Wick Farm Solar Farm
Landscape & Ecological Management Plan

Submitted to discharge planning condition 11 (planning ref 20/06840/FUL)

JBM Solar Projects
September 2023 | P20_0137_EN_20A **Environment**



Revision	Date	Initials	Revision Note
First Issue	04.09.2023	LS	-
A	11.09.2023	IBD	Amended following ecologist review

Pegasus Group
33 Sheep Street
Cirencester
Gloucestershire
GL7 1RQ

www.pegasusgroup.co.uk I T 01285 641717

Job code	P20_0137
Author	LS
Checked by	IBD
Date	11/09/2023

The contents of this document must not be copied or reproduced in whole or in part without the written consent of Pegasus Planning Group Ltd. © Crown copyright. All rights reserved, Licence number 100042093.
Ordnance Survey Copyright Licence number 100042093 I Promap Licence number 100020449.



CONTENTS

1. INTRODUCTION
2. SITE DESCRIPTION AND PROPOSALS
3. ENVIRONMENTAL CONSIDERATIONS
4. GENERAL MAINTENANCE REQUIREMENTS
5. MAINTENANCE SPECIFICATIONS
6. SCHEDULE OF MANAGEMENT, MAINTENANCE AND MONITORING
7. RESTORATION AND DECOMMISSIONING

NOTE: THIS DOCUMENT IS DESIGNED TO BE VIEWED AS A4 DOUBLE SIDED

1 Introduction

Background

1.1 This Landscape and Ecological Management Plan (LEMP) has been prepared by Pegasus Group and Avian Ecology to support the planning application for the development at land north of Melksham Substation, Wiltshire (Wick Farm). This Landscape and Ecological Management Plan has been prepared to discharge condition 11 of planning permission 20/06840/FUL.

"No development shall commence on site until a Landscape and Ecological Management Plan (LEMP) has been submitted to, and approved in writing by, the Local Planning Authority. The LEMP shall explain how habitats will be managed to achieve the predicted biodiversity net gains as represented on the submitted Biodiversity Management Plan (drawing no. P20-0137_19 Rev C) during the operational phase of development. The content of the LEMP shall include, but not necessarily be limited to, the following information:

a) Description and evaluation of features to be managed during the operational phase of development for its entire temporary lifetime;

b) Landscape and ecological trends and constraints on site that might influence management;

c) Aims and objectives of management;

d) Appropriate management options for achieving aims and objectives;

e) Prescriptions for management actions;

f) Preparation of a work schedule (including an annual work plan capable of being rolled forward over the lifetime of the development including the decommissioning phase);

g) Details of the body or organisation responsible for implementation of the plan;

h) Ongoing monitoring and remedial measures;

i) Details of how the aims and objectives of the LEMP will be communicated to future owners of the development.

j) Details of a mechanism for adaptive management to achieve the long-term objectives of the approved Biodiversity Mitigation and Enhancement Plan as a result of actions arising from the Monitoring Strategy (as required by condition 12).

The LEMP shall also include details of the legal and funding mechanism(s) by which the long-term implementation of the plan will be secured by the developer with the management body/ies responsible for its delivery.

The plan shall also set out (where the results from monitoring show that the conservation aims and objectives of the LEMP are not being met) how contingencies and/or remedial action will be identified, agreed and implemented.

The LEMP shall be implemented in full in accordance with the approved details."

1.2 The following documents have been used to inform the maintenance and management prescriptions set out within the LEMP, and should be read in conjunction with these documents:

- Biodiversity Management Plan, [Avian Ecology, July 2020]
- Tree Survey Report [Barton Hyett Associates, July 2020]
- Detailed Planting Plan [ref: P20-0137_09, Pegasus Group]
- Biodiversity Mitigation and Enhancement Plan [ref: P20-0137_19, Pegasus Group]

1.3 The objective of this Landscape and Ecological Management Plan (LEMP) is to set out the management and maintenance procedure for the solar installation at Wick Farm, to ensure successful habitat protection and enhancement measures effectively develop and maintain wildlife habitats. In addition, the LEMP aims to ensure the successful establishment of the landscape proposals as prescribed within the landscape plans and integrate the scheme within the existing landscape framework noting the site's key opportunities and constraints such as the public rights of way, existing vegetation and habitat. The proposals shall contribute to wider ecological connectivity, in line with the biodiversity net-gain targets of *The Environment Act, 2021* (furthering those set out within *National Planning Policy Framework, 2021),* as well as local planning policy and best practice.

1.4 Biodiversity Guidance for Solar Developments, BRE, 2014, states:

> *"with appropriate land management, solar farms have the potential to support wildlife and contribute to national biodiversity targets. Indeed, solar farms may have several additional advantages in that they are secure sites with little disturbance from humans and machinery once construction is complete. Recent research suggests biodiversity gains on solar farms can be significant."*

1.5 This LEMP is designed for the operational phase of the development and will commence from the handover date from the landscape contractor to the management company.

Landscape and Ecological Management Plan

1.6 The purpose of this Landscape and Ecological Management Plan is:

- To ensure that clear objectives for this new solar installation are agreed and laid down;
- To set clear standards for the performance of landscape maintenance work prior to the handover to the landscape maintenance contractor;
- To develop work programmes and schedules for landscape maintenance staff for the first year after completion and thereafter for a period of 40 years;
- To preserve and enhance the site biodiversity to ensure net gain for local biodiversity;
- To help in the allocation of financial resources for landscape maintenance; and
- To help monitor success and progress against management targets.

Management Aims

1.7 The main aims for the site's landscape management and maintenance are:

- To assimilate the solar installation into the local landscape, thereby minimising any effects on local landscape character, landscape elements and visual receptors;
- To manage operational activities to protect existing retained trees, hedgerows to prevent short term damage and longer term adverse impacts;
- To maintain new and existing trees, hedgerows and grassland in order to maximise their landscape and ecological benefits, as well as strengthening wider habitat connectivity;
- To provide additional nesting and refuge /overwintering habitat for wildlife such as reptiles, invertebrate and small mammals, through inclusion and maintenance of habitat piles/hibernacula, bird and bat boxes, insect hotels and hedgehog boxes; and
- To manage existing and proposed trees and vegetation to minimise risks for operational staff.

1.8 These works should be carried out by suitably experienced contractors, under the watch of qualified / licensed ecologists and arboriculturists where appropriate.



Indicative image of wildflower grassland beneath panels

Scope and Review

1.9 This document should be seen as an operational guide for maintaining the landscape and ecological proposals for the lifetime of the solar installation and is subject to change and improvement as the different landscape features mature and develop.

1.10 We recommend that this LEMP is reviewed with the input of an ecologist and/or landscape architect as required, to ensure the management aims are still necessary and relevant for the duration/life span of the solar installation. Section 6.2 for monitoring and review sets out the strategy for the review of the LEMP.

1.11 As such, this LEMP details the management prescriptions for the first five years with the requirements set out for the following period to 40 years.

Ecological trends and constraints

1.12 This LEMP is to be seen as an operational guide subject to review to incorporate landscape and ecological trends that may impact on the landscape management aims, objectives and maintenance regime. The review process would allow for changes in order to meet conservation targets as well as those set out within the biodiversity net gain assessment.

1.13 Changes to management practice for ecological trends for habitat and species which may be updated to local policy and biodiversity targets may need to be incorporated as necessary. This would help to ensure that the LEMP remains fit for purpose in the evolving dynamic of landscape and help to ensure resilience to the effects of climate change and social pressures.

Managing Risk and Competencