel pile adjacent to the hedgerow in the northern part of the Site. Suitable for hibernating reptiles and amphibians and well connected to good habitat.

9		TN14 – Pile of stones stacked up against the base of a mature oak tree. Suitable hibernation habitat for reptiles and amphibians.
10		Pond 1 – Pictured on 27 June 2022. Recently dried but evidence of aquatic plants such as duckweed visible in the basin of the pond. Pond is heavily shaded but habitat suitable for terrestrial great crested newts adjacent and connected to the wider landscape via hedgerows. Pond 1 was found to be holding water during the check on 16 May 2023.

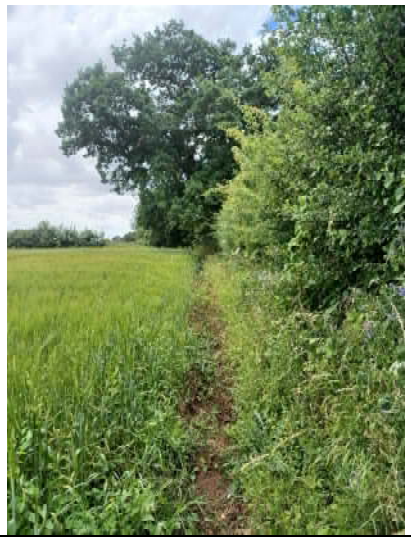
11		Pond 3 – Pictured on 20 April 2022. Seasonal pool already dried and mostly devoid of aquatic plants. Some water mint *Mentha aquatica* present on the periphery of the pond. Heavily choked with willow leaves from the surrounding scrub.
12		Pond 6 – Pictured on 20 April 2022. Holding water and aquatic plants and plants indicative of damp ground such as soft rush *Juncus effusus* present.
13		Pond 10 – Pictured on 19 April 2022. Seasonal pool already dried. Aquatic plants absent, and plants such as common nettle *Urtica dioica* present in the basin of the pool. Pond 10 was confirmed to be dry during the check on 16 May 2023.
14		Pond 11 – Pictured on 20 April 2022. Dry at the time of inspection and full of terrestrial plants.

15		Pond 12 – Pictured on 19 April 2022. Seasonal pool dry at the time of inspection. Terrestrial plants such as ground ivy *Glechoma hederacea*, nettles and grass sp. present in the basin of the pool.
16		Pond 15 – Pictured on 19 April 2022. Seasonal pool still holding a small amount of water, but not enough to eDNA or capable of supporting breeding GCN. Pool holds terrestrial plants such as grass. Pond 15 was found to be holding water during the check on 16 May 2023.
17		Pond 16 – Pictured on 19 April 2022. Holding shallow water but basin is choked with leaf litter from the surrounding scrub. Lack of aquatic plants present. Pond was dry on second inspection on 27 June 2022. Pond 16 was found to be holding water during the check on 16 May 2023.
18		Pond 17 – Pictured on 19 April 2022. Seasonal pool holding shallow water, located under blackthorn scrub. Grass present in the basin of the pool and lack of aquatic plants. Pond was dry on second inspection on 27 June 2022. Pond 17 was found to be holding water during the check on 16 May 2023.

19		Pond 18 – Pictured on 19 April 2022. Holding shallow water but basin is choked with leaf litter from the surrounding scrub. Lack of aquatic plants present. Pond was dry on second inspection on 27 June 2022. Pond 18 was found to be holding water during the check on 16 May 2023.
20		Pond 21 – Pictured on 19 April 2022. Holding shallow water and in the process of drying. Pond is choked with detritus from the surrounding scrub. No plants suitable for breeding great crested newts present. eDNA survey returned a negative result.
21		Pond 22 – Pictured on 19 April 2022. Seasonal pool dry and choked with scrub on inspection. Pond 22 was confirmed to be dry during the check on 16 May 2023.

22		Pond 23 – Pictured on 19 April 2022. Seasonal pool holding shallow water, located under blackthorn scrub. Pond 22 was confirmed to be dry during the check on 16 May 2023.
23		Pond 24 – Pictured on 27 June 2022. Pond holding water on inspection, but heavily shaded and surrounded by scrub and plants. No further inspection possible.
24		Pond 27 – Pictured on 19 April 2022. TN4- Holding shallow water and suitable to eDNA. Water mint and soft rush present capable of supporting breeding great crested newts. eDNA survey returned a negative result.

25		North field pictured looking north towards where the access track enters the Site. Picture shows modified grassland typical of the Site.
26		Other modified grassland and hedgerows in the central part of the Site.
27		TN16 showing mammal track found through the hedgerow and dry ditch on Site on 27 June 2022.

28		Showing an example of the cereal crops on Site and associated field margin, bat potential tree and hedgerows on Site.
29		Exterior of Lake Copse, pictured from the southwestern part of the Site. Hedgerow is pictured in front of the copse and cereal crops are present in the foreground.
30		Example of the dry ditches found across the Site. Ditches are choked with terrestrial plants.

31		Ditch on Site labelled as the Cromwell Brook on maps, present on the southern edge of the Site. Holding water on 27 June. No flow observed. Habitat is heavily shaded and has a lack of plants suitable to support protected species such as water vole.
32		Badger tracks noted on Site on 1 July 2022.
33		Scattered broadleaved trees on Site

34		Field margins on the southernmost hedgerow on Site.
35		Parcel of unmanaged grassland and scrub in the north of the Site
36		Parcel of unmanaged grassland and scrub in the north of the Site
37		Area of unmown grassland, scrub and a mature pedunculate oak tree is located within a field to the south of the Site.

38		A wet drainage ditch is present to the southeast of the Site.
39		The northernmost field on Site required for access off Farleigh Lane. Surveyed on 19 October 2022.
40		Section of hedgerow that will be removed to re-open the gateway off Farleigh Lane to create access on to Site.
41		View of the proposed access route, looking south from where the gateway will be re-opened on to Site.

Appendix 1: Great Crested Newt Survey results

The ponds varied in quality as indicated by the Habitat Suitability Index (HSI) scores below. As noted, it is considered that ponds 3, 10, 11, 12, 19, 22 and 23 did not hold sufficient water long enough to be capable of supporting amphibian populations. eDNA survey confirmed that great crested newts as absent from pond 6, 21 and 27.

Pond	Photographs	HSI	Suitability for GCN	2022 Notes	2023 Update
1	10	0.56	Below average	Dry as of 27/06/22	Holding water on 16/05/23
2	N/A			No data available	No data available.
3	11			Scoped out as dry on 20/04/22	No data available.
4	N/A			No data available	No data available.
5	N/A			Scoped out as more than 250m from Site boundary	No data available.
6	12	0.48	Poor	eDNA negative	No data available.
7	N/A			No data available.	No data available.
8	N/A			No data available.	No data available.
9	N/A			No data available. Surrounded by thick blackthorn and hawthorn scrub. Inaccessible to survey.	No data available.
10	13			Scoped out as dry on 20/04/22	Confirmed to be dry 16/05/23
11	14			Scoped out as dry on 20/04/22	No data available.
12	15			Scoped out as dry on 20/04/22	No data available.
13	N/A			Scoped out as more than 250m from Site boundary	No data available.
14	N/A			Scoped out as more than 250m from Site boundary	No data available.
15	16	0.56	Below average	Too shallow to eDNA. Dry as of 27/06/22	Holding water on 16/05/23
16	17	0.42	Poor	Too shallow to eDNA. Dry as of 27/06/22	Holding water on 16/05/23
17	18	0.66	Average	Scrub limiting access to pond edge. Dry as of 27/06/22	Holding water on 16/05/23
18	19	0.46	Poor	Too shallow to eDNA. Dry as of 27/06/22	Holding water on 16/05/23
19	N/A			Scoped out as dry on 20/04/22	Holding water on 16/05/23
20	N/A			No data available.	No data available.

21	20	0.61	Average	eDNA negative	No data available.
22	21			Scoped out as dry on 20/04/22	Confirmed to be dry 16/05/23
23	22			Scoped out as dry on 20/04/22	Confirmed to be dry 16/05/23
24	23	0.59	Below average	Holding water as of 27/06/22	No data available.
25	N/A			Could not be accessed for survey, however the desk study showed this pond to contain a small population of ten great crested newts in 2017.	No data available.
26	N/A			Quarry. No data available.	No data available.
27	24	0.76	Good	eDNA negative	No data available.

SureScreen Scientifics

Folio No: E13184
Report No: 1
Purchase Order: P22-254
Client: BSG ECOLOGY LTD
Contact: Joanne Conway

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 03/05/2022
Date Reported: 10/05/2022
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
3072	Pond 6 Varley Farm	ST 69887 90569	Pass	Pass	Pass	Negative	0
3073	Pond 27 Varley Farm	ST 70554 89818	Pass	Pass	Pass	Negative	0
3074	Pond 21 Varley Farm	ST 70881 89800	Pass	Pass	Pass	Negative	0

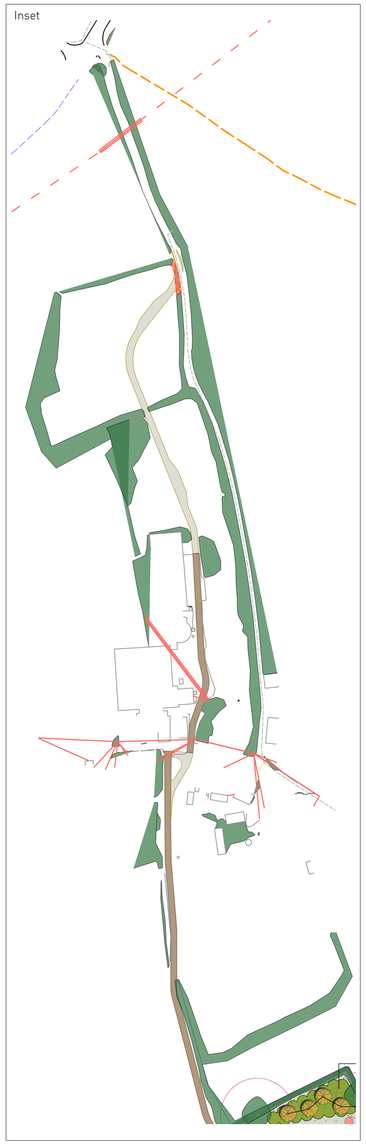
If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Esther Strafford **Approved by:** Chris Troth

Forensic Scientists and Consultant Engineers
SureScreen Scientifics Ltd, Morley Retreat, Church Lane, Morley, Derbyshire, DE7 6DE
UK Tel: +44 (0)1332 292003 Email: scientifics@surescreen.com
Company Registration No. 08950940

Appendix 2: Landscape Strategy

Inset



PLANTING SPECIFICATION

1 GENERAL

1.1 All plants will conform to BS 3936-1 (1992): and be in accordance with the National Plant Specification. Supplying nurseries will be registered under the HTA Nursery Certification Scheme. All plants will be packed and transported in accordance with the Code of Practice for Plant Handling as produced by CPSE.

1.2 Planting will not be carried out when the ground is waterlogged, frost bound or during periods of cold drying winds.

1.3 All bare-root planting stock will be kept covered until actually planted in order to minimise water-loss and prevent the roots from drying out.

1.4 All bare-root planting stock will be root dipped in an approved water-retaining polymer.

1.5 If the formation level is compacted it should be ripped through before topsoiling.

2 TREE PLANTING

2.1 All areas of proposed structure mix/tree belt planting shall be ripped in advance of planting works.

2.2 All extraneous matter such as plastic, wood, metal and stones greater than 100mm diameter will be removed from the planting areas and disposed of off-site.

2.3 Where necessary existing weeds will be treated with a suitable glyphosate-based herbicide and a suitable period allowed to elapse, as recommended by the manufacturer, for the herbicide to take effect before new planting commences.

Standard

2.4 Standard trees are to be placed into pits (1000 x 1000 x 600mm depth) and backfilled with excavated topsoil. A general-purpose slow release fertiliser (at the rate of 35gm/m2) and Tree Planting and Mulching Compost (at the rate of 20 litres/m2) are to be incorporated into the top 150mm of topsoil during backfilling if existing ground is unsuitable for re-use or is deemed to be required. Where tree pits are more than 300mm deep, backfilled material shall be consolidated/firmed in 150mm layers.

2.5 Trees shall be planted as per the plant schedule shown on this drawing.

2.6 All standard trees will be held so that movement at the root collar is minimised until new roots have developed to anchor the tree. A single vertical stake (75mm dia x 1.8m length) will be used and attached to the tree at approximately 1200mm above ground level. Stakes will be driven 300mm into undisturbed ground beneath tree pit before planting the tree, taking care to avoid underground services and cables. The trees will be secured using proprietary rubber straps and must be firmly fixed with a spacing device used to prevent chafing against the tree.

2.7 All select standard trees will be protected from rabbit and deer damage by the fitting of 1.2m tree guards.

2.8 Composted bark mulch or equivalent will be spread to a depth of 50mm in a 1.0m diameter circle around all individual select standard trees.

2.9 All trees shall be watered in at the end of each day of planting.

Feathered Trees

2.10 Feathered trees are to be placed into the pits 500 x 500 x 300mm deep and backfilled with excavated topsoil site. A general-purpose slow release fertiliser (at the rate of 35gm/m2) and Tree Planting and Mulching Compost (at the rate of 20 litres/m2) are to be incorporated into the top 150mm of topsoil during backfilling if existing ground is unsuitable for re-use or is deemed to be required.

2.11 All newly planted feathered trees will be held so that movement at the root collar is minimised until new roots have developed to anchor the tree. Therefore low staking (75mm dia x 1.5m length) will be driven diagonally into the ground and attached to the tree at approximately 600mm above ground level. Stakes will be driven 300mm into undisturbed ground below base of tree pit before planting the tree, taking care to avoid underground services and cables. The trees will be staked using proprietary rubber ties and must be firmly fixed with a spacing device used to prevent chafing against the tree.

2.12 All feathered trees will be protected from rabbit and deer damage by the fitting of 600mm spiral tree guards.

2.13 All trees shall be watered in at the end of each day of planting.

3 NATIVE WOODLAND BUFFER PLANTING

Ground Preparation

3.1 Cut existing rough grass and weeds to between 20mm and 30mm and remove 300x300mm squares of turf.

Planting

3.2 All native shrub planting to be UK grown, cell grown 60-80cm stock.

3.3 The minimum overall recommended rooting depth for shrubs is 600mm and for trees is 900mm. The first 300mm shall be made up of multi-purpose topsoil, it shall be ensured that a suitable subsoil provides the remainder of the minimum rooting depth. Before receiving topsoil, subsoils should be loosened using ripping equipment; this shall be done when the subsoil is dry to encourage soil shattering. All stones and other objects larger than 50 mm shall be removed from the prepared surface.

3.4 Shrub / tree planting is to be as per the planting pattern as set out on the planting plan and planting schedule, with shrubs / trees planted at even spaces into the prepared soil at the specified number per centre, with minimal disturbance to the rootball, and well firmed in. Planting should avoid man-made grids and lines, and should group species together in groups of 5-7 plants. Spread ornamental pine bark mulch to a depth of 50mm to a 900mm diameter around each planting station.

3.5 All bare-root planting stock will be protected from rabbit damage using approved proprietary 0.6m (for shrub species) or 1.2m (for tree species) biodegradable shrub/tree guards, supported with 0.9m (or 1.35m for trees) x 32mm x 32mm softwood stakes as advised by the manufacturer.

3.6 All areas to receive native shrub planting to be covered with weed supressing coir matting and pinned into place. Wood chip mulch be spread to a depth of 75mm across the full extent of the coir matting, ensuring that the root flare and base of the stem, along with any ground cover plants, are not buried.

Maintenance

3.7 Using approved herbicides, a 900mm diameter circle centred on each planting station shall be kept weed free throughout the maintenance period. In the autumn following planting the CA will prepare a list of all plants which are dead, dying or diseased and are to be replaced during the following planting season.

4 NATIVE HEDGE PLANTING

Ground Preparation

4.1 Where necessary existing weeds will be treated with a glyphosate-based herbicide and a suitable period allowed to elapse, as recommended by the manufacturer, for the herbicide to take effect.

4.2 All extraneous matter such as plastic, wood, metal and stones greater than 50mm diameter will be removed from site to a registered waste disposal facility.

Planting

4.3 New hedgerows to be planted in double staggered rows as per schedule.

4.4 Existing hedgerows to have infill planting (as required following detailed review on site), species and stock size to match proposed new hedgerow planting (see planting schedule).

4.5 The plants should be planted using L shaped or straight notches) using spades of a design suitable for this purpose. The notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).

4.6 All bare-root hedge planting stock will be protected from rabbit damage using approved proprietary 600mm clear plastic spiral guards, supported with 0.9m 12/14lb canes as advised by the manufacturer. Excluding evergreen species.

4.7 All plants shall be watered in at the end of each day of planting.

4.8 Weed growth in all areas of tree planting will be controlled until successful establishment is achieved by careful application of a systemic herbicide such as Roundup by an approved landscaping contractor in order to clear any extraneous vegetation.

4.9 All hedgerow planted areas to be finished with a 50mm min depth of Amenity bark mulch.

Maintenance during first growing season

4.10 All dead, dying or diseased hedge plants will be replaced with plants of similar size and species. If the failure of the plant is due to disease and the disease is considered likely to re-occur then an alternative species may be used as replacement if agreed with the LPA.

4.11 The planting area will be kept weed free throughout the maintenance period using approved herbicides in April, June and August.

5 NATIVE HEDGEROW SUPPLEMENTARY INFILL PLANTING

Ground Preparation

5.1 Where necessary existing weeds will be treated with a glyphosate-based herbicide and a suitable period allowed to elapse, as recommended by the manufacturer, for the herbicide to take effect.

5.2 All extraneous matter such as plastic, wood, metal and stones greater than 50mm diameter will be removed from site to a registered waste disposal facility.

Planting

5.3 The planting arrangement shall be as set out in the plant schedule on the relevant planting plan.

5.4 Bare-root hedge plants shall be notch planted in a double staggered row at the rate of 5 plants per linear metre (using L- shaped notches) using spades of a design suitable for this purpose. The notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).

5.5 All container-grown planting stock will be protected from rabbit damage using approved proprietary 600mm biodegradable shrub shelters, supported with 0.9m x 32mm x 32mm softwood stakes as advised by the manufacturer.

5.6 All bare-root hedge planting stock will be protected from rabbit damage using approved proprietary 600mm biodegradable spiral guards, supported with 0.9m 12/14lb canes as advised by the manufacturer.

Maintenance during first growing season

5.7 All dead, dying or diseased hedge plants will be replaced with plants of similar size and species. If the failure of the plant is due to disease and the disease is considered likely to re-occur, then an alternative species may be used as replacement if agreed with the LPA.

6 NATIVE SCRUB PLANTING

6.1 All planting areas to be weed free prior to planting.

6.2 All whips to be planted using the slit planting method. Slits are made by inserting a spade into the ground to a depth deep enough for the roots and pushing forwards. The whip is inserted into the slit with the roots 2cm below ground level and the soil pushed back and firmed around the stem.

6.3 All stock to be well watered when planted with a minimum of 4.5L/whip prior to applying 75mm deep medium grade bark mulch (5-75mm particle size and of British origin, FSC certified), and then when required within the Maintenance Period to ensure survival.

6.4 Mulch is not to be placed against the stem of the whip. All planting to be fitted with proprietary rabbit guards.

7 GRASS

Preparation

7.1 Areas of grassland to be seeded shall be sprayed out with a glyphosate herbicide and cultivated to a depth of 100mm removing all weeds debris and stones over 75mm diameter. The surface shall be raked to smooth flowing contours with a fine tilth.

Seeding

7.2 Seeds shall be sown in September during calm weather and not when the ground is frost bound or waterlogged.

7.3 To achieve an even sowing, bulk with an inert carrier, such as sand. Seed shall be sown in two equal sowings in transverse directions at e.g. Emorsgate EM2 Standard General Purpose Meadow Mixture, 4g/m2 and Emorsgate EMF2 Standard General Purpose Wildflowers, 1.5g/m2. After sowing the contractor shall roll in the seed to guarantee intimate contact with the soil, ensuring not to rake or cover the seed with soil.

8 GENERAL MAINTENANCE

8.1 The Landscape contractor shall maintain all areas of new planting for a period of 12 months following practical completion. All stock deemed to be dead, dying or diseased within the defects period shall be replaced by the contractor at his own cost. The site is to be visited monthly throughout the year to undertake the Following operations:

- Weed clearance: All planting areas to be kept weed free by hand weeding or herbicide treatment.
- Litter clearance: All litter is to be removed from planting beds.
- Watering: All planted areas are to be watered for the first two years from May to September following any dry periods of 7 days.

Trees and Shrubs

8.2 All trees are to be watered weekly from May to the end of September unless unnecessary due to heavy rain; to receive 20 gallons of water. All shrubs are to be watered for the first two years from May to September following any dry periods of 7 days. All tree ties and stakes are to be checked and adjusted if too loose, too tight or if chaffing is occurring. Any broken stakes are to be replaced. Any damaged shoots/branches are to be pruned back to healthy wood. Plants are to be pruned in accordance with good horticultural practice to maintain healthy, well-shaped specimens. Native shrubs - Using approved herbicides a 1m diameter circle centred on each planting station shall be kept weed free throughout the maintenance period. Stakes may be removed from Year 2 if plant is fully established and if shelter is suppressing further growth.

Hedges

8.3 Hedge lines shall be kept mulched until established. At the end of the Defects Liability Period/ First Year's Maintenance the CA will prepare a list of all plants which are dead, dying or diseased and are to be replaced during the following planting season at the contractor's expense.

