

# **HEOLDDU SOLAR FARM**

## **Environmental Statement**

**Volume 3, Appendix 2.1: Landscape and Ecological Design  
Scheme Strategy**

**September  
2025**

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# 1 INTRODUCTION

## Background

- 1.1 RPS was commissioned by Heolddu Solar Park Ltd to prepare a Landscape and Ecological Design Scheme (LEDS) Strategy (the 'LEDS Strategy') to support the development of a solar farm. The solar farm development includes the installation of solar photovoltaic arrays and associated ancillary infrastructure (the 'Proposed Development') on land at Maes Mawr and Treforris Fawr Farm, Ferryside, Carmarthenshire.
- 1.2 The Proposed Development is described in more detail in the Environmental Statement (ES), Volume 1: Chapters 1 – 4, and is contained within the red line as shown on Figure 1.1 in ES Volume 2: Figures. This red line is hereafter referred to as the 'Site'.
- 1.3 Landscape and ecology elements, and their management, are intrinsically linked. As such, this LEDS Strategy includes input from both landscape architects and ecologists to ensure the management meets the required aims and objectives intended following the related survey work, and the design and habitat provision intentions. Expectedly there is some overlap and repetition within the guidance provided.

## Site Description

- 1.4 The Site extends to 81.78 hectares (ha) and is located wholly within the administrative boundary of Carmarthenshire County Council (CCC). The Site is set within a rural, farmed landscape 1km to the east of Ferryside. Kidwelly is 4.0 km to the south. Smaller settlements within a 5.0 km radius of the Site include the villages of Llandyfaelog, Broadway, Llansaint, Saint Ishmael and Broadlay.
- 1.5 The Site comprises:
  - Solar Area West – comprising Field 1 to Field 15.
  - Solar Area East – comprising Field 16 to Field 24.
  - Underground cable route connecting the Solar Area East and Solar Area West routing along the unnamed highway.
  - Construction access routing northwards from Field 24 to the Carmarthen Road.
- 1.6 Solar Area West extends to 54.66 hectares and is south-westerly facing, whilst Solar Area East extends to 25.09 hectares and is south-easterly facing. The underground cable route covers 0.48 hectares and the temporary construction route covers 1.55 ha.
- 1.7 Solar Area West consists of fifteen fields (1-15), mainly flat and separated from each other by mature hedgerows which also form the Site boundaries. There is a small linear woodland between Field 3, 4 7 and 10. The land is well screened from

the surrounding landscape and views by existing mature boundary vegetation. Solar Area East consists of eleven fields (16-26) some of which, due to the surrounding topography and their hillside location, are more visible in the landscape than Solar Area West

## Purpose and Structure of the Landscape and Ecological Design Scheme Strategy

- 1.8 The purpose of the LEDS Strategy is to provide details for the long-term management and maintenance requirements of landscape and ecology measures that will be incorporated into the Proposed Development. The LEDS Strategy sets out the measures that would mitigate effects of the Proposed Development on biodiversity (and where appropriate) landscape features, and enhance the value of such features in accordance with relevant local and national planning policy. The measures in this document have been designed specifically to deliver habitat restoration and enhancement measures, some of which respond to the effects identified in relevant chapters of the ES.
- 1.9 The proposed habitat creation, restoration and enhancement measures designed as part of the Proposed Development are illustrated on the LEDS plan, in Figure 1 of this strategy. The indicative planting palette for hedgerows, trees and shrubs is set out in **Table 11-2**.
- 1.10 The LEDS Strategy defines the biodiversity, and landscape aims and objectives for the habitats at the Site during the operation of the Proposed Development. It sets out the proposed management actions / specifications which are designed to achieve these objectives. The LEDS Strategy also details the monitoring programme and targets which would assess the outcomes of initial habitat creation, restoration and enhancement and the ongoing management. It also provides a landscape maintenance schedule at **Table 11-3**.
- 1.11 The LEDS Strategy serves as the Proposed Development's outline landscape and ecological management plan at Pre-Application Consultation (PAC) stage, otherwise referred to as a LEMP. A final, detailed LEDS Strategy document would be prepared and agreed with CCC following successful Development of National Significance (DNS) consent and must accord with the final version of this document, prepared for full submission of the DNS. This approach will be secured by planning condition.
- 1.12 Monitoring will inform future management decisions, confirming where the specific target habitat conditions are being achieved and identifying if there are shortfalls to be addressed through remedial actions or modifications to management. This process of habitat management for biodiversity, supported by monitoring, will be a long-term commitment that will continue over the lifetime of the Proposed Development.

## Interaction with Wider DNS Documents

- 1.13 An outline Construction Environmental Management Plan (CEMP) has been prepared which outlines measures to prevent effects arising on biodiversity (and other environmental receptors) during the construction phase of the Proposed Development. A detailed CEMP would be prepared (secured by planning condition) and would include the finer detail associated with sensitive vegetation clearance, timing, and pollution control amongst other environmental best practice.
- 1.14 This LEDS strategy identifies the provision of created, restored and enhanced measures to address loss and disturbance of existing habitats and the species they support. These measures provide mitigation to reduce impacts, and provides enhancement measures to deliver benefits for ecological receptors assessed in ES Volume 1: Chapter 6 Biodiversity.

## Mechanism of Securing Landscape and Biodiversity Measures

- 1.15 It is anticipated that measures set out in the LEDS Strategy would be secured through a planning condition attached to the planning permission issued for the Proposed Development. This would require a final, detailed version of the LEDS Strategy to be prepared prior to implementation of the Proposed Development. A detailed CEMP would also be secured by planning condition. All documents and their associated measures would be subject to consultation with CCC prior to construction of the Proposed Development.
- 1.16 Implementation and maintenance of all hard and soft landscape areas (including planting) shall be covered by the main contractor under the terms of the 12-month defects period. The defects period will commence following the agreed Practical Completion (PC) date. The main contractor shall be responsible for all reasonable plant failures and defects with the landscape and biodiversity measures for the duration of this period. Following completion of the 12-month defects period, at an agreed date responsibility for all future maintenance and management shall be passed to Heolddu Solar Park Ltd.
- 1.17 The mechanism through which the long-term funding can be guaranteed will be agreed with CCC prior to the start of construction. Funding will cover the physical management on the ground following good ecological practice, targeted biodiversity monitoring and the associated reporting and when necessary remedial measures.
- 1.18 All management and maintenance of the landscape and biodiversity measures would be secured for the entirety of the operational lifetime of the Proposed Development.

## Responsibilities for Management

- 1.19 Heolddu Solar Park Ltd will be responsible for the full implementation of the management actions and monitoring activities in accordance with the plan and work schedule. The implementation of the management prescriptions at the correct time

of year will continue over the lifetime of the Proposed Development. Heolddu Solar Park Ltd. will appoint suitably experienced contractors and ecologists as required to assist in the delivery.

- 1.20 All maintenance and management of habitat creation and enhancement areas within the Site will be undertaken by a suitably qualified landscape management contractor and/or other specialist contractors (as required) on behalf of Heolddu Solar Park Ltd, following the end of the 12-month defects period and satisfactory completion of any landscape defects or necessary reinstatement.
- 1.21 Periodically the landscape and ecology maintenance and monitoring works shall be inspected by suitably qualified and experienced professionals (landscape architects, ecologists and arboriculturists) to ensure that the landscape and habitat management operations are being completed in accordance with the detailed version of the LEDS.
- 1.22 The dynamic nature of habitats and plants means that the management requirements shall be reviewed periodically to ensure that they are still achieving the overarching objectives and any adjustments made to practices and / or frequency to bring the scheme in line with the management requirements.
- 1.23 Heolddu Solar Park Ltd will document progress in relation to the landscape and biodiversity aims and objectives and monitoring reports will be circulated to CCC.

## 2 LANDSCAPE DESIGN OBJECTIVES AND MANAGEMENT AIMS

### Landscape Design Objectives

- 2.1 The landscape design was developed in co-ordination with the other related environmental disciplines including ecologists, flood risk, heritage and arboricultural teams to ensure a responsive and multi-functional design was created.
- 2.2 The broad design objectives of the landscape proposals are as follows:
- **Landscape Screening:** to provide an appropriate level of screening of the solar farm from adjacent views, whilst not screening the panels from sunlight.
  - **Landscape Value:** to enhance the landscape and ecological value and aesthetic appeal of the solar farm, incorporating various native planting schemes, and grassland and wildflower meadows.
  - **Landscape Reinforcement:** to reduce the impact of the proposed development over a period of years, existing hedgerows will be reinforced, if required, and planting of native tree and shrub areas, specimen trees, and new hedgerows.
  - **Landscape Amenity:** maintain and enhance, where possible, the local residents and visitors experience within this landscape, including the retention and enhancement of public access along footpaths.
  - **Biodiversity:** to protect, manage and enhance the natural ecological and biodiversity value of appropriate areas of the Site.
  - **Ecological Buffers:** to serve as a transitional zones that protects and enhances the ecological function of field hedges and trees.

### Management Aims

- 2.3 The management of the Site shall seek to balance the Site's operational objectives / needs within the existing vegetation and context of the locality. It will lead to the retention, enhancement and management of the existing hedgerows and trees; particularly strengthening and maintaining hedgerow boundaries. The management aims will ensure longevity of new tree and hedge planting, and the establishment of grasslands and areas of native tree and shrub planting.
- 2.4 To ensure the longevity of the landscape scheme, the recommendations contained within this report should be implemented post practical completion of all soft landscape elements within the Site.

## 3 LANDSCAPE ELEMENTS

- 3.1 For the purposes of this LEDS Strategy document, the landscape elements have been grouped into hard and soft landscape elements, these have been identified below and the various elements shall be managed in accordance with best practice guidance and specific works outlined in **Table 11.3** (Indicative Establishment, Maintenance and Management Plan). Due to the intrinsic nature of landscape and ecology, there is an overlap with the biodiversity features listed in the following section. The LEDS Strategy document should be read in conjunction with the LEDS plan (Figure 1 of this document), which shows the existing and proposed landscape elements.

### Arboricultural Baseline

- 3.2 There are no high-quality category A, Veteran, Champion or Ancient trees recorded on the Site. None of the trees recorded on the Site are protected by a Tree Preservation Order nor is the Site located within a Conservation Area. There is no Ancient Semi Natural Woodland associated directly with the Site, although an Ancient Semi Natural Woodland lies adjacent to the west of Solar Area West.
- 3.3 Further detail is available in Environmental Statement Volume 3, Appendix 5.2: Tree Survey and Arboricultural Impact Assessment.

### Soft Landscape Elements

- 3.4 The key soft landscape elements are summarised below:

#### Native Species Hedgerow

- 3.5 Native hedgerow containing a mixture of deciduous native plants selected to reflect local ecosystems and predominantly include hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*, supplemented by hazel *Corylus avellana*, pedunculate oak *Quercus robur* and holly *Ilex aquifolium*. This approach not only supports local wildlife but also serves as a natural boundary within the landscape.

#### Native Tree and Shrub Planting

- 3.6 Native bareroot transplant/whip tree and shrub planting, including hawthorn, elm, hazel. Establishment of a woodland barrier to the edge of Proposed Development. Especially between the development and main road / residential properties to the east of the western development area and at the edge of existing woodland areas in the eastern development area.

#### Grassland – Under Photovoltaic Arrays

- 3.7 Species rich grassland within the perimeter fence, under the photovoltaic arrays, to enhance the existing agriculturally managed grasslands and introduce.

### **Grassland - Meadows**

- 3.8 Species-rich and in places tussocky grassland margins outside the perimeter fence, to provide enhanced grassland-hedgerow ecotones within the existing boundary.

### **Field Margins**

- 3.9 Species-rich and in places tussocky grassland margins outside the perimeter fence, to provide enhanced grassland-hedgerow ecotones within the existing boundary.

### **Ecological Enhancements**

- 3.10 Ecological enhancements have been added to the Proposed Development to include bird and bat boxes to create valuable resources for wildlife.

## **Performance Requirements**

- 3.11 The performance requirements of these elements are set out below. The primary objectives for these elements are to promote biodiversity and enhance landscape and visual quality, as well as enhancing the Site's existing green infrastructure.

### **Grassland**

- 3.12 Grass species appropriate to the situation and intended maintenance regime to create structural variation and enhance vascular plant diversity.
- 3.13 Grazing grassland shall be flail mowed annually after flowering to encourage the increase coverage of forbs and grasses.
- 3.14 Provide an attractive sward of diverse native species that offers seasonal interest for the benefit of both domesticated animals and wildlife.

### **Field Margins**

- 3.15 Meadow and grass species appropriate to establish on the boundary between hedges and the grasslands under the photovoltaic arrays.
- 3.16 The management requirements of established hedgerow mixtures can be tailored to suit light levels and integrate with adjacent vegetation types.
- 3.17 Zoned management of field margins to enhance their condition, to increase vascular plant diversity of habitat structure. Areas closest to the hedge or woodland boundary and those which are more shaded would be managed accordingly.
- 3.18 Field margins will be managed in a similar manner to grasslands outside of the perimeter fence. They would be flail mowed annually after flowering to encourage diversity of species, with areas left at heights of 50mm with all arisings removed.
- 3.19 They would provide an attractive sward of diverse species offering seasonal interest and habitat structure beneficial to wildlife. Flowering in the second growing season will be very good, and as the years go by, with good management, species diversity is expected to increase.

- 3.20 Hedgerow vegetation that is not mown or grazed each year will become rough and “tussocky” in character. It can form a valuable refuge habitat on corners and margins of the site.

### **Native Species Hedgerow**

- 3.21 New hedge planting to form a full, dense hedgerow at Year 3, with no gaps present. Hedgerows shall be maintained at a minimum of 2 m in height and up to 3 – 4 m.
- 3.22 Existing native hedgerows shall be cut on a two-three year bases to maintain an even shape and dense screen, and maintained at a minimum of between 1.5 – 2m in height and up to 3 – 4 m in height. Cutting shall only be carried out in autumn / winter and outside the bird nesting season.
- 3.23 The hedgerows would provide an effective and consistent vegetated barrier to contain neighbouring land uses and conceal the infrastructure of the solar farm.

### **Native Tree and Shrub Planting**

- 3.24 Tree and shrub planting would provide an effective and consistent vegetated barrier between the perimeter fence and specific boundaries and existing woodland to contain the site and offer visual mitigation from sensitive areas/views whilst adding to the overall green infrastructure of the scheme and providing wildlife refuge.
- 3.25 Thinning would be undertaken as required in Year 3 onwards to provide species balance and thin out more vigorous species to ensure long-term structure.
- 3.26 Undertake coppicing of certain species as appropriate on a 5-year cycle to rejuvenate some species and ensure a dense vegetated barrier, further increasing structural diversity.

### **Individual Trees**

- 3.27 Integrating trees as specimens or in groups of native species can offer many benefits, including enhancing existing green infrastructure, providing an essential structural presence, and blending the Proposed Development into the overall landscape setting of the solar farm.
- 3.28 Although not a requirement, trees planted which have a clear stem should have this maintained up to 1.5m -1.8m from the ground. A balanced canopy shall be maintained with a central leader.
- 3.29 They shall be maintained thereafter to develop and retain a well-balanced crown, shape and character typical of the species, with any redundant stakes, ties and shelters removed and disposed of offsite.
- 3.30 Trees provide an important structural element to the overall landscape setting of the solar farm, including enhancing the biodiversity and habitat of the site.

### **Existing Vegetation**

- 3.31 Protect, conserve, and enhance existing trees and hedgerows where retained to maintain a mature green infrastructure for the Proposed Development.

- 3.32 Continual tree and hedgerow lines provide important wildlife corridors which shall be enhanced (rough relaxed management) to support the movement and foraging of birds, mammals and invertebrates.
- 3.33 Grasslands would be enhanced and restored through a change in management.

### Hard Landscape Elements

- 3.34 The various hard landscape elements are listed below, for further detail regarding the maintenance of these areas refer to **Table 11.3** (Indicative Establishment, Maintenance and Management Plan).
- Existing fencing;
  - Existing pathways;
  - Existing field access points;
  - Proposed fencing (including stock fencing, as necessary);
  - Proposed maintenance roads;
  - Proposed vehicular access points;
  - Proposed vehicular access to construction site compounds;

## 4 SKILLS AND STANDARDS

4.1 Where and to the extent that materials and management delivery are not fully specified, they are to be:

- 1) Suitable for the purposes of the stated objectives;
- 2) In accordance with good horticultural practice or the current British Standard, with particular reference to:
  - BS 3998: Recommendations for tree work
  - BS 4428: Code of practice for general landscape operations
  - BS 7370: Grounds maintenance
    - Part 1: Recommendations for establishing and managing grounds maintenance organisations and for design considerations related to maintenance.
    - Part 2: Maintenance of hard areas.
    - Part 3: Maintenance of amenity and functional turf (other than sports turf).
    - Part 4: Maintenance of soft landscape (other than amenity turf).

4.2 In terms of Health and Safety, the contractor shall refer to the sites Health and Safety File for residual risks and ensure strict compliance to any health and safety measures set out. All maintenance operations shall only be carried out with due consideration to the welfare of the landscape maintenance operatives and members of the public. The contractor shall carry out his own risk assessment(s) as necessary to assess current conditions at the time of operation, including compliance when making use of any subcontractors to carry out specialist areas of works.

## **5 RESPONSIBILITIES FOR MANAGEMENT**

- 5.1 All maintenance and management of installed soft landscaping within the Proposed Development site will be undertaken by a suitably qualified landscape management contractor on behalf of the client, following the end of the establishment period and satisfactory completion of any landscape defects or necessary reinstatement works.
- 5.2 Periodically, the landscape maintenance works shall be reviewed by a suitably qualified and experienced person to ensure that the landscape management operations are being completed in accordance with the approved report.

## 6 SCHEDULE OF MAINTENANCE

- 6.1 The establishment and upkeep of the various soft landscape elements will entail the maintenance operations outlined below.

### Health & Safety

- 6.2 The contractor shall refer to the site's Health and Safety File for residual risks and ensure strict compliance to any health and safety measures set out. All maintenance operations shall only be carried out with due consideration to the welfare of the landscape maintenance operatives and members of the public. The contractor shall carry out his own risk assessment(s) as necessary to assess current conditions at the time of operation, including compliance when making use of any subcontractors to carry out specialist areas of work.

### Grassland

- 6.3 Rotational grazing, adjusting grazing intensity, and managing livestock will help to achieve a balance between animal needs and grassland health.
- 6.4 Grazing should aim to keep the grass plants leafy and actively growing, typically by maintaining an average sward height of at least 5cm while growing.
- 6.5 Avoid overgrazing, as it can lead to reduced grass growth, weakening plants, and increased weed invasion. Conversely, avoid undergrazing, as this can also be detrimental, leading to the dominance of less palatable species and a reduction in the overall quality of the grassland.
- 6.6 Avoiding grazing during early spring can allow for the development of early-flowering species, which benefit pollinators and ground-nesting birds.
- 6.7 Avoiding grazing during peak summer flowering periods allows for seed development and benefits wildlife.
- 6.8 Grazing density is set out in **Section 10**.

### Field Margin Meadow

- 6.9 The sown or green hay meadow species are perennial and establish slowly; in the first year, a flush of annual weeds may appear, which should not be cut until late summer.
- 6.10 Flail cut from mid-August to mid-September and remove arisings. Then by further cuts through to the end of March of the following year.
- 6.11 In the second growing season, and each year thereafter, leave the meadow uncut and un-grazed from the end of March to mid-summer, allowing the sown species to flower in June and July. After flowering, cut and remove the vegetation. The meadow may then be kept mown (or grazed, where sheep can be introduced) through to the end of March in the following year.
- 6.12 Flowering in the second growing season will be successful, and over the years, with appropriate management, species diversity will increase.

- 6.13 Any areas which fail to establish or become damaged would undergo remedial actions as required. Meadow restoration is a no-plough method for diversifying existing established grassland.

### **Trees**

- 6.14 Remove redundant tree support systems once trees are fully established. Formative pruning as necessary to establish a well-balanced head appropriate to the species and purpose.
- 6.15 Remedial pruning/tree surgery as necessary in accordance with BS:3998 or to remove growth obstructing paths, carriageways, lighting and signs.

### **Shrubs**

- 6.16 Remove redundant rabbit protection systems once shrubs are fully established. Formative pruning as necessary to establish a neat hedge line (New hedgerow planting ONLY). Once established, trim the hedge annually (in autumn) to form a hedgerow maintained between 2 to 3m in height.
- 6.17 Remedial pruning/tree surgery as necessary in accordance with BS:3998 or to remove growth obstructing paths, carriageways, lighting and signs.

### **Deadwood and Log Pile Habitats**

- 6.18 Where standing and fallen dead wood from the trees, and/or hedgerows, has occurred, log piles would be gathered and left in situ as a habitat for wildlife.

### **Watering**

- 6.19 Watering shall only be carried out as necessary, but particularly during prolonged dry spells, to maintain the health and continued vigour of the trees and shrubs until fully established.
- 6.20 Areas which become prone to waterlogging shall be alleviated suitably, and/or drainage added as required.

### **Pesticides Generally**

- 6.21 No pesticides shall be used, unless absolutely necessary and only with the prior written approval from Heolddu Solar Park Ltd. (or the management company). In such cases, all pesticides shall be selected from the current list of approved chemicals and applied in strict accordance with the Control of Pesticide Regulations 1986 and other related Acts and Regulations.
- 6.22 Take appropriate action only if severe infestation occurs. If the problem persists over a number of years, consider changing the plant species concerned to one less vulnerable to infestation.

### **Timing of Operations (Nesting Birds)**

- 6.23 It is an offence to disturb nesting wild birds and their nests under the Wildlife and Countryside Act 1981 (as amended).

- 6.24 Avoid clearance, pruning and trimming operations during the bird nesting period, generally March to August inclusive, or check in advance that there are no birds nesting in the area of operation.

### **Ecological Stewardship**

- 6.25 It is an offence to disturb nesting wild birds and bats, including their nests, under the Wildlife and Countryside Act 1981 (as amended).
- 6.26 Avoid clearance, pruning and trimming operations during the bird nesting period, generally March to August inclusive. If operations have to take place during this time, then a suitably competent ecologist shall check in advance that there are no birds nesting in the planned area of operation.
- 6.27 Cutting of meadow/rank grasses shall be carried out in early autumn to prevent disturbance to reptile or ground nesting birds, and all material shall be disposed of off-Site.
- 6.28 Opportunities for further enhancement following routine maintenance and management shall be encouraged in line with a Site wide post-development management plan such as creating brash and/or log piles to offer refuge to wildlife.
- 6.29 Reference to the site's specific ecological considerations shall be taken into account before carrying out any routine maintenance and management operations; if in doubt, consult with a suitably competent ecologist.

### **Biosecurity**

- 6.30 The threat of pests and diseases that affect plant species is widely recognised and all landscape practitioners have a responsibility in detecting, monitoring and controlling pests and diseases at every stage of a plant's life from growing, specifying, handling, managing and destroying plants.
- 6.31 All planting shall be specified from local provenance and reputable sources (such as providers within Carmarthenshire and South Wales) with supporting paperwork provided at each stage to demonstrate an auditable supply chain should proof be requested.
- 6.32 Reference shall be made regularly to updates from DEFRA and the Forestry Commission, with any recommendations or warnings strictly adhered to, to prevent further spread of disease, including reporting known outbreaks as appropriate.
- 6.33 Good plant husbandry shall be implemented on Site to prevent further spread of diseases, particularly where symptoms or confirmed outbreaks of disease have occurred.

## 7 TYPICAL PROGRAMME OF OPERATIONS

7.1 The table below sets out a typical programme for select management activities. This should be viewed in conjunction with Error! Reference source not found.. Meadow management is specifically referred to in **Section 10** onwards.

**Table 7-1 Indicative Programme of Management Activities**

Management Activity	Calendar Month											
	J	F	M	A	M	J	J	A	S	O	N	D
<b>HEDGE &amp; BUFFER PLANTING:</b>												
Maintain mulch												
Weed control												
Selective pruning												
Hedge Clipping												
Coppice (if required)												
Watering (until establishment)												
<b>INDIVIDUAL TREES / SHRUBS:</b>												
Check and adjust support												
Formative pruning												
Remedial pruning												
<b>PEST AND DISEASE CONTROL</b>												
Physical / Mechanical means												
<b>MONITORING AND INSPECTION:</b>												
Generally												
<b>TIMING OF OPERATIONS:</b>												
Avoid nesting birds												

## 8 BIODIVERSITY BASELINE

### Existing Site Management

- 8.1 The Site comprises farmland used predominantly for the purposes of silage production and pastoral land. Solar Area West is grazed by sheep in the winter on rotation. Between March and September, the grassland fields are cut a minimum of three times followed by the application of fertiliser.
- 8.2 Solar Area East is predominantly pastoral land, with the grassland fields grazed between March and September by cattle and ungrazed between October and late February.

### 8.2 Habitats

- 8.1 A habitat survey of the Site was first undertaken in December 2024, followed by an updated survey in May and June 2025. A detailed description of the habitats recorded within the Site and their botanical composition is set out in ES Volume 3: Appendix 6.1 – Preliminary Ecological Appraisal.
- 8.2 The habitat survey identified 10 broad habitat types. The broad habitat types recorded, and their respective habitat areas and lengths are set out in **Table 8.1**. This included broadleaved woodlands, scrub, grasslands, hedgerows, marginal / inundation vegetation, waterbodies, watercourses and ditches, bare ground and artificial features. Agricultural land in the form of a rye grass and clover ley was recorded to the north of Solar Area East. Grasslands were the most abundant habitat type recorded within the Site, with poor semi-improved grassland making up the majority of the area.
- 8.3 More than 9 km of hedgerow was identified within the Site, which included species-rich, species poor and defunct types, with scattered trees recorded along some of the Site’s boundaries. Woodland, grassland, agricultural land, hedgerows and farm buildings were recorded adjoining the Site.

**Table 8-1 Habitat Types within the Site**

Broad Habitat Type	Area (ha)	Length (km)
Broadleaved woodland – semi-natural	1.22	
Scrub – dense and scattered	0.18	
Grasslands – poor semi-improved and neutral	77.48	
Arable – rye-grass and clover ley	0.13	
Hedgerows – intact species-poor and species-rich, defunct, hedges with trees		10.83
Marginal / Inundation - open vegetation	0.07	
Waterbodies	0.05	

Watercourses and ditches		0.86
Bare and disturbed ground	0.02	
Artificial features – fence lines/gates, farming infrastructure and hardstanding	0.4	0.17

## Protected and/or Notable Species

- 8.4 An initial walkover in December 2024 highlighted the potential for the Site to support several protected and/or notable species. This included roosting, commuting and foraging bats, badger, hazel dormouse, otter and water vole, and breeding and wintering birds. The Preliminary Ecological Appraisal (PEA) provides an assessment of the suitability of the Site for the above species including western European hedgehog and polecat. The Site was less assessed as less suitable for other taxonomic groups, specifically reptiles, amphibians and noteworthy assemblages of invertebrates.
- 8.5 Further ecological survey and assessment work has been undertaken within and in proximity to the Site targeting selected ecological receptors. Surveys have included:
- Bat activity surveys and aerial inspections of trees;
  - Hazel dormouse surveys;
  - Otter, water vole and badger surveys;
  - Breeding and wintering bird surveys;
  - Great crested newt eDNA sampling;
- 8.6 No bat roosts were recorded in trees with Potential Roosting Features (PRF), though passive acoustic monitoring undertaken has recorded a minimum of seven species along linear features and woodland habitats. No evidence of hazel dormouse has been recorded during field surveys to date, though surveys are currently ongoing. Features suitable for otter and water vole have been identified within and along wooded stream areas, but no evidence of either species has been recorded to date. Badger presence has been confirmed within the Site, with a badger sett recorded during the initial Site walkover in December 2024. Targeted surveys since December have confirmed the sett is disused.
- 8.7 The Site supports common and widespread species of breeding birds, with most of the bird activity recorded in hedgerows, woodlands and scrub. Species of conservation concern have been recorded during the breeding bird surveys, including ground nesting species (skylark *Alauda arvensis* and meadow pipit *Anthus pratensis*), though no confirmed breeding territories or ground nesting species were recorded. The wintering assemblage included mostly common and widespread species, with relatively large flocks of redwing *Turdus iliacus*, fieldfare *Turdus pilaris* and starling *Sturnus vulgaris* recorded foraging within and outside of the Site. All three species were recorded foraging in selected grasslands (primarily Solar Area East), within hedgerows and in trees.
- 8.8 Great crested newt eDNA sampling has confirmed a negative result for the species, indicating likely absence of the species from the Site and surrounding area.

8.9 No invasive non-native plants or animals were recorded during the habitat surveys within the Site.

## 9 HABITAT AND SPECIES PROTECTION MEASURES

### Generic Ecological Measures

- 9.1 An Ecological Clerk of Works (ECoW) would provide advice and undertake ecological supervision where required and where specified during the construction phase of the Proposed Development. The ECoW would be suitably experienced for the necessary tasks that require consideration
- 9.2 Prior to any works being carried out which risk harming wildlife, all Site staff would be given a toolbox talk by the project ecologist or ECoW. The toolbox talk will brief all staff on the following:
- Protected and/or notable species that may be encountered and their legal status;
  - How the work could affect protected and/or notable species that may be present;
  - Summary of precautionary methods of work and measures specific to selected areas of the Site
  - How to approach protected and/or notable species encountered while carrying out construction activities; and,
  - The ecologist's contact details during the construction activities.
- 9.3 The ECoW or project ecologist will provide the site manager with an information pack containing contact details and all the material used for the toolbox talk. The information pack will be kept securely in the temporary construction compounds for reference for the duration of the works.
- 9.4 Any new Site staff arriving after the toolbox talk will be expected to attend a toolbox talk briefing delivered either by the ecologist or the Site manager, before starting work.
- 9.5 Best practice in construction Site hygiene management will minimise the risk of harm to animals which may stray into the construction area.
- 9.6 All excavations left overnight will either be covered, or if left open will be provided with a means of escape such as a shallow sloping scaffolding plank, earth slope or similar, to allow animals that enter excavations to easily escape. Open pipework larger than 150mm external diameter will be covered at the end of each working day.
- 9.7 In the unlikely event that a trapped badger or small mammal is encountered, an ecologist will be contacted immediately for further advice. Chemicals or other hazardous materials will be contained and stored so they cannot be accessed or knocked over by roaming animals.
- 9.8 To minimise the risk of animals being attracted into the working area, food and litter will not be left overnight in construction areas.

- 9.9 Storage mounds of soft material into which badgers or other animals could dig to establish setts (such as topsoil) will be kept to a minimum. Where such storage is essential the materials will be subject to daily inspections by site staff to identify any larger mammal holes. The site manager would contact the project ecologist to confirm if any of the entrances have the potential to be used by badger. Site inspections would be undertaken where needed to confirm its status.
- 9.10 Where there is potential for impacts on protected and/or notable species, the species specific mitigation measures described below will be implemented during the construction and decommissioning of the Proposed Development.
- 9.11 Environmental best practice measures set out within the CEMP would be implemented throughout the construction phase.

## Species Specific Ecological Measures

### Bats

- 9.12 At the current stage, no trees are to be removed during construction and so impacts on bat potential bat roosts are unlikely. Moreover, no bat roosts have been identified in trees during targeted surveys. Where the need to remove a tree forms part of the construction proposals, it could lead to the loss of a bat roost should potential roosting features be present.
- 9.13 Where tree removal is required, affected trees will be re-surveyed by a suitably experienced ecologist to confirm whether potential roost features are present. Should potential roost features (PRF) be present, further inspection undertaken by a qualified tree climber who also holds a Natural Resources Wales bat survey and handling licence to confirm whether these are in use by bats.
- 9.14 In the absence of potential roost features or signs of use by bats or other protected species (e.g. nesting birds) following a survey / inspection, the trees could be felled (where it is not considered veteran, ancient or champion). Surveys / inspections of trees should be undertaken at least 24 hours before felling to limit the potential for protected and/or notable species to colonise features. As a precaution, tree felling should be supervised by a bat licensed ecologist. In the unlikely event that bats, or signs of bats are found that indicate present of a roost, tree felling would be postponed and no works affecting the trees, or which could indirectly affect the roost would be carried out until a Natural Resources Wales mitigation licence has been obtained.

### Hazel Dormouse

- 9.15 At the current stage, hazel dormouse has not been recorded as part of targeted surveys. If hazel dormouse is present within the onsite hedgerows there is potential for individuals to be harmed during habitat clearance if this is not carried out sensitively and at the appropriate time of year.
- 9.16 Where short sections of hedgerow removal (up to 10m) are required to widen the access points or facilitate access tracks, precautionary working measures would be

required. This will follow a non-licenced method statement unless hazel dormouse is confirmed as part of remaining survey work.

- 9.17 Vegetation clearance would be supervised by a licensed ecologist as a precaution. The ecologist would undertake hand search of areas of dense canopy where necessary to ensure no dormice are present prior to and throughout the vegetation clearance. Where feasible, hedgerow removal would be undertaken outside of the peak breeding season for hazel dormouse (end of September onwards).
- 9.18 Hedgerows would be first cut to between 150mm and 300mm above ground level. Cutting will be carried out using only hand tools (i.e. chainsaws and brush cutters) and ensuring that there is no ground disturbance. All arisings will be removed from the Site after cutting.
- 9.19 The second stage of clearance to ground level will be carried out only once the licensed ecologist has confirmed it is safe to do so. This will be between April – October when daytime temperatures are over 9°C and hazel dormice are likely to have emerged from hibernation sites.
- 9.20 In the event that a dormouse is encountered during vegetation removal, it would be carefully captured by the licensed ecologist and placed in suitable habitat away from the works. Any works which could affect dormouse would be postponed until a Natural Resources Wales mitigation licence has been obtained.

### Other Mammals

- 9.21 Otter and water vole have not been recorded during targeted surveys to date. Watercourse and ditch buffers would be implemented during construction to prevent encroachment and pollution run off. An ECoW would supervise all DNO access construction works in proximity to the watercourse in Solar Area East.
- 9.22 An ECoW would check the watercourse prior to construction to search for signs and evidence of resting places for otter and burrows for water vole. Dependent on nature of resting place, status of burrow, all works may need to cease and a mitigation licence may be needed for otter, or a site-specific licence for water vole.
- 1.27 In the unlikely event that otter is recorded using a watercourses or resting places that have not been identified or water vole field signs are encountered, construction may be able to continue pursuant to precautionary working methods and supervised by an ECoW so long as disturbance would not contravene wildlife legislation.
- 1.27 A disused badger sett was recorded on Site during surveys in 2024 and 2025. Sufficient buffer distances have been applied to prevent damage from construction should the sett become active at a later stage. A pre-construction walkover to check for the presence of new badger setts would be undertaken. Should new badger setts be confirmed within construction areas, measures would be adapted to prevent damage to setts, with a minimum buffer of 20m applied to the sett entrances. Dependent on the status of the sett and the position of entrance tunnels, some construction activities could resume within the 20m buffer where the potential for damage can be ruled out.

## Birds

- 9.23 Works affecting hedgerows and grasslands have potential to impact upon nesting birds if carried out during the breeding season (March to August inclusive). Where possible all hedgerow removal will be undertaken outside of the breeding season (March to August Inclusive). Provided this is the case, there would be no risk of damage or disturbance to active nest sites.
- 9.24 If for any reason this is not possible and vegetation clearance is required within the breeding season, an ECoW will check the vegetation for active nests or nesting activity no more than 48 hours prior to vegetation removal. Where works are planned within grasslands during the active season, a walkover should be undertaken prior to works commencing by an ECoW to check for the presence of ground nesting birds.
- 9.25 Active nests would be protected by a suitably sized buffer and must remain undisturbed until the ECoW has confirmed that the nest site is inactive. The ECoW would define an appropriate buffer / exclusion zone around the nest within which no works would be permitted.
- 9.26 Where construction is to take place during winter, precautionary measures would be required to ensure wintering flocks are not harmed. Whilst wintering flocks are usually flushed when disturbed, sensitive Site clearance and vegetation measures should be employed to prevent killing and or injury.

## Reptiles and Amphibians

- 9.27 Reptiles may be present along the edges of grasslands, within hedgerow bases. All vegetation clearance to hedgerows should be undertaken in mid-late September, outside of the breeding bird season and outside of the peak breeding period for hazel dormouse. This is also a suitable time for herpetofauna. Where grassland is to be cleared to facilitate parts of the Proposed Development (such as tracks, deployment of temporary construction compounds or construction of substation), a two phased cut would be implemented, to allow reptiles to move out of the area and away from danger.
- 9.28 No excavation should be undertaken within areas likely to support hibernating reptiles as this would cause the greatest extent of harm. Excavation and the dismantling of hibernacula (if necessary) should be timed for late March – April when reptiles are likely to be active.

## Assumptions and Protection Buffers

- 9.29 It is assumed that the deer fence installed along the edge of photovoltaic arrays would terminate at the junction of an existing hedgerow and tied into existing fences where possible. At the current stage, no hedgerow sections would be cleared to facilitate the installation of deer fences.
- 9.30 Protection buffers during construction and operation would vary. All access tracks proposed would be constructed outside all hedgerow root protection areas (RPAs) with a minimum of 5m buffer from hedgerow base, except for areas where

hedgerows are to be severed or where existing entrances widened. All construction activities would be undertaken outside of the RPAs of trees and woodlands, with the exception of a relatively minor section of the DNO access track in Field 20. No excavation or drilling would be undertaken within 10m of woodland habitats. Tree protection barriers would be installed around all trees during construction to raise awareness of trees and their RPAs. At the current stage, the DNO access track in Field 20 (crossing the watercourse) has not been finalised. As a result, exclusion areas have not been identified but watercourse and woodland buffers would be installed as necessary, with tree barriers installed as necessary.

- 9.31 A minimum of 8 m would be offset from wet ditches and watercourses (except for areas where they are already proximal to hardstanding or existing tracks).
- 9.32 A minimum operational buffer of 10m from the perimeter fence (except for access tracks) to hedgerows would be implemented. A minimum of 15m from woodland edges to photovoltaic arrays and the Proposed Development substation would be implemented during operation.
- 9.33 RPAs, tree protection barriers and an estimation of the wooded vegetation removal can be seen on the Tree Retention and Removal Plan (BHA\_6507\_02) in the Arboricultural Impact Assessment (Volume 3, Appendix 5.2 Arboricultural Impact Assessment). It should be noted that the estimated vegetation clearance at this stage is an estimate and is subject to change following the PAC process.

## 10 BIODIVERSITY TARGETS

### Aims

10.1 The key aims for biodiversity are:

- Enhance the condition and botanical diversity of existing poor semi-improved grasslands under photovoltaic arrays, with the aim of reaching close to meadow conditions as far as feasibly possible
- Develop more diverse grasslands along field edges (outside of Proposed Development deer fence)
- Altered management of Fields 1, 2, 3 and 13 to encourage skylark breeding and to encourage foraging and roosting of overwintering birds
- Maintain existing areas of scrub, hedgerows and trees and enhance their vascular plant diversity
- Infill defunct hedgerow and gaps (except for relic hedges) with hedgerow trees to reconnect features, increase ability for wildlife to disperse and commute through the landscape
- Restore the waterbodies and ditches providing additional habitat for amphibians and invertebrates, breeding and wintering birds
- Protect mature broadleaved trees and allow deadwood features to develop where appropriate
- Enhance green infrastructure connectivity across the Site through new wooded features, restored open vegetation and regeneration of bare or damaged ground
- Restoration of blue infrastructure through reduction in grazing pressure and protection buffers
- Retain and enhance areas for wintering bird flocks (specifically for redwing *Turdus iliacus*, fieldfare *Turdus pilaris* and starling *Sturnus vulgaris*) to forage and roost
- Tree, woodland and hedgerow protection zones to prevent root damage and increase structural diversity of ecotones between woodland and grassland
- Watercourse buffers to prevent encroachment into riparian zones and enhance watercourse health
- Identify any negative habitat trends and indicators and effectively address through management and/or remedial actions
- Implement precautionary measures across all development related activities to reduce impacts and effects on mammals, birds, herpetofauna and invertebrates.
- Ensure that all management actions comply with all international and domestic wildlife legislation and biodiversity good practice (BS42020 : 2013

Biodiversity: Code of Practice for Planning and Development), including best practice for trees (BS 5837:2012 Trees in relation to design, demolition and construction).

## Objectives

### Native Tree, Shrub Planting and Woodland Meadow

- Maintain dense, closed structure of scrub and manage encroachment into grasslands
- Establish and maintain trees and scrub comprising a mixture of native species, primarily hazel *Corylus avellana*
- Promote flowering / fruiting of shrubs and trees through low intensive management
- Enhance and expand existing woodland through planting of shrubs (on edge of woodland in Solar Area East) and encouragement of typical woodland ground layer forbs to develop a woodland edge and an expanded woodland ground layer
- Develop a scrub and grassland mosaic to create structural variation in the landscape, with added shelter and protection benefits (to fauna), offering landscape screening in the long term

### Grasslands – wet / lowland meadows and tussocky grassland

- Increase species diversity through use of local green hay<sup>1</sup> and local seed and limit spread of undesirable species specifically docks *Rumex* sp. and thistles *Cirsium* sp. (i.e. those listed on the Weeds Act 1959). Reduce agricultural pressure through limiting intensive grazing and fertiliser.
- Encourage wet meadow species to colonise and proliferate, including extending the flowering period of cuckoo flower *Cardamine pratensis* to deliver benefits to invertebrates
- Establishment of local yellow rattle *Rhinanthus minor* seed to support management of coarse grasses and increase ability of forbs to flourish
- Rotational, low intensity sheep grazing to support and sustain a healthy ratio of grasses to forbs within grasslands under photovoltaic arrays.
- Maintain varied sward heights within proposed tussocky grassland areas. Increase positive indicator species of tall forbs. Manage sward to prevent grassland becoming rank and reduce presence of undesirable species

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<sup>1</sup> Hay taken from recently harvested meadows comprising seeds leaves and stems

- Develop tall forb and grassland ground layer around relic hedgerow to provide shelter, forage and to reduce exposure, erosion and environmental pressures
- Maintain the health and structure of enhanced grasslands below and between photovoltaic arrays to generate forage for wildlife, specifically foodplants for invertebrates and creating additional prey items for birds, bats and mammals
- Develop structurally and botanically diverse field margins outside of deer fences to create stepped ecotones that offer a variety of new opportunities for mammals, birds and invertebrates
- Meet long term target conditions set for each area of retained and enhanced grassland including the frequency/abundance of positive and negative indicator species

### **Hedgerows – new and enhanced**

- Establish and maintain new native species-rich hedgerows, alongside existing hedgerows to create diverse double hedgerows (in the long-term)
- Increase the diversity of hedgerow ground flora through less intensive management of hedgerows and field margins
- Promote flowering / fruiting of shrubs and trees through sensitive management, specifically rotational and incremental cutting
- Protect mature and semi-mature trees allowing them to continue to develop value for biodiversity. Plant and encourage trees to standard size within hedgerow gaps to offer additional niches within hedgerow and offer landscape screening (in the long-term)
- Avoid all unnecessary tree management works maintaining a balance between health and safety, arboricultural value and biodiversity value

### **Ditches, Waterbodies, and Open Vegetation**

- Maintain areas of standing water, margins and banksides through reduction in cattle pressure
- Establish and maintain a diversity of non-competitive herbaceous wetland plant species on existing margins of waterbody in Field 24
- Sufficiently control eutrophication and algal blooms
- Avoid establishment of invasive non-native species
- Enhance riparian zone along ditches through grazing restrictions to increase height of bankside vegetation
- Identify negative indicators and assess waterbody health and implement remedial actions where negative pressures are apparent

# 11 HABITAT CREATION, RESTORATION AND ENHANCEMENT

## Proposed Measures

- 11.1 The following section sets out the proposed habitats to be created, restored and enhanced within the Site. Each of the proposed habitats below correspond with the LEDS plan on **Figure 1**.
- 11.2 sets out the estimated areas of each of the proposed biodiversity measures to support the Proposed Development’s aims of achieving an overall Net Benefit for Biodiversity (NBB).

**Table 11-1 Estimated Areas and Length of Proposed Habitats and Features**

Existing Habitat	Proposed Biodiversity Measure	Nature of Proposal	Outline Management	Area / Length / Quantity of Proposed Measure
<b>Grasslands</b>				
Poor Semi-Improved Grassland	Lowland meadow – managed through cutting	Enhancement	Up to two cuts within a year (outside of breeding bird season) followed by low intensity aftermath <sup>2</sup> grazing	6.87 ha
	Lowland meadow / tall wildflower mosaic – managed through cutting	Enhancement	Green hay, overseeded and managed through selective cutting prior to and following summer period, creating varying sward heights. Aftermath grazing through winter.  Shallow depressions within Field 25 to create swales.	5.62 ha

<sup>2</sup> Grazing of subsequent vegetation growth following a hay cut

Existing Habitat	Proposed Biodiversity Measure	Nature of Proposal	Outline Management	Area / Length / Quantity of Proposed Measure
	Wet meadow – managed through low intensity grazing <sup>3</sup>	Enhancement	Low intensity rotational sheep grazing / removal of undesirable species	61.41 ha
	Wet meadow – managed through cutting	Enhancement	Use of green hay and/or seed.  Up to two cuts within a year (outside of breeding bird season) followed by low intensity aftermath grazing	2.23 ha
	Tussock grassland and ruderal	Enhancement / restoration	Green hay, overseeded and allowed to develop a tall sward, through low intensity sheep grazing	0.34
<b>Hedgerows</b>				
Poor semi-improved grassland	Proposed hedgerows	Creation	Notch planted. Allowed to establish for a year, followed by a single cut.  Cut every two years, incremental cuts where appropriate	3.24 km
Species-rich and species-poor hedgerows	Enhanced hedgerows	Enhancement	Rotational cutting every two years. Coppicing and or laying where appropriate	1.24 km

<sup>3</sup> Includes 23.04 ha of grassland underneath photovoltaic arrays

Existing Habitat	Proposed Biodiversity Measure	Nature Proposal	Outline Management	Area / Length / Quantity of Proposed Measure
Species-poor defunct hedgerow	Proposed hedgerows - hedgerow with trees	Restoration and enhancement	Planting of semi-mature trees. Managed on rotation as part of general hedgerow management	0.49 km
<b>Trees and Woodland</b>				
Poor semi-improved grassland	Native tree planting (scrub edge)	Creation	Notch planted and supported by an appropriate timber stake and tree shelter.	0.40 ha
	Lowland meadow and native tree planting	Creation and enhancement	Trees would be notch planted and supported by an appropriate timber stake and tree shelter  Grassland would be cut twice per year outside of the breeding bird season	0.83 ha
	Woodland meadow planting / tree planting	Enhancement and creation	Trees would be notch planted and supported by an appropriate timber stake and tree shelter  Woodland meadow plants would be allowed to colonise, supplemented by plug plants where necessary	0.09 ha
<b>Wetland</b>				

Existing Habitat	Proposed Biodiversity Measure	Nature of Proposal	Outline Management	Area / Length / Quantity of Proposed Measure
Marginal / Inundation – Open vegetation	Wetland planting and pond enhancement	Restoration	Natural regeneration of open water vegetation and pond margins	0.16 ha
Dry ditch / poor semi-improved grassland banksides	Riparian zone and Ditch Enhancement	Restoration / enhancement	Regeneration of aquatic and wetland species.  Grazing animals to be excluded.	0.10 ha
Poor semi-improved grassland	Drainage Features (interceptor channels)	Creation	Drainage features would be managed as part of grazed wet meadow management approach	0.91 km
<b>Wildlife Boxes</b>				
Broadleaved woodland	Schwegler 1B 32 mm bird box	Creation	Checked every three years and repaired if damaged.	x2
	Schwegler 2FN bat box			x1
	Schwegler 2FD bat box			x1
Dense scrub	Schwegler 2M 32 mm bird box			x2

11.3 Outline management of the proposed biodiversity measures, specifically new and enhanced habitats are summarised below. The indicative establishment and maintenance measures are set out in **Table 11.3** for the first five years.

### Wet Meadow – Managed Through Grazing

11.4 All grasslands below proposed photovoltaic arrays would be subject to low intensity grazing by sheep on rotation throughout the year. Where feasibly possible prior to installation of the photovoltaic arrays, all Fields would be cut once or twice (outside of the summer period) within a single growing season with the aim of removing as

much of the existing nutrients as possible, though this may not be possible depending on land ownership.

- 11.5 Following installation of photovoltaic arrays, the grasslands would be grazed until July / August. Where practicable, the ground would be scarified to receive green hay or seed obtained locally. Hay would be spread and/or seed would be sown within the grasslands where feasibly possible around the photovoltaic arrays. Green hay and/or seed would be sourced from one (or all) of the following providers:
- CCC’s local meadows unit (Kidwelly)
  - National Botanic Garden of Wales (Llanarthne)
  - Wildlife Trust of South and West Wales (Pembrey)
- 11.6 Low intensity grazing is typically defined as 1.0 livestock unit per ha (LU/ha)<sup>4</sup>, where one ewe and one lamb are 0.12 LU. For the Proposed Development’s it is proposed that the stocking density for Fields under photovoltaic arrays within the Site would be a maximum of 0.8 LU/ha. This would equate to 6 ewes (and lambs) per ha, within each Field. A Field with an area of 6 ha would be grazed by a total of 36 sheep. This is considered the appropriate density to feasibly enable the grasslands to develop a richer vascular plant diversity and reach their target condition.
- 11.7 The units used to for sheep have been published by the UK Government<sup>5</sup>. As a guide, stocking density above 3LU per ha is considered ‘high intensity’ grazing<sup>6</sup> such that would be implemented on a high-unput farmland.
- 11.8 Sheep would be rotated across the Fields in both Solar Area West and Solar Area East across the year, with the aim of resting certain Fields to mimic natural grazing patterns and prevent soil degradation. There would be no use of organic or inorganic fertilisers as part of the grazing management.
- 11.9 Stocking density and the approach to grazing rotation would be confirmed following successful DNS consent, in consultation with CCC. The measures are intended to deliver increased species and structural diversity, bringing existing grasslands as close to meadow style conditions as feasibly possible.
- 11.10 Field edges outside of the deer fence would be allowed to develop a slightly longer sward forming a stepped mosaic with hedgerow bases. Field edges outside of the deer fence would be cut in March and once again in August. At present, no grazing

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<sup>4</sup> Guidance on Managing Unimproved Grassland - Malvern Hills Area of Outstanding Natural Beauty (AONB) Partnership at [https://www.malvernhillsaonb.org.uk/wp-content/uploads/2022/01/Grassland\\_Guidance.pdf](https://www.malvernhillsaonb.org.uk/wp-content/uploads/2022/01/Grassland_Guidance.pdf)

<sup>5</sup> [Annex 6C: Convert livestock numbers into Livestock Units - GOV.UK](https://www.gov.uk/government/publications/countryside-stewardship-mid-tier-and-wildlife-offers-manual-for-agreements-starting-on-1-january-2022/annex-6c-convert-livestock-numbers-into-livestock-units) (<https://www.gov.uk/government/publications/countryside-stewardship-mid-tier-and-wildlife-offers-manual-for-agreements-starting-on-1-january-2022/annex-6c-convert-livestock-numbers-into-livestock-units>)

<sup>6</sup> Finch, H.J.S.; Samuel, A.M. and Lane, (2014) Grazing management. In Lockhart & Wiseman’s Crop Husbandry Including Grassland, 9th ed.; Woodhead Publishing: London, UK, 2014; pp. 499–512

is to be implemented within grasslands outside of Fields, though this could change based on the response of the grassland margins to cutting.

### **Wet Meadow / Lowland Meadow – Managed Through Cutting**

- 11.11 Grazing would be omitted from multiple grasslands between March and August (specifically Fields 1, 2, 3 and 13). A cut would be taken in March, with arisings removed, and a further hay cut taken in August using tractor mounted cut and collect machinery / flail collector (where available). Following the August cut, green hay and / or seed from local sources as listed in paragraph 11.4 would be spread and/or sown within the Fields. Green hay would be spread using a muck spreader or similar, where available.
- 11.12 The northern grassland section of Field 20 comprises rush vegetation. The grassland would be cut once in February or March, using a patchwork approach leaving some areas uncut (with arisings removed). Another cut would be taken in August. Cutting would be alternated every year, with new patches created near previously cut patches.
- 11.13 Where feasible, aftermath sheep grazing (low intensity) would be implemented from October through winter on a rotational basis alongside all other grassland fields. Grazing would be adopted within the northern section of Field 21 between August and November only. Where grazing is impracticable due to Proposed Development fencing, or sheep access, the management approach would be revised accordingly and winter cuts would be introduced instead.
- 11.14 The restriction on grazing animals between March and August is to implement the necessary traditional meadow style management to increase the vascular plant diversity, with the aim of delivering as close to meadow conditions as feasibly possible.
- 11.15 The change in grassland management to a hay meadow style input with an early and late cut would also benefit ground nesting birds (specifically skylark), providing adequate cover and protection for their nest sites between April and July<sup>7</sup>.
- 11.16 Sward heights would be monitored accordingly to ensure the sward heights do not become too tall for skylark to nest.

### **Lowland Meadow / Tall Wildflower Mosaic – Managed Through Cutting**

- 11.17 Field 25 would be managed in a similar manner to Fields 1, 2, 3 and 13, though an early cut in late winter or early March would be undertaken as to create a patchwork of vegetation heights. The Field would be left ungrazed and uncut until late July/August. Green hay and/or local seed would be spread or sown, supplemented by tall forbs (where available). This would be obtained from local sources and

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<sup>7</sup> Winspear, R and Davies, G (2005) A Management Guide to birds of Lowland Farmland. RSPB. ISBN 10: 1901930572.

include a composition comprising (but not limited to) tall umbellifers<sup>8</sup>, vetches *Vicia* spp., knapweed *Centaurea nigra* and teasel *Dipsacus fullonum* where available

- 11.18 Shallow depressions would be created by excavator machinery to create swales. The swales would be created to increase topographical variation and encourage use by breeding and wintering birds, and invertebrates.
- 11.19 As the edges of Field 21, Field 22 and Field 23 would be within areas of photovoltaic arrays (i.e. inside deer fence areas), the edges would be overseeded and subject to less cuts than other grasslands to encourage a taller sward. The taller sward would be less suitable for sheep to graze completely, which would leave varying sward heights. The grassland edges would be cut on rotation, outside of the summer months.
- 11.20 The grassland would be aftermath grazed by sheep (low intensity) from September/October through winter.

### **Tussock Grassland and Ruderal**

- 11.21 A tall grassland strip would be encouraged around the relic hedgerow between Field 16 and Field 17 to enhance structural diversity and introduce a new grassland-scrub ecotone. The management approach would be akin to the tall wildflower mosaic (as described above), though cutting would be implemented to create a sward height that would be relatively uniform across the strip.

### **Wetland Planting and Pond Enhancement**

- 11.22 Grazing animals would be fenced out of the waterbody and open vegetation in the north west of Field 24 to prevent poaching, trampling and accumulation of bare ground. Open vegetation will be allowed to regenerate naturally. Area to be cut as needed if vegetation becomes rank.
- 11.23 Encouragement of wetland species to colonise bare and trampled ground that are already present in the vicinity. Examples include existing plants recorded, specifically jointed rush species *Juncus* spp., sedges *Carex* spp., cuckoo flower *Cardamine pratensis*, lesser spearwort *Ranunculus flammula*, ivy-leaved crowfoot *Ranunculus hederaceus*, tufted forget me-not *Myosotis laxa* amongst other aquatic or wet meadow species.
- 11.24 The riparian zone of the ditch/watercourse within Field 20 would be buffered by a minimum of 8 m from photovoltaic arrays, with no construction or operational activities taking place within the buffer. Bankside vegetation would be subject to similar management measures as per the grassland in the north of Field 21, though cutting would be reduced to encourage taller bankside vegetation.

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<sup>8</sup> Plant species of the carrot family, Apiaceae

## Woodland Meadow Planting / Tree Planting

- 11.25 Broadleaved trees and shrubs would be planted within the eastern corner of Field 20, between November and March to create new area of woodland. The existing grassland would be cut and arisings removed before planting. Tree species would be drawn from the planting palette in **Table 11.2** below, with hazel and pedunculate oak *Quercus robur* to form the key species. Trees would be planted two metres apart, with woodland ground flora allowed to develop and colonise from the existing woodland. Where appropriate (and if natural colonisation of woodland species is failing), the ground layer would be supplemented with local seed of typical woodland plants.
- 11.26 The number of whips planted within the woodland meadow would be discussed and agreed with CCC following successful DNS consent.

## Native Tree Planting (Scrub Edge)

- 11.27 Several hazel shrubs would be planted along edge of the off-Site woodland, within the corner of Field 25. Shrubs would be notch planted between November and March and supported by an appropriate timber stake and guard (fitted in accordance with manufacturer's instructions).
- 11.28 The scrub edge would provide a stepped structure, enhancing the existing woodland-grassland ecotone, protecting the woodland edge and providing shelter, forage and connectivity for fauna.

## Proposed Hedgerows

- 11.29 Tree whips would be planted along existing Site boundary hedgerows to deliver new green infrastructure to the landscape and to enhance the structural integrity of the existing hedgerow. Whips would be notch planted and spaced 30 cm apart, between November and March. Mulch mats would be used where appropriate to provide whips with the necessary nutrient and protection measures. The species planted would be taken from the planting palette in **Table 11.2**.
- 11.30 The same approach above would be implemented for the new hedgerow along the diverted section of the Public Right of Way (along Field 4, Field 7 and Field 9), the new hedgerow bisecting Field 4 and Field 7 and the new hedgerow along Field 11.
- 11.31 Hedgerows would be allowed to establish over a year, with a cut at 12 months of growth to encourage typical hedgerow canopy growth. Subsequent cuts would be implemented once every two-three years.

## Enhanced Hedgerows – Management and Infill Planting / Hedgerow Trees

- 11.32 Hedgerows would be cut on a rotational basis so that not all hedgerows will be cut in the same year, this allows hedgerows to flower and fruit regularly. Existing hedgerows would be cut every two to three years, with incremental cutting allowing the hedgerows to develop higher canopies and wider bases without significantly impacting hedgerow health. Cutting would be undertaken in late winter to allow

berries to remain on trees over winter and to prevent disturbance to breeding birds. The hedgerows would be managed to resemble a loose A shape.