PROPOSED PLANTING SCHEDULE

PROPOSED TREE PLANTING

Species	Girth	Height (cm)	Form	Root condition
Acer campestre	12-14	350-425	Heavy Standard	RB
Corylus avellana	12-14	350-425	Heavy Standard	RB
Malus sylvestris	12-14	350-425	Heavy Standard	RB
Quercus robur	12-14	350-425	Heavy Standard	RB

PROPOSED WOODLAND PLANTING

Trees to be planted at 1.8m centres (0.3/m2), shrubs to be planted at 1.2m centres (0.7/m2)

Species	Mix (%)	Girth	Height (cm)	Form	Age/ Times transplanted	Root condition
Trees (40%)						
Acer campestre	25	12-14	200-250	Feathered	-	B
Corylus avellana	25	12-14	200-250	Feathered	-	B
Malus sylvestris	15	12-14	200-250	Feathered	-	B
Quercus robur	35	12-14	200-250	Feathered	-	B
Shrubs (60%)						
Acer campestre	10	-	60-80	Transplant	1+1	B
Cornus sanguinea	10	-	60-80	Transplant	1+1	B
Corylus avellana	15	-	60-80	Transplant	1+1	B
Crataegus monogyna	40	-	60-80	Transplant	1+1	B
Prunus spinosa	15	-	60-80	Transplant	1+1	B
Sambucas nigra	10	-	60-80	Transplant	1+1	B

PROPOSED HEDGEROW PLANTING

To be planted at 5 per linear metre in double staggered rows, rows will be 40cm apart or as appropriate where infilling gaps in existing hedgerows

Species	Mix (%)	Height (cm)	Form	Age/ Times transplanted	Root Condition
Acer campestre	20	60-80	Transplant	1+1	B
Cornus sanguinea	5	60-80	Transplant	1+1	B
Corylus avellana	5	60-80	Transplant	1+1	B
Crataegus monogyna	40	60-80	Transplant	1+1	B
Prunus spinosa	20	60-80	Transplant	1+1	B
Sambucas nigra	10	60-80	Transplant	1+1	B

PROPOSED SCRUB PLANTING

To be planted at 1m2

Species	Mix (%)	Height (cm)	Form	Root Condition
Cornus sanguinea	20	60-80	Branched	B
Crataegus monogyna	35	60-80	Branched	B
Euonymus europeus	10	60-80	Branched	B
Ligustrum vulgare	10	60-80	Feathered	B
Prunus spinosa	15	60-80	Branched	B
Viburnum lantana	10	60-80	Branched	B

Refer to Inset for continued landscape proposal

Proposed woodland planting
Trees
22 no. Acer campestre
22 no. Corylus avellana
13 no. Malus sylvestris
31 no. Quercus robur
Shrubs
31 no Acer campestre
31 no. Cornus sanguinea
47 no. Corylus avellana
124 no. Crataegus monogyna
47 no. Prunus spinosa
31 no. Sambucas nigra

3 no. Quercus robur
3 no. Quercus robur
3 no. Malus sylvestris

Proposed hedgerow planting (2 blocks)
26 no Acer campestre
7 no. Cornus sanguinea
7 no. Corylus avellana
52 no. Crataegus monogyna
26 no. Prunus spinosa
13 no. Sambucas nigra

Proposed hedgerow planting
218 no Acer campestre
55 no. Cornus sanguinea
55 no. Corylus avellana
436 no. Crataegus monogyna
218 no. Prunus spinosa
109 no. Sambucas nigra
5 no. Malus sylvestris

Proposed hedgerow planting
225 no Acer campestre
56 no. Cornus sanguinea
56 no. Corylus avellana
450 no. Crataegus monogyna
225 no. Prunus spinosa
113 no. Sambucas nigra
3 no. Corylus avellana
2 no. Malus sylvestris
3 no. Quercus robur
1 no. Acer campestre
2 no. Malus sylvestris
3 no. Acer campestre

Proposed hedgerow planting
5 no Acer campestre
1 no. Cornus sanguinea
1 no. Corylus avellana
10 no. Crataegus monogyna
5 no. Prunus spinosa
3 no. Sambucas nigra

Proposed hedgerow planting
3 no Acer campestre
1 no. Cornus sanguinea
1 no. Corylus avellana
6 no. Crataegus monogyna
3 no. Prunus spinosa
2 no. Sambucas nigra
2 no. Quercus robur

4 no. Quercus robur
3 no. Acer campestre
1 no. Quercus robur
3 no. Malus sylvestris
3 no. Corylus avellana
2 no. Malus sylvestris

1 no. Malus sylvestris
2 no. Acer campestre
2 no. Malus sylvestris

Proposed hedgerow planting
156 no Acer campestre
39 no. Cornus sanguinea
39 no. Corylus avellana
312 no. Crataegus monogyna
156 no. Prunus spinosa
78 no. Sambucas nigra
3 no. Acer campestre
2 no. Corylus avellana

Proposed scrub planting
152 no. Cornus sanguinea
266 no. Crataegus monogyna
76 no. Euonymus europeus
76 no. Ligustrum vulgare
114 no. Prunus spinosa
76 no. Viburnum lantana

Proposed scrub planting
185 no. Cornus sanguinea
323 no. Crataegus monogyna
92 no. Euonymus europeus
92 no. Ligustrum vulgare
139 no. Prunus spinosa
92 no. Viburnum lantana

1 no. Malus sylvestris
3 no. Acer campestre
3 no. Malus sylvestris
3 no. Quercus robur
2 no. Quercus robur
Proposed woodland planting
Trees
65 no. Acer campestre
65 no. Corylus avellana
39 no. Malus sylvestris
90 no. Quercus robur
Shrubs
90 no Acer campestre
90 no. Cornus sanguinea
136 no. Corylus avellana
362 no. Crataegus monogyna
136 no. Prunus spinosa
90 no. Sambucas nigra
4 no. Acer campestre
1 no. Malus sylvestris
2 no. Acer campestre
1 no. Malus sylvestris

Proposed woodland planting
Trees
36 no. Acer campestre
36 no. Corylus avellana
22 no. Malus sylvestris
51 no. Quercus robur
Shrubs
51 no Acer campestre
51 no. Cornus sanguinea
76 no. Corylus avellana
204 no. Crataegus monogyna
76 no. Prunus spinosa
51 no. Sambucas nigra

Proposed scrub planting
242 no. Cornus sanguinea
424 no. Crataegus monogyna
121 no. Euonymus europeus
121 no. Ligustrum vulgare
182 no. Prunus spinosa
121 no. Viburnum lantana
1 no. Quercus robur

Proposed hedgerow planting
311 no Acer campestre
78 no. Cornus sanguinea
78 no. Corylus avellana
622 no. Crataegus monogyna
311 no. Prunus spinosa
156 no. Sambucas nigra
3 no. Malus sylvestris
3 no. Corylus avellana
6 no. Malus sylvestris
Proposed hedgerow planting
99 no Acer campestre
25 no. Cornus sanguinea
25 no. Corylus avellana
198 no. Crataegus monogyna
99 no. Prunus spinosa
50 no. Sambucas nigra

1 no. Quercus robur
1 no. Corylus avellana
1 no. Acer campestre

1.22m RM

0 100m

N

KEY

CONSTRAINTS

- **Site Boundary**
- **Existing Overhead Power Lines**
- **Existing Gas Lines**
- **Existing Telecom line**
- **Public Right of Way**
- **Existing vegetation with RPA to be retained. To be maintained at 3.5m where possible**
  Refer to Arboricultural Report by Barton Hyett Associates for details
- **Existing vegetation to be removed**
- **Existing solar panel**
- **Ditches**

HARD LANDSCAPE PROPOSALS

- **Security Fence**
- **Gates within security fence**
- **CCTV**
- **Temporary Compound**
- **Indicative Solar PV Array**
- **Access Road/Hard standing - to be compacted crushed aggregate**
- **Existing Access Road**
- **Spare Container**
- **Inverter**
- **Substation compound**
- **Sheep handling system**
- **Close board timber gate**

SOFT LANDSCAPE PROPOSALS

- **Emorsgate EM2 Standard General Purpose Meadow Mixture -** or similar approved sown at 4g/m2. To be sown over existing areas under arable
- **Emorsgate EMF2 Standard General Purpose Wildflowers -** or similar approved sown at 1.5g/m2. To be sown over existing pastures.
- **Proposed Woodland Planting**
- **Proposed Native Tree Planting**
  12-14, Heavy Standards, 350-425cm high, RB
- **Proposed New Hedgerow Planting**
  Maintained at max height of 3.5m
  Species to match existing hedgerows on site.
  BR Transplant stock, 60-80cm high
- **Proposed Scrub planting**
- **Surface water attenuation**
- **Indicative location of proposed pond**

DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

Detailed Landscape Proposal
Varley Solar Farm

Client: RES

DRWG No: P22-0915_09 Sheet No:_ REV: C

Drawn by : LAB Approved by: DT

Date: 21/07/2023

Scale: 1:2,000 @ A1

PEGASUS GROUP

Appendix 3: Target notes from Extended Phase 1 survey

Target note	Description	Photograph Reference
1	Scattered broadleaved trees and former pond Small (approximately 7 m by 7m), dry, depression towards the southernmost field boundary. Flora is dominated by floating sweet-grass *Glyceria fluitans* indicating wetter soil / periodic inundation. Mature field trees ash *Fraxinus excelsior* and pedunculate oak *Quercus robur* border the depression with isolated stands of hawthorn scrub also present.	Photograph 33
2	Field margin Approximately 1.5 – 2 m field margin along the southernmost hedgerow (with a dry ditch) with differing, less frequent management than the wider field. Likely temporarily fenced when grazing animals present due to the presence of abundant false oat-grass *Arrhenatherum elatius* (taller grass which is less tolerant of grazing). Grass dominant the sward is longer (approximately 800 mm in height), with a closed / dense sward. Other species present include abundant Yorkshire fog *Holcus lanatus,* cock's-foot grass *Dactylis glomerata* and rough meadow-grass *Poa trivialis.* Occasional species include perennial rye-grass *Lolium perenne* and common couch *Elymus repens*. Forbs present are common within improved habitats, such as common nettle *Urticia diocia*, creeping thistle *Cirsium arvense,* common cleavers *Galium aparina* and broad-leaved dock *Rumex obtusifolius*	Photograph 34
3	Semi-improved grassland, scattered scrub, invertebrate interest and mammal path A parcel of unmanaged grassland and scrub over a large depression located at the north western corner of a field. To the south edge is a small south facing embankment with rough grassland and patches of bare ground and stone (offering suitable invertebrate habitat in otherwise poor surrounding habitat). Grassland within is tall (approximately 900 mm) with a dense / continuous sward and locally abundant patches of meadow foxtail and barren brome *Bromus sterilis*. Forb species present include common weeds of improved pasture with occasional mugwort *Artemisia vulgaris*, groundsel *Senecio vulgaris*, meadow vetchling *Lathyrus pratensis* and hogweed *Heracleum sphondylium.* Bordering scrub is formed of dominant blackthorn *Prunus spinosa* and hawthorn *Crataegus monogyna* with elder *Sambuca nigra*, bramble *Rubus fruticosus* agg. and alder *Alnus glutinosa*.	Photographs 35 & 36

	A small mammal track is present heading north through dense bramble to off-Site habitats. No other associated evidence noted.	
4	<u>Pond 27</u> A small pond (approximately 20 m by 20 m) within a hedgerow towards the centre of the Site. The pond is heavily shaded by surrounding hedgerow and scrub vegetation. Pond weed *Lemna sp.* was noted, with marginal vegetation comprising floating sweet-grass and hemlock water dropwort *Oenanthe crocata*. Habitat suitable to support GCN	Photograph 24
5	<u>Pond 21</u> Damp depression within field towards the south of the Site bordered by mature trees and scattered scrub. The centre of the depression was wet underfoot, heavily shaded and chocked with leaf litter. Small areas of shallow standing water were present with duckweed present *Lemna sp.* Mature trees surrounding the pond comprise pedunculate oak, field maple *Acer campestre* and hazel *Corylus avellana.* Scrubby understory comprises dominant blackthorn. A small rubble pile was noted at the northern edge of the depression and several exposed root systems of mature trees were present in the sounding banks offer suitable habitat for amphibian and reptile species.	Photograph 20
6	<u>Pond 10</u> A small, dry, depression within a field to the north of the Site. Heavily cattle poached, the ground is largely bare and bordered with common nettle. Hawthorn and bramble scrub with a mature pedunculate oak tree is also present.	Photograph 13
7	<u>Rough grass and mature trees</u> An area of unmown grassland, scrub and a mature pedunculate oak tree is located within a field to the south of the Site. Grassland comprises dominant false oat-grass (indicating consistently reduced management). Scrub comprises a dense and impenetrable blackthorn thicket.	Photograph 37
8	<u>Wet ditch and hedgerow</u> A wet drainage ditch is present to the south of the Site boundary. Holding water at the time of survey and dominated by wetland species including soft rush, water dropwort and yellow flag iris *Iris pseudacorus.* Mature crack willow *Salix fragilis* present within the hedgerow itself.	Photograph 38

9	Badger Fresh badger footprints present on access track, off-Site, to the north	Photograph 32
10	Rubble pile and rubbish Piles of bricks and stones stacked on the ground and within the hedgerow. Suitable for hibernating reptiles, amphibians and invertebrates.	Photograph 3
11	Building Small stone hut with corrugated iron roof, possibly used for sheltering livestock in the past. Building investigated for evidence of roosting barn owl, but no evidence (feathers, pellets, white washing) was found. No suitable nesting features The building was also found to be of negligible potential for roosting bats, lacking features capable of supporting a roost. Interior of the building is also filled with old sleepers and overgrown with bramble, suitable for hibernating reptiles and amphibians.	Photograph 4 & 5
12	Rubble pile and rubbish Stacked above ground on pallets, so limited suitability for amphibians or reptiles. Gravel pile adjacent with slabs stacked on top, within the undergrowth provides suitable overwintering shelter.	Photograph 6 & 7
13	Rubble pile and rubbish Piles of bricks and stones stacked on the ground and within the hedgerow. Suitable for hibernating reptiles, amphibians and invertebrates.	Photograph 8
14	Rubble pile and rubbish Piles of bricks and stones stacked on the ground at the base of tree within the grassland. Suitable for hibernating reptiles, amphibians and invertebrates.	Photograph 9
15	Pond 27 Pond 27 holding water on Site at time of the survey. Ditch connected to the pond is dry	Photograph 24
16	Mammal path Mammal path leading under hedge to ditch and through to the next field. No evidence of use by any particular species.	Photograph 27
17	Lake Copse This area was not subject to an in-depth survey as it is not included within the Site boundary. However, the boundary trees were assessed from the ground in case of bat potential features, and several bird territories were noted during the breeding bird survey. From the outside the wood consists of semi-mature conifers, scattered ash trees, birch and oak. The	Photograph 29

	woodland is well connected to hedgerows and the wider environment.	
18	<u>Wet ditch</u> Only ditch on Site observed holding water. No flow observed, but approx. 3cm of water present at the time of survey.	Photograph 31

Appendix 4: Ground Level Tree Assessment for Bat Roost Potential

The results of the ground level tree assessment undertaken by Rosie Sparks (Level 2 Natural England Survey Class Licence 2020-46325-CLS-CLS) on the 8th June and 27th June 2022 can be found in **Table 4** below.