- 11.33 Dead / diseased wood would be pruned back, and material removed except where its retention would have ecological benefit. Ground flora beneath the hedge line would be allowed to develop as part of the grassland management and herbicides / pesticides avoided.
- 11.34 Hedgerow trees would be sourced from a local provider of trees and shrubs (National Botanic Garden of Wales or Celtic Wildflowers). Where available, trees would be immature and beyond sapling stage.

## Planting Palette

- 11.35 The proposed planting palette for new trees, new hedgerows, hedgerow trees and shrubs would be drawn from species outlined in the **Table 11.2 below**. The species in this table reflects the landscape character and have been derived from the species recorded during the habitat (Volume 3, Appendix 6.1 Preliminary Ecological Appraisal) and tree surveys (Volume 3, Appendix 5.2 Arboricultural Impact Assessment).
- 11.36 The lists below are not comprehensive but includes species which have an abundant, frequent or occasional presence across the Site. Additional species may be added following further consultation with CCC. Ash has been excluded from the planting palette given potential future issues with ash dieback. Native species that have not been recorded within the Site have not been proposed.

**Table 11-2 Indicative Proposed Planting Palette - Hedgerows, Trees and Shrubs**

Proposed Biodiversity Measure	Indicative Species
<b>Trees, Shrubs and Woodland</b>	
Native tree planting / woodland edge	Hazel
Lowland meadow and native tree planting	Hazel
Woodland meadow / tree planting	Hazel Pedunculate oak
<b>Hedgerows</b>	
New hedgerows	Hawthorn <i>Crataegus monogyna</i> Blackthorn <i>Prunus spinosa</i> Hazel

	<p>Pedunculate oak</p> <p>Holly <i>Ilex aquifolium</i></p> <p>Elder <i>Sambucus nigra</i></p> <p>Rowan <i>Sorbus aucuparia</i></p> <p>Dog rose <i>Rosa canina</i></p> <p>Honeysuckle <i>Lonicera periclineum</i></p>
Hedgerow trees	<p>Pedunculate oak</p> <p>Beech <i>Fagus sylvatica</i></p>

## Establishment and Management

- 11.37 An indicative establishment and management plan for the first five years is set out in **Table 11.3** below. The table sets out desired objectives referred to earlier in this document and the indicative measures for successful establishment and management in the initial 12 months, and subsequent four years following completion of construction. It is anticipated that the establishment and management plan would be adapted after the initial five years (following monitoring, reviews and remedial actions) and implemented for the remainder of the operational lifetime of the Proposed Development.
- 11.38 Where habitat creation, restoration and enhancement measures can be implemented during the construction stage (such as within areas not proposed for the installation of photovoltaic arrays) this would be agreed with CCC and implemented where appropriate. This approach would reduce the temporal impacts on biodiversity by providing biodiversity features in advance of loss.

**Table 11-3 Indicative Establishment, Maintenance and Management Plan**

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
Wet / Lowland Meadow managed through grazing	<ul style="list-style-type: none"> <li>• Increase vascular plant diversity</li> <li>• Enhance structural diversity</li> <li>• Increase opportunities for foraging (birds, mammals and invertebrates)</li> <li>• Increase the carbon sequestration potential of vegetation through species diversity</li> <li>• Increase resiliency of ecosystem</li> <li>• Contribute towards food security</li> </ul>	<p>Low intensity grazing (0.8 LU/ha) until July/August.</p> <p>Parts of the ground around photovoltaic arrays scarified where practicable to prepare for green hay or seed in August.</p> <p>Green hay or seed spread or sown into grassland where practicably possible within and around photovoltaic arrays (to boost existing species composition).</p> <p>Sheep rotated to help trample seed, with grazing continuing into autumn/winter.</p> <p>Low intensity rotational grazing from September/October throughout winter</p>	<p>Low intensity grazing throughout subsequent years, rotated across all fields within the Site at a density of 0.8 LU/ha</p> <p>Changes to grazing density would be made following monitoring assessment of grasslands where necessary. Where grassland is not meeting initial targets, grazing would be reduced.</p> <p>Subsequent seed sowing, green hay spreading where vascular plant diversity remains significantly low (year three or five)</p> <p>Removal of undesirable or negative indicator species by hand throughout year where feasible</p>
Wet / Lowland Meadow managed through cutting	<ul style="list-style-type: none"> <li>• Increase vascular plant diversity</li> <li>• Enhance structural diversity</li> <li>• Increase opportunities for foraging (birds, mammals and invertebrates)</li> <li>• Increase carbon sequestration potential of vegetation</li> <li>• Increase resiliency of ecosystem</li> <li>• Contribute towards food security</li> </ul>	<p>Cuts undertaken in early March and again in August using tractor mounted cut and collect machinery / flail collector. All arisings taken off grasslands.</p> <p>Grassland scarified to increase establishment of green hay or seed. Green hay to be spread using muck spreader.</p> <p>Patchwork cutting of grassland in north of Field 20 in late winter</p>	<p>Low intensity aftermath grazing throughout winter period, with potential for grassland to be grazed less from November to March.</p> <p>Changes to grazing density would be made following monitoring assessment of grasslands where necessary</p> <p>Subsequent seed sowing, green hay spreading where vascular plant diversity remains significantly low (year three or five)</p>

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
		Supplement grassland with yellow rattle in September to support with coarse grass management.	Removal of undesirable or negative species by hand throughout year
Lowland Meadow / Wildflower Mosaic Tussocky Grassland	Tall and <ul style="list-style-type: none"> <li>• Increase vascular plant diversity</li> <li>• Enhance structural and topographical diversity</li> <li>• Increase opportunities for foraging (birds, mammals and invertebrates)</li> <li>• Provide cover, shelter and hibernation for mammals, herpetofauna and invertebrates</li> <li>• Offer roosting sites for wading birds</li> </ul>	<p>Cuts undertaken in late winter or March in year one using a patchwork approach whereby the sward is cut at various heights.</p> <p>Field 25 would be subjected to selected areas cut to 10cm, with other areas cut or left at 20cm using tractor mounted cut and collect machinery / flail collector.</p> <p>Grassland be cut again in August using tractor mounted cut and collect machinery / flail collector, selected areas would be scarified, and green hay or seed would be spread/sown. Grazing would be omitted from Fields 21, 22 and 23 and the edges would be overseeded and allowed to develop a taller sward. Grazing could then be re-introduced in October.</p> <p>Field 25 to be grazed (low intensity) from September/October onwards</p>	<p>Low intensity aftermath grazing throughout winter period.</p> <p>Changes to grazing density would be made following monitoring assessment of grasslands where necessary. Grazing may need to be excluded in place of a further winter cut.</p> <p>Subsequent seed sowing, green hay spreading where vascular plant diversity remains significantly low (year three or five)</p> <p>Removal of undesirable or negative species by hand</p>
Native Tree Planting (including meadow)	woodland <ul style="list-style-type: none"> <li>• Soften edge of off-Site woodland in Solar Area East</li> <li>• Introduce secondary woodland in Field 20</li> <li>• Enhance structural and plant diversity</li> </ul>	<p>Inspect for presence and effectiveness of mulch mats at base of plants.</p> <p>Ensure grass and competitive growth is controlled by strimming outside of areas controlled by mulch mats.</p> <p>During establishment, water at a frequency of no less than two times per week for a period of six</p>	<p>Undertake annual walkover inspection of planted areas. Inspect at the beginning of the growing season for the first 5 years to ensure that grassland and herbaceous species within planted areas remain clear of individual shrubs that would otherwise lead to failure.</p> <p>Review needs for mulch mats (Years 3 to 5).</p>

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
	<ul style="list-style-type: none"> <li>• Provide additional shelter for birds, mammals and herpetofauna</li> <li>• Improve ecosystem resilience and enable adaptability to environmental hazards</li> <li>• Enhance ability to deliver carbon sequestration functions</li> <li>• Provide mosaics and additional habitat interfaces for hazel dormouse and breeding birds</li> </ul>	<p>weeks (if necessary). Thereafter, the watering regime will be based on continuous monthly advanced review of weather forecasts to determine appropriate watering frequency, though this would only be required in the key growing season in case of drought.</p> <p>Inspect planting for windblow, re-firm trees and check staking and tree ties, replace where necessary.</p> <p>Check for damaged or diseased shrubs, replace shrubs where sufficient damage has occurred to jeopardise long term survival of the shrub (during first available planting season).</p> <p>Inspect and maintain rabbit proof fencing / guards. Newly planted whips inspected during the growing season.</p> <p>Check for damaged, dead or diseased plants, remove plants where damage has occurred that would otherwise jeopardise long term survival of plants and replace in the next planting season following identification.</p>	<p>Trimming should be undertaken outside of the bird nesting season, and ideally during late winter (January to February), to allow any fruits and berries to be foraged by overwintering birds and small mammals.</p> <p>Review watering regime based on continuous monthly advanced review of weather forecasts and determine appropriate watering frequency (years 2 and 3).</p> <p>Strim to control competition from grass and herbaceous growth outside of areas controlled by mulch mats (requirement for strimming to be reviewed following year three as growth reduces impact of competition).</p> <p>Thereafter, replace if failure would reduce the effectiveness, density of the established planting (replacement during first available planting).</p> <p>Inspection of rabbit-proof fencing / guards during routine maintenance visits and make good any damage. Remove rabbit proof fencing/guards (end of year 5 – subject to review of plant vigour and density).</p> <p>Ensure secondary woodland planting (i.e. newly planted trees) does not smother ground flora. Ground flora to be checked for presence of typical woodland species,</p>

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
New Hedgerows	<ul style="list-style-type: none"> <li>• To reinstate lost hedgerows</li> <li>• Increase density of existing hedgerows</li> <li>• Supplement existing green infrastructure</li> <li>• Offer additional screening</li> <li>• Provide new nesting habitat for breeding and wintering birds and mammals</li> <li>• Provide new shelter for herpetofauna</li> <li>• Offer additional foraging and commuting habitat for bats</li> </ul>	<p>Whips assumed to have already been planted in winter before year one.</p> <p>Inspect for presence and effectiveness of mulch mats at base of plants at end of growing year</p> <p>Ensure grass / herbaceous competitive growth is controlled by strimming outside of areas controlled by mulch mats.</p> <p>Control / eradicate undesirable species where present</p> <p>During establishment, water at a frequency of no less than two times per week for a period of six weeks (where needed).</p> <p>Thereafter, the watering regime will be based on continuous monthly advanced review of weather forecasts to determine appropriate watering frequency.</p> <p>Inspect planting for windblow, re-firm whips and check staking and tree ties, replace where necessary.</p> <p>Check for damaged or diseased shrubs, replace shrubs where sufficient damage has occurred to</p>	<p>specifically those within existing woodland - bluebell, red campion, wood speedwell, dog's mercury, enchanter's nightshade.</p> <p>Undertake annual walkover inspection of planted areas until year three. Inspect at the beginning of the growing season for the first three years to ensure that grassland and herbaceous species within planted areas remain clear of individual shrubs.</p> <p>Review needs for mulch mats.</p> <p>A review schedule would be identified such that management of hedgerows for the Proposed Development is undertaken on a two-three year rotation.</p> <p>Cutting should aim to maintain the hedgerows at no less than 3m in height to retain a dense habitat. Trimming should be undertaken outside of the bird nesting season, and ideally during late winter (January to February), to allow any fruits and berries to be foraged by over-wintering birds and small mammals.</p> <p>Some bramble will be allowed to establish through self-seeding as it is valuable to wildlife, but it will be managed so that it does not become dominant.</p> <p>Review watering regime based on continuous monthly advanced review of weather</p>

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
		<p>jeopardise long term survival of the shrub (during first available planting season).</p> <p>Where disease is identified, tree should be removed.</p>	<p>forecasts and determine appropriate watering frequency</p> <p>Strim to control competition from grass and herbaceous growth outside of areas controlled by mulch mats (requirement for strimming to be reviewed following year three as growth reduces impact of competition).</p> <p>Replace failed shrubs identified annually during the first three growing seasons. Thereafter, replace if failure would reduce the effectiveness, density of the established planting (replacement during first available planting).</p> <p>Inspection of guards during routine maintenance visits and make good any damage. Remove guards (end of year three, four or five – subject to review of plant vigour and density).</p>
Enhanced Hedgerows / Infill Planting	<ul style="list-style-type: none"> <li>Enhance connectivity and join up fragmented habitat corridors.</li> <li>Create additional nesting and foraging opportunities for breeding birds, provide refuge for reptiles and amphibians and new commuting and foraging opportunities for bats.</li> <li>Increase carbon sequestration.</li> </ul>	<p>Existing hedgerows with gaps would be infilled with suitable trees from agreed planting palette prior to beginning of year one.</p> <p>Mulch mats used to support growth of newly planted hedgerow species.</p> <p>Newly planted whips in gaps will be inspected during the growing season. Damaged, dead or diseased plants removed where damage / disease would jeopardise long term survival of the plant</p>	<p>Management of hedgerows on two-three year rotation, to allow hedgerows to remain undisturbed.</p> <p>Cutting should aim to maintain the hedgerows at no less than 2m in height and 1.5m wide to retain a dense habitat and resemble an A shape.</p> <p>Trimming should be undertaken outside of the bird nesting season, and ideally during</p>

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
	<ul style="list-style-type: none"> <li>Enhance resilience of ecosystem through bolstering existing hedgerows</li> <li>Provide screening through establishment of standard trees within hedgerow gaps</li> </ul>	<p>and replace in the next planting season following identification.</p> <p>Inspect condition of mulch mats at base of plants.</p> <p>Ensure grass / herbaceous competitive growth is controlled by strimming outside of areas controlled by mulch mats.</p>	<p>late winter (January to February), to allow any fruits and berries to be foraged by over-wintering birds and small mammals.</p> <p>Replace planted trees at the earliest appropriate time following failure of newly planted areas</p>
<p>Wetland Planting and Pond Enhancement</p>	<ul style="list-style-type: none"> <li>Restoration of poached waterbody and marginal / inundated vegetation</li> <li>Reduce bare ground and increase cover of vascular plants</li> <li>Create diverse wetland for birds, bats, other mammals, herpetofauna and invertebrates</li> <li>Introduce bankside cover along existing ditch / watercourse</li> </ul>	<p>Grazing animals fenced out of waterbody area in Field 24 to reduce pressure on habitat</p> <p>Vegetation along bankside of ditch / watercourse in Field 20 cut once as part of wet meadow management (implemented within Field 20) to allow taller bankside vegetation to develop.</p>	<p>Monitoring visits to inform adaptive management as necessary.</p> <p>Cut vegetation around waterbody up to two times within each year (outside April and August) if vegetation becomes rank or overgrown. Soft rush may become dominant which would need to be controlled to allow other species to flourish</p> <p>Remove duckweed <i>Lemna</i> sp. and other undesirable waterbody and wetland plants as soon as is practical. Hemlock water-dropwort <i>Oenanthe crocata</i> to be managed accordingly if found to colonise ditch / watercourse.</p> <p>Adapt cutting regime of ditch / watercourse as necessary, with cuts taking place in early winter or late summer/</p>

Proposed Measures	Objectives	Establishment/Management – Year One	On-going Activities Years Two - Five
Wildlife Boxes – Bat and Bird	<ul style="list-style-type: none"> <li>• Provide shelter and additional nesting and roosting opportunities for birds, bats, other mammals reptiles, amphibians and invertebrates.</li> <li>• Contribute to delivery of NBB</li> </ul>	Schwegler boxes for birds and bats would be installed on suitable trees in separate wooded areas across the Site. Appropriate fixing material would be sourced to attach boxes to trees.	Boxes checked in year three Replace damaged boxes as needed following initial three-year period

## 12 MONITORING AND REMEDIAL ACTIONS

- 12.1 It is proposed that all monitoring would be undertaken in Years 1, 2, 3, and 5 to ascertain success of the initial implementation of biodiversity measures. Follow up monitoring (beyond the initial five years) would be discussed and agreed with CCC, though,, with remedial actions implemented following the reporting monitoring results. Revisions to management as a result of changing site conditions would be defined in an updated work schedule which would be agreed within CCC prior to its implementation.

### Monitoring

- 12.2 All created, enhanced and restored habitats would be monitored over the course of the initial five-year period to ascertain if habitats are reaching initial target condition. The monitoring would be undertaken in selected years after the initial five-year period as agreed with CCC.

### Grasslands

- 12.3 Quadrat sampling across all grasslands (outside of photovoltaic arrays) would be implemented. Five 2m x 2m quadrats will be undertaken within each grassland outside of photovoltaic arrays. Quadrat data would be used to ascertain presence of positive and negative indicator species. The data would be used to ascertain the closest vegetation type to published British National Vegetation Classification (NVC) communities. The monitoring approach would adapted from the Common Standards Monitoring Guidance CSM for Lowland Grassland Habitats<sup>9</sup>.
- 12.4 For grasslands under photovoltaic arrays, a species list would be compiled using DAFOR<sup>10</sup> to ascertain relative abundance, as this would be best suited given the potential for variation underneath and between arrays.
- 12.5 Monitoring data would be collected on the percentage cover of grasses, herbs, bryophytes (where present) and bare ground. The monitoring data will be supported by photographs to provide a visual record of each of the grassland areas.
- 12.6 Long term target conditions for grasslands (i.e. beyond the initial five-year period) outside of photovoltaic arrays would include:
- Between eight and 10 species (as a minimum) per metre square
  - No more than 30% grass cover

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<sup>9</sup> Joint Nature Conservation Committee (2004) Common Standards Monitoring Guidance for Lowland Grassland Habitats. ISSN 1743-8160.

<sup>10</sup> Dominant Abundant Frequent Occasional Rare

- Less than 10% of the sward made up of negative indicators (such as perennial rye-grass *Lolium perenne*, cock's-foot *Dactylus glomerata*, white clover *Trifolium repens* etc)
- Varied sward heights
- Limited bare ground cover (less than 5%)
- Absence of scrub encroachment

12.7 For grasslands underneath photovoltaic arrays:

- A minimum of six species per metre square
- Less than 20% of the sward made up of negative indicators (such as perennial rye-grass, cock's foot, docks, thistles and white clover etc) or occurring no more than occasional
- Limited bare ground cover (less than 10%)
- Absence of scrub encroachment

12.8 Other target conditions would be discussed and agreed with CCC where necessary. Grasslands would be surveyed in late June during the first five years to assess their condition as part of the monitoring programme.

### **Wetlands, Waterbodies and Open Vegetation**

12.9 The waterbody, ditches, watercourses and new drainage features within the Site would be monitored primarily to assess negative and undesirable species and pressures. Quadrat sampling of the open vegetation around the margins of the waterbody would be undertaken. Five 2 x 2 quadrats (adapted as necessary) would be collected.

12.10 Information obtained as part of monitoring visits would include:

- Water depth and presence / rate of flows
- Extent and diversity of marginal vegetation
- Extent of negative indicator plants and undesirable species, including common reed *Phragmites australis*, duckweed. and hemlock water-dropwort among others
- The presence of invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981
- The presence of algal blooms

12.11 The long-term target for the open vegetation around the waterbody in Field would be to reduce the bare ground cover created by annual cattle poaching. Photographic evidence would be obtained to provide visual context of regeneration progress.

12.12 Wetlands would be surveyed in late June during the first five years to assess their condition.

## Native Trees and Shrubs

- 12.13 Establishment and failures within each planted area would be recorded, including presence and relative abundance of negative indicators / undesirable species. Where possible failures would be marked on digital mapping devices. Photographs would be obtained to provide visual context and notes on browsing pressure would be made.
- 12.14 Tree planting areas would be surveyed in September to assess their condition

## Hedgerows

- 12.15 Newly created hedgerows would be monitored to assess establishment and failures of planted whips. Enhanced hedgerows would be monitored to assess their response to rotational and incremental cutting.
- 12.16 Where possible failures would be marked on digital mapping devices. Photographs would be obtained to provide visual context and notes on browsing pressure would be made. The following information would be obtained:
- Height and width of hedgerows
  - Density
  - Diversity of established and flourishing woody species, specifically within 30 m sections.
  - Structure and diversity of hedgerow ground flora
- 12.17 Hedgerows would be surveyed in September during the first five years to assess their condition.

## Wildlife Boxes

- 12.18 Boxes would be monitored after the first three years of deployment to check for defects. They would then be monitored alongside every five yearly habitat monitoring visit after the initial five years.
- 12.19 Where boxes are damaged, they would be replaced.

## Management Review and Subsequent Actions

- 12.20 Management reviews would consider the extent to which the objectives and aims are being achieved through the ongoing implementation of management actions over the lifetime of the Proposed Development. The effectiveness of the measures, methods and timing of management would be assessed based on the status of habitats.
- 12.21 The monitoring results will be compiled into a monitoring report. The report would highlight positive and negative outcomes for biodiversity, both habitats and species (specifically those identified within ES, Volume 1, Chapter 6 Biodiversity). The monitoring report would highlight any unforeseen changes to factors influencing management decisions and actions and the continued relevance of each of the management prescriptions.

- 12.22 Where habitats and features are not achieving the management objectives this would be highlighted. The monitoring reports would include additional management actions to be implemented to address undesirable and negative changes in the new baseline. This would include management of native plants, actions to repair dramatic effects on a habitat or where current management measures are not effective.
- 12.23 Remedial measures may be required following monitoring visits, typical examples are listed in **Table 12.1** below. The need for the implementation of any of these would be triggered by monitoring visits.

**Table 12-1 Example of Modifications to Management and Remedial Measures**

Proposed Biodiversity Measure	Potential Actions following Monitoring Results
Wet / Lowland meadows	<ul style="list-style-type: none"> <li>• Supplemental wildflower seeding and/or additional green hay following summer cut</li> <li>• Changes to levels of grazing density or timing of grazing</li> <li>• Management increased coarse grass and nutrient rich topsoil if undesirable species persist</li> </ul>
Tussocky Grassland / Tall Wildflower Mosaic	<ul style="list-style-type: none"> <li>• Changes in frequency and timing of grass cutting</li> <li>• Supplemental wildflower seeding</li> <li>• Increase winter grazing if necessary</li> </ul>
Wetlands, Waterbodies and Open Vegetation	<ul style="list-style-type: none"> <li>• Removal of any non-native species if colonised</li> <li>• Removal of undesirable species</li> <li>• Removal of sediment / leaf litter or other undesirable material within water features</li> <li>• Management of tall vegetation</li> </ul>
Hedgerows	<ul style="list-style-type: none"> <li>• Selective cutting back of dominant species to promote diversity.</li> <li>• Adapting cutting regime/method to promote dense growth and flowering ability</li> <li>• Supplementary planting to infill gaps and replace failures</li> </ul>
Native Tree Planting	<ul style="list-style-type: none"> <li>• Supplement planting to replace failures</li> <li>• Plug planting of woodland ground flora to increase colonisation of typical woodland flora</li> </ul>
Wildlife Boxes	<ul style="list-style-type: none"> <li>• Repair or replacement</li> </ul>