Tree number	Species	Features suitable for bats recorded	Overall bat roost potential
T1	Oak	Cracks in dead wood with a big enough gap to provide roosting opportunity for a small number of bats. Ivy covers the stem and lower reaches of the tree. The majority of growth is immature, however there are some thicker exposed stems that would provide some opportunities for individual bats.	Moderate
T2	Apple	The canopy has died back and has rotted away creating numerous cavities in the limbs and stems that are suitable for roosting bats.	Moderate
T3	Ash	Several knotholes present with the potential to lead to further cavities. Several tear outs with the potential to lead to further cavities.	Low
T4	Oak	Hollow limb providing access to cavities beyond and potential to extend into the main trunk. Cracks in dead wood big enough to provide roosting opportunities for individual bats.	High
T5	Oak	Callus roll from old wound caused by an old tear out. The wound may extend to a cavity and the callus itself may present opportunities for a small number of bats.	Moderate
T6	Ash	Five knotholes caused by fallen branches. Potential to open up to cavities beyond.	Low
T7	Oak	Torn off limb leading to healed wound with a potential to lead to a cavity. Dead limb presenting numerous opportunities for roosting bats including several cavities and crevices. Snapped out limb leading to potential cavity. Knothole with potential to lead to cavity beyond.	High
T8	Oak	Woodpecker hole in partially dead semi-mature oak. Knothole from fallen branch leading to a potential cavity.	High
T9	Willow	Hollow stem possibly caused by an old torsion wound which has rotted away. Cavity is large and quite exposed.	Low
T10	Oak	Woodpecker holes in the limb of a dead oak. Multiple knotholes are also present which may lead to cavities where the heartwood is dying back.	High
T11	Oak	Dying crown of the tree. Numerous cracks in the dead limbs which would present limited opportunities for small numbers of transitional bats.	Low
T12	Oak	Snapped branch leading to a potential cavity behind the dying heartwood. Dead branches leading to cracks in the dead wood.	Moderate
T13	Oak	Healed callus roll that potentially leads to a cavity behind.	Moderate

		Pruning cut where heartwood has died back leading to an upward facing cavity. Tear out that has healed, leading to a callus roll and potential cavity.	
T14	Oak	Cracked and peeling bark presenting opportunities for roosting bats.	Moderate
T15	Oak	Dying heartwood forming potential cavity.	Low
T16	Ash	Knothole in the limb. Woodpecker hole on the underside of the limb suitable for roosting bats. Flaking bark on cracked dead limb presenting limited opportunities for a small number of bats.	High
T17	Oak	Tear out leading to a potential cavity behind.	Moderate
T18	Oak	Tear out in a limb with potential to extend into a cavity.	Low
T19	Ash	Hollow limb with cracked bark appears to have a cavity, suitable to support roosting bats.	Moderate
T20	Ash	Three woodpecker holes suitable for roosting bats.	High
T21	Oak	Tear out in limb with potential to extend into a cavity.	Moderate
T22	Oak	Knothole in dead limb, potential to lead to cavity but cannot assess from the ground.	Moderate
T23	Oak	Dead limb which has dried out, leading to cracks that would support small numbers of opportunistic bats.	Low
T24	Oak	Knot hole, small entrance but appears to be smooth from the ground level.	Low
T25	Oak	Knothole with dying heartwood, potentially leading to a cavity behind.	Moderate
T26	Unknown (dead)	Dead tree with cracks and cavities suitable for roosting bats.	High
T27	Ash	Mature ivy cover with thick stems with clear clutter and drop zones. Opportunities for bats to roost behind the stems.	Moderate
T28	Ash	Woodpecker hole suitable to support roosting bats.	High
T29	Ash	Knot hole in limb with potential to lead to cavity, but cannot assess fully from the ground	Moderate
T30	Oak	Four woodpecker holes in limbs on the southern aspect of the tree. Cracked dead limb offering some opportunities for roosting bats.	High
T31	Oak	Tear outs in the canopy that may result in small features.	Low
T32	Oak	Knot hole leading to a potential cavity on the underside of the limb.	Low
T33	Oak	Knot hole that has potentially been further excavated by a woodpecker as the hole is smooth and regular.	Moderate
T34	Oak	Knot holes across the tree, some with remaining heartwood and possible cavities behind. Tear out which has healed with a callus. Possible cavity at the apex of the feature and possibility of rams horns which would allow the bats to roost behind the callus.	Low

T35	Oak	Dead limb in the centre of the canopy which has partially rotted away, leading to a potential cavity.	Low
T36	Oak	Tear out leading to potential cavity.	Low
T37	Oak	Dead limb partially rotted away, exposing the hollow inside. Numerous cavities and crevices available for bats.	Moderate
T38	Oak	Potential cavity in limb, however cannot get a good view from the ground due to foliage.	Moderate
T39	Oak	Snapped out dead wood, leading to a potential cavity.	Moderate
T40	Oak	Woodpecker hole leading to a cavity with the potential to support roosting bats. Peeling bark present across the tree, suitable for transitional roosts for a small number of bats	High
T41	Oak	Hazard beam in a dead limb with the potential to extend to cavities at either end.	Low
T42	Alder	Multistem alder with one dead stem. The stem is hollow and has a large cavity inside.	Moderate
T43	Willow	Snapped step leading to multiple opportunities for bats. However, the features are low to the ground and surrounded by clutter.	Low
T44	Ash	Dead stem which has partially rotted, leading to multiple opportunities in the dead wood	High
T45	Ash	Dead wood with a woodpecker hole, leading to a cavity with potential to support roosting bats. Multiple knot holes with rotted heartwood.	High
T46	Oak	Dead limb with hazard beam, potentially leading to further cavities at either end.	Moderate
T47	Ash	Two knot holes in the limbs of the tree. Possibility of cavities behind.	Moderate
T48	Oak	Old snap out which has healed. Potential cavity behind the callus.	Low
T49	Oak	Thick mature ivy stems which present some roosting opportunities for opportunistic bats.	Low

Appendix 5: Biodiversity gain headline results

FINAL RESULTS		
Total net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	31.96
	Hedgerow units	44.66
	Watercourse units	0.00
Total net % change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	13.42%
	Hedgerow units	34.83%
	Watercourse units	0.00%
Trading rules satisfied?	Yes ✓	
You must specify if irreplaceable habitats are on-site at baseline ▲		

Appendix 6: Summaries of Relevant Policy, Legislation and Other Instruments

National Planning Policy Framework

The Government issued the National Planning Policy Framework (NPPF) in July 2021. Text excerpts from the NPPF are shown where they may be relevant to planning applications and biodiversity including protected sites, habitats and species.

The Government sets out the three objectives for sustainable development (economy, social and environmental) at paragraphs 8-10 to be delivered through the plan preparation and implementation level and 'are not criteria against which every decision can or should be judged' (paragraph 9). The planning system's environmental objective is 'to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity…'(paragraph 8c).

In conserving and enhancing the natural environment, the NPPF (Paragraph 174) states that 'planning policies and decisions should contribute to and enhance the natural and local environment' by:

- Protecting and enhancing...sites of biodiversity value... '(in a manner commensurate with their statutory status or identified quality in the development plan)'.
- Recognising the wider benefits from natural capital and ecosystem services including trees and woodland.
- Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

In respect of protected sites, at paragraph 175, the NPPF requires local planning authorities to distinguish, at the plan level, '…between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value...take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.' A footnote to paragraph 175 refers to the preferred use of agricultural land of poorer quality if significant development of agricultural land is to take place.

Paragraph 179 refers to how plans should aim to protect and enhance biodiversity. Plans should: 'identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity [a footnote refers to ODPM Circular 06/2005 for further guidance in respect of statutory obligations for biodiversity in the planning system], wildlife corridors and stepping stones that connect them and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation;' and to 'promote the conservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.'

Paragraph 180 advises that, when determining planning applications, '…local planning authorities should apply the following principles:

- 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;
- 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;

- development resulting in the loss or deterioration of irreplaceable habitats, (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and
- development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.'

In paragraph 181, the following should be given the same protection as habitats sites:

- potential Special Protection Areas and possible Special Areas of Conservation;
- listed or proposed Ramsar sites; and
- 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.'

In paragraph 182 the NPPF refers back to sustainable development in relation to appropriate assessment and states: 'the presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats 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'.

In paragraph 183, the NPPF refers to planning policies and decisions taking account of ground conditions and risks arising from land instability and contamination at sites. In relation to risks associated with land remediation account is to be taken of 'potential impacts on the natural environment' that arise from land remediation.

In paragraph 185 the NPPF states that planning policies and decisions should ensure that development is appropriate to the location and take into account likely effects (including cumulative) on the natural environment and, in doing so, they 'should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation' (paragraph 185c).

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation

Paragraph 98 of Government Circular 06/2005 advises that "the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat. Local authorities should consult Natural England before granting planning permission. They should consider attaching appropriate planning conditions or entering into planning obligations under which the developer would take steps to secure the long-term protection of the species. They should also advise developers that they must comply with any statutory species' protection provisions affecting the site concerned..."

Paragraph 99 of Government Circular 06/2005[8] advises that "it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted".

Standing Advice (GOV.UK)

The GOV.UK website provides information regarding protected species and sites in relation to development proposals: 'Local planning authorities should take advice from Natural England or the Environment Agency about planning applications for developments that may affect protected species.' GOV.UK advises that 'some species have standing advice which you can use to help with planning decisions. For others you should contact Natural England or the Environment Agency for an individual response.'

[8] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

The standing advice (originally from Natural England and now held and updated on GOV.UK9) provides advice to planners on deciding if there is a 'reasonable likelihood' of protected species being present. It also provides advice on survey and mitigation requirements.

When determining an application for development that is covered by standing advice, in accordance with guidance in Government Circular 06/2005, Local planning authorities are required to take the standing advice into account. In paragraph 82 of the aforementioned Circular, it is stated that: 'The standing advice will be a material consideration in the determination of the planning application in the same way as any advice received from a statutory consultee…it is up to the planning authority to decide the weight to be attached to the standing advice, in the same way as it would decide the weight to be attached to a response from a statutory consultee.'

The Environment Act 2021

The Environment Act includes the provision of mandatory biodiversity gain for developments in England; this will be mandated through an amendment to the Town and Country Planning Act 1990. The two-year transition period following Royal Assent (November 2021) means that mandatory biodiversity gain will become law in autumn 2023. This will require:

- The provision of a required percentage of biodiversity gain, currently set nationally to be at 10%
- The use of the national Defra Biodiversity Metric to calculate the biodiversity gain, currently Metric 3.1
- The provision of a biodiversity gain plan to demonstrate how biodiversity gain will be delivered on and or off-site; statutory instruments and regulations are in preparation by Defra and Natural England to provide templates for reporting
- Biodiversity gain will be secured for a fixed period, currently nationally set at 30 years
- Demonstration of how the biodiversity gain will be secured; conservation covenants will be used to deliver this which are in preparation by Defra and Natural England
- A national register of land used for biodiversity gain will be established; this will involve setting up a new biodiversity credits market, the approach for which is in preparation by Defra and Natural England

NB. The policy basis for net gain is already set out in the NPPF. During the transition period, we would expect local planning authorities to increasingly require the measures set out within the Environment Act as part of their development decision making process.

European protected species

The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland) transpose the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

"European protected species" (EPS) are those which are present on Schedule 2 of the Regulations. They are subject to the provisions of Regulation 39. In summary, this legislation makes it an offence to:

- capture, injure or kill a wild animal EPS
- to disturb such an animal while it is occupying a structure or place it uses for shelter or protections
- to disturb such an animal while it is rearing or otherwise caring for its young
- to obstruct access to a breeding site or resting place of such an animal or to otherwise deny the animal use of the breeding site or resting place
- to disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs
- to disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

Although the law provides strict protection to these species, it also allows this protection to be set aside (derogation) through the issuing of licences. The licences in Scotland are currently determined by Scottish

[9] https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications#standing-advice-for-protected-species

Natural Heritage (SNH) for development works. In accordance with the requirements of the Regulations, a licence can only be issued where the following requirements are satisfied:

- that there is no satisfactory alternative, and
- that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Protected species - Wildlife and Countryside Act 1981

Protected animals are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended in Scotland), (all EPS are also protected under the 1981 Act). In summary, this legislation makes it an offence to intentionally or recklessly:

- Kill, injure or take any wild animal listed on Schedule 5
- Damage, destroy or obstruct access to any structure or place which such an animal uses for shelter or protection or to disturb such an animal when it is occupying a structure or place for that purpose.

All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition, it is an offence to disturb any wild bird listed on Schedule 1 of the act whilst it is building a nest or is in, on, or near a nest containing eggs or young, or whilst lekking; or to disturb the dependent young of any wild bird listed on Schedule 1.

Natural Environment and Rural Communities (NERC) Act 2006 – Habitats and species of principal importance

The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act require the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England as required by the Act. In accordance with the Act the Secretary of State keeps this list under review and will publish a revised list if necessary, in consultation with Natural England.

The S41 list is used to guide decision-makers such as public bodies, including local authorities and utilities companies, in implementing their duty under Section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions, including development control and planning. This is commonly referred to as the 'Biodiversity Duty.'

Guidance for public authorities on implementing the Biodiversity Duty[10] has been published by Defra. One of the key messages in this document is that 'conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them.' In England the administration of the planning system and licensing schemes are highlighted as having a 'profound influence on biodiversity conservation.' Local authorities are required to take measures to "promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species. The guidance states that 'the duty aims to raise the profile and visibility of biodiversity, clarify existing commitments with regard to biodiversity, and to make it a natural and integral part of policy and decision making.'

In 2007, the UK Biodiversity Action Plan (BAP) Partnership published an updated list of priority UK species and habitats covering terrestrial, freshwater and marine biodiversity to focus conservation action for rarer species and habitats in the UK. The UK Post-2010 Biodiversity Framework[11], which covers the period from 2011 to 2020, now succeeds the UK BAP. The UK priority list contained 1150 species and 65 habitats requiring special protection and has been used as a reference to draw up the lists of species and habitats of principal importance in England.

In England, there are 56 habitats of principal importance and 943 species of principal importance on the S41 list. These are all the habitats and species found in England that were identified as requiring action in the UK BAP and which continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.

[10] Defra, 2007. *Guidance for Public Authorities on Implementing The Biodiversity Duty*. (http://www.defra.gov.uk/publications/files/pb12585-pa-guid-english-070516.pdf)

[11] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. *UK Post-2010 Biodiversity Framework*. July 2012. (http://jncc.defra.gov.uk/page-6189)

European protected species (Animals)

The Conservation of Habitats and Species Regulations 2017 (as amended) consolidates various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

"European protected species" (EPS) of animal are those which are shown on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). They are subject to the provisions of Regulation 43 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:

a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species
b. Possess or control any live or dead specimens or any part of, or anything derived from a these species
c. deliberately disturb wild animals of any such species
d. deliberately take or destroy the eggs of such an animal, or
e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—

a. to impair their ability—
    i. to survive, to breed or reproduce, or to rear or nurture their young, or
    ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
b. to affect significantly the local distribution or abundance of the species to which they belong.