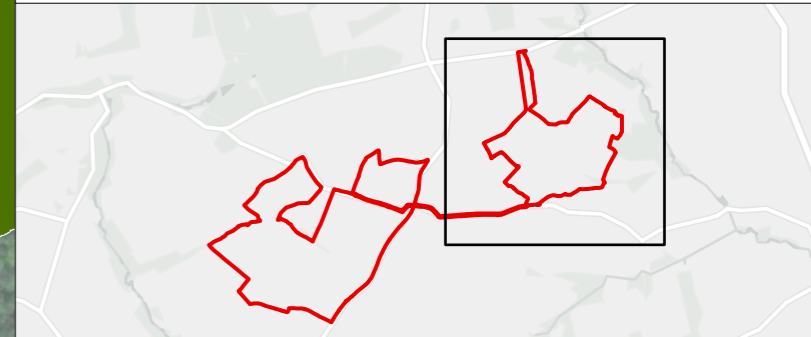
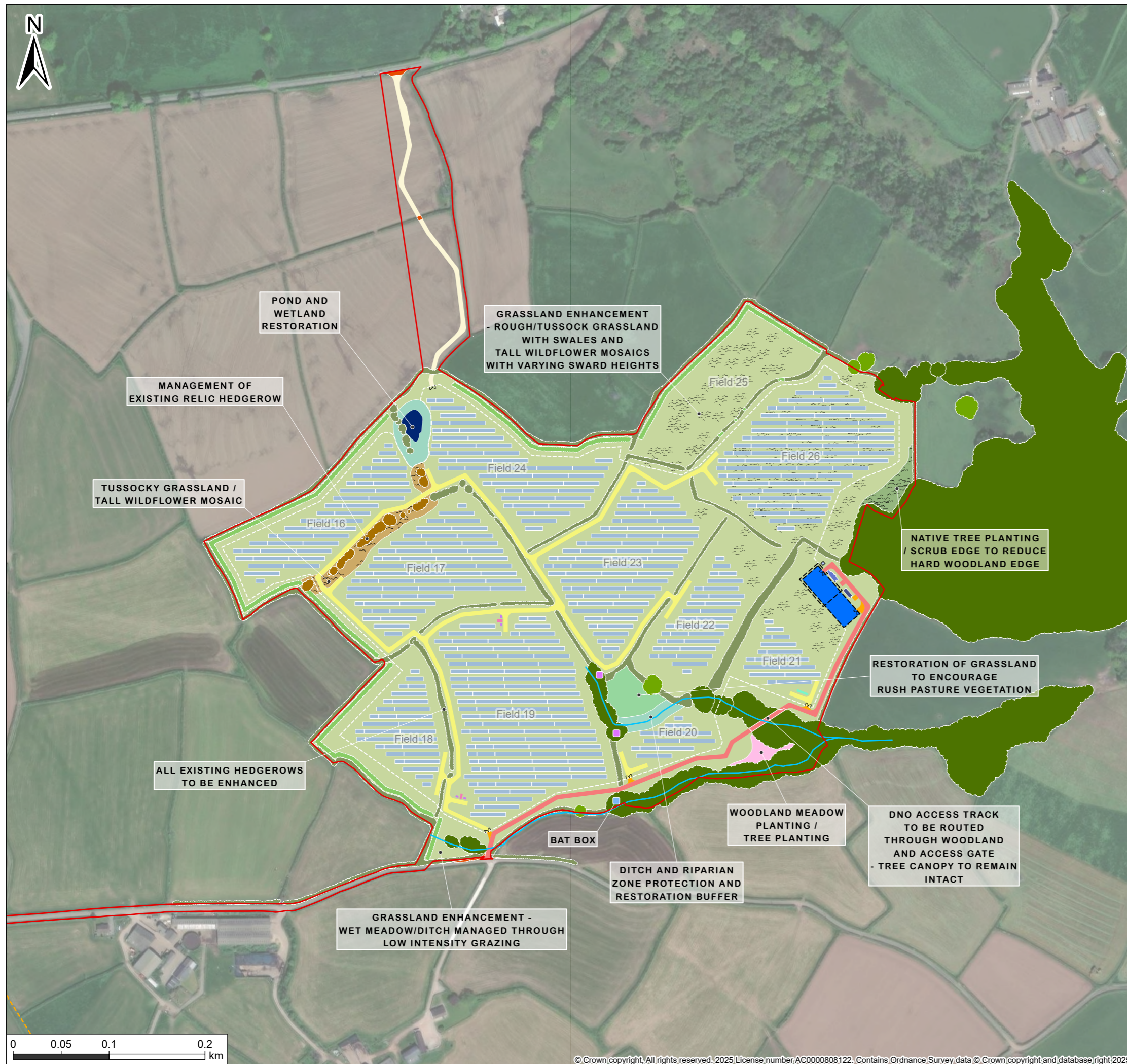
- 12.24 Maintaining flexibility will be essential in ensuring that the management measures can be tailored as necessary to achieve the desired outcomes. Many of the management prescriptions during the first five years post-construction will be undertaken as required based on monitoring visits to assess the habitats condition against desired targets.

## Figure 1 - Landscape and Ecological Design Scheme Plan



**Legend**

Site	Existing woodland
<b>Scheme Elements</b>	Standing water
Communications tower	Existing PRoW
Customer control room	Watercourse
Distribution Network Operator - Access	<b>Landscape and Biodiversity Strategy</b>
Distribution Network Operator - Control room	Grassland enhancement - lowland meadow/tall wildflower mosaic managed through cutting
Distribution Network Operator - Indicative access through woodland	Grassland enhancement - wet meadow managed through low intensity grazing
Distribution Network Operator - Substation	Grassland enhancement - wet meadow managed through cutting
Inverter	Native tree planting
Maintenance tracks	Proposed hedge
Photovoltaic frames	Tussock grassland and ruderal
Site access	Vegetation to be removed
Spare parts container	Wetland planting and pond enhancement
Transformer	Woodland meadow planting / tree planting
Security fencing	Bat box
Deer fencing	Bird box
Gate	
<b>Existing Features</b>	
Existing hedge	
Existing relic hedge	
Existing tree	



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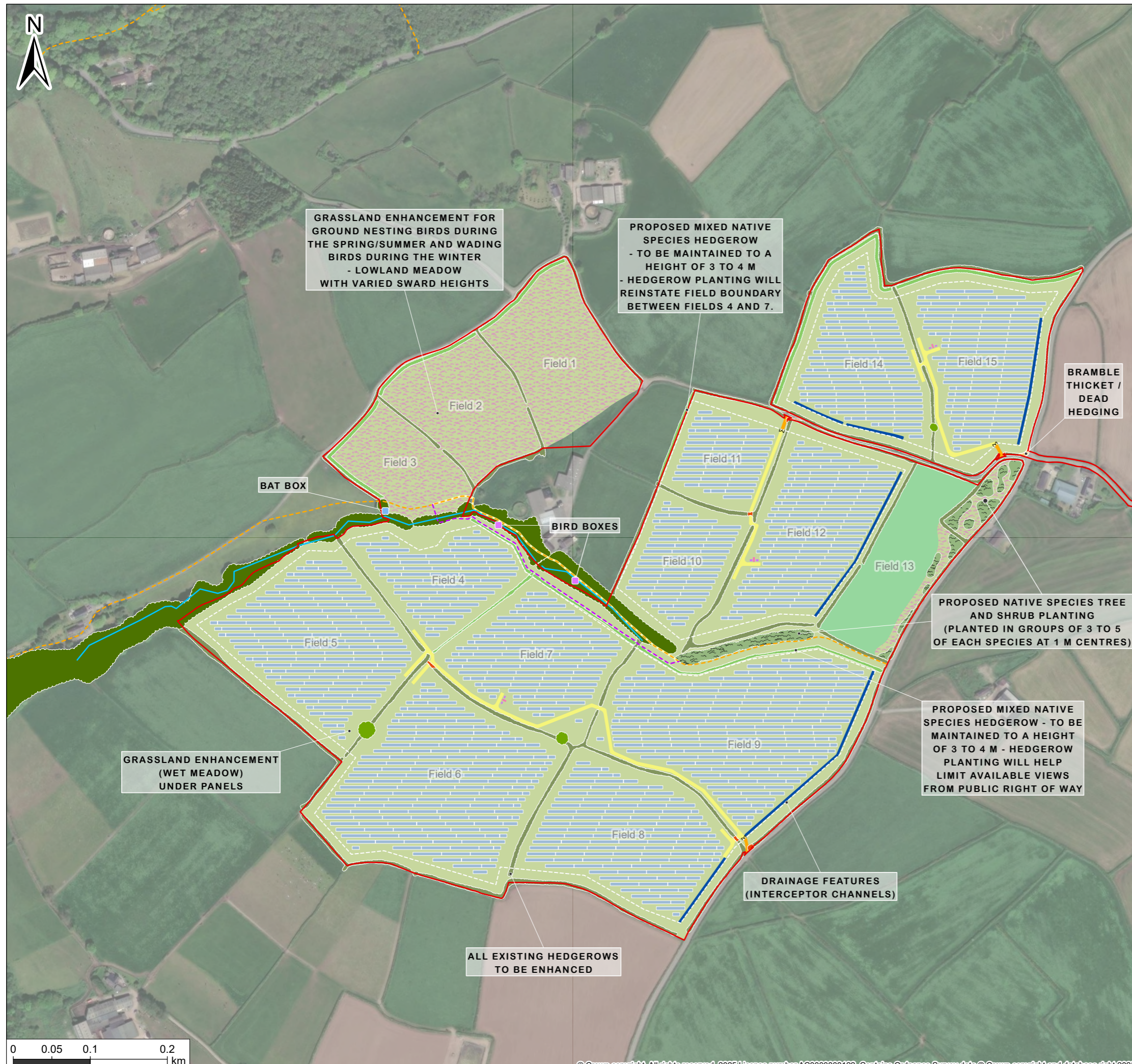
Project Name	<b>Heolddu Solar Farm</b>			
Drawing Title	<b>Landscape and Ecological Design Scheme - Solar Area East</b>			
Figure Number	<b>1</b>			
Drawing Number	<b>NDIP00319-0005-13</b>			
13	09/09/2025	FINAL	AC	LR
Rev	Date	Status	By	CB
Scale @ A3		Plot Size	Datum	
<b>1:4,000</b>		<b>294 x 277 mm</b>	<b>OSGB 1936</b>	

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**Legend**

- Scheme Elements**
- Inverter
  - Maintenance tracks
  - Photovoltaic frames
  - Site access
  - Transformer
  - Deer fencing
  - Gate
- Existing Features**
- Existing hedge
  - Existing tree
  - Existing woodland
  - Existing PRoW
  - Watercourse
- Landscape and Biodiversity Strategy**
- Bramble thicket / dead hedging
  - Grassland enhancement - lowland meadow
  - Grassland enhancement - wet meadow managed through cutting
  - Native tree planting
  - Proposed hedge
  - Vegetation to be removed
  - Drainage features (interceptor channels)
  - PRoW to be deregistered
  - Proposed diverted PRoW
  - Bat box
  - Bird box



GRASSLAND ENHANCEMENT FOR GROUND NESTING BIRDS DURING THE SPRING/SUMMER AND WADING BIRDS DURING THE WINTER - LOWLAND MEADOW WITH VARIED SWARD HEIGHTS

PROPOSED MIXED NATIVE SPECIES HEDGEROW - TO BE MAINTAINED TO A HEIGHT OF 3 TO 4 M - HEDGEROW PLANTING WILL REINSTATE FIELD BOUNDARY BETWEEN FIELDS 4 AND 7.

BRAMBLE THICKET / DEAD HEDGING

BAT BOX

BIRD BOXES

PROPOSED NATIVE SPECIES TREE AND SHRUB PLANTING (PLANTED IN GROUPS OF 3 TO 5 OF EACH SPECIES AT 1 M CENTRES)

PROPOSED MIXED NATIVE SPECIES HEDGEROW - TO BE MAINTAINED TO A HEIGHT OF 3 TO 4 M - HEDGEROW PLANTING WILL HELP LIMIT AVAILABLE VIEWS FROM PUBLIC RIGHT OF WAY

GRASSLAND ENHANCEMENT (WET MEADOW) UNDER PANELS

DRAINAGE FEATURES (INTERCEPTOR CHANNELS)

ALL EXISTING HEDGEROWS TO BE ENHANCED



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Drawing Title	<b>Landscape and Ecological Design Scheme - Solar Area West</b>			
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