Although the law provides strict protection to these species, it also allows this protection to be set aside (derogated) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works and by Natural Resources Wales in Wales. In accordance with the requirements of the Regulations (2017, as amended), a licence can only be issued where the following requirements are satisfied:

a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'
b. 'There is no satisfactory alternative'
c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Definition of breeding sites and resting places

Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The European Council (EC) which has prepared specific guidance in respect of the interpretation of various Articles of the EC Habitats Directive.[12] Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that 'The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.' Further the guidance states: 'It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so

[12] Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.

that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.'

European protected species (Plants)

The Conservation of Habitats and Species Regulations 2017 (as amended) consolidates various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

"European protected species" (EPS) of plant are those which are present on Schedule 5 of the Conservation of Habitats and Species Regulations 2017 (as amended). They are subject to the provisions of Regulation 46 of those Regulations.

Regulation 47 makes it an offence to deliberately pick, collect, cut, uproot or destroy a wild plant of an EPS. It also makes it an offence to have in possession or control any live or dead plant or part of plant which has been taken in the wild and which is an EPS (or listed in Annexe II(b) or IV(b) of the Habitats Directive).

Competent authorities

Under Regulation 7 of the Conservation of Habitats and Species Regulations 2017 (as amended) a "competent authority" includes "any Minister of the Crown…, government department, statutory undertaker, public body of any description or person holding a public office.

In accordance with Regulation 9, "a competent authority must exercise their functions which are relevant to nature conservation, including marine conservation, so as to secure compliance with the requirements of the [Habitats and Birds] Directives. This means for instance that when considering development proposals a competent authority should consider whether EPS or European Protected Sites are to be affected by those works and, if so, must show that they have given consideration as to whether derogation requirements can be met.

Birds

All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to disturb them whilst they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.

The Conservation of Habitats and Species Regulations 2017 (as amended) places duties on competent authorities (including Local Authorities and National Park Authorities) in relation to wild bird habitat. These provisions relate back to Articles 1, 2 and 3 of the EC Directive on the conservation of wild birds (2009/147/EC, 'Birds Directive'[13]) (Regulation 10 (3)) requires that the objective is the 'preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of the upkeep, management and creation of such habitat, as appropriate, having regard to the requirements of Article 2 of the new Wild Birds Directive…' Regulation 10 (7) states: 'In considering which measures may be appropriate for the purpose of security or contributing to the objective in [Regulation 10 (3)] Paragraph 3, appropriate account must be taken of economic and recreational requirements'.

In relation to the duties placed on competent authorities under the 2017 Regulations, Regulation 10 (8) states: 'So far as lies within their powers, a competent authority in exercising any function [including in relation to town and country planning] in or in relation to the United Kingdom must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds (except habitats beyond the outer limits of the area to which the new Wild Birds Directive applies).'

Badger

Badger is protected under the Protection of Badgers Act 1992. It is not permitted to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as "a structure or place, which displays signs indicating current use by a badger".

[13] 2009/147/EC Birds Directive (30 November 2009. European Parliament and the Council of the European Union.

ODPM Circular 06/2005[14] provides further guidance on statutory obligations towards badger within the planning system. Of particular note is paragraph 124, which states that "The likelihood of disturbing a badger sett, or adversely affecting badgers' foraging territory, or links between them, or significantly increasing the likelihood of road or rail casualties amongst badger populations, are capable of being material considerations in planning decisions."

Natural England provides Standing Advice[15], which is capable of being a material consideration in planning decisions. Natural England recommends mitigation to avoid impacts on badger setts, which includes maintaining or creating new foraging areas and maintaining or creating access (commuting routes) between setts and foraging/watering areas.

Reptiles

All native reptile species receive legal protection in Great Britain under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Viviparous lizard, slow-worm, grass snake and adder are protected against killing, injuring and unlicensed trade only. Sand lizard and smooth snake receive additional protection as "European Protected species" under the provisions of the Conservation of Habitats and Species Regulations 2017 (as amended) and are fully protected under the Wildlife and Countryside Act 1981 (as amended).

All six native species of reptile are included as 'species of principal importance' for the purpose of conserving biodiversity under Section 41 (England) of the NERC Act 2006 and Section 7 of the Environment (Wales) Act 2016.

Current Natural England Guidelines for Developers[16] states that 'where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.' Further the guidance states: 'Normally prohibited activities may not be illegal if 'the act was the incidental result of a lawful operation and could not reasonably have been avoided'. Natural England 'would expect reasonable avoidance to include measures such as altering development layouts to avoid key areas, as well as capture and exclusion of reptiles.'

The Natural England Guidelines for Developers state that 'planning must incorporate two aims where reptiles are present:

- To protect reptiles from any harm that might arise during development work;
- To ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population, either on-site or at an alternative site, with no net loss of local reptile conservation status.'

Water vole

Water vole is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to kill, injure or take any water vole, damage, destroy or obstruct access to any place of shelter or protection that the animals are using, or disturb voles while they are using such a place. Water vole is listed as a Species of Principal Importance under the provisions of the NERC Act 2006 in England and under the provisions of the Environment (Wales) Act 2016.

Wild mammals in general

The Wild Mammals (Protection) Act 1996 (as amended) makes provision for the protection of wild mammals from certain cruel acts, making it an offence for any person to intentionally cause suffering to any wild mammal. In the context of development sites, for example, this may apply to rabbits in their burrows.

Invasive non-native species

An invasive non-native species is any non-native animal or plant that has the ability to spread causing damage to the environment.

[14] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.
[15] http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/standingadvice/specieslinks.aspx

[16] English Nature, 2004. *Reptiles: guidelines for developers.* English Nature, Peterborough. https://webarchive.nationalarchives.gov.uk/20150303064706/http://publications.naturalengland.org.uk/publication/76006

Under the Wildlife and Countryside Act 1981 (as amended) it is an offence to release, or to allow to escape into the wild, any animal which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state or is listed under Schedule 9 of the Act.

It is an offence to plant or otherwise cause to grow in the wild invasive non-native plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Hedgerows

Article 10 of the Habitats Directive[17] requires that 'Member States shall endeavour…to encourage the management of features of the landscape which are of major importance for wild fauna and flora. Such features are those which, by virtue of their linear and continuous structure…or their function as stepping stones…are essential for the migration, dispersal and genetic exchange of wild species'. Examples given in the Directive include traditional field boundary systems (such as hedgerows).

The aim of the Hedgerow Regulations 1997[18], according to guidance produced by the Department of the Environment[19], is "to protect important hedgerows in the countryside by controlling their removal through a system of notification. In summary, the guidance states that the system is concerned with the removal of hedgerows, either in whole or in part, and covers any act which results in the destruction of a hedgerow. The procedure in the Regulations is triggered only when land managers or utility operators want to remove a hedgerow. The system is in favour of protecting and retaining 'important' hedgerows.

The Hedgerow Regulations set out criteria that must be used by the local planning authority in determining which hedgerows are 'important'. The criteria relate to the value of hedgerows from an archaeological, historical, wildlife and landscape perspective.

[17] Council Directive 92/43/EEC of 2i May 1992 on the conservation of natural habitats and of wild fauna and flora.
[18] Statutory Instrument 1997 No. 1160 – The Hedgerow Regulations 1997. HMSO: London
[19] The Hedgerow Regulations 1997: a guide to the law and good practice, HMSO: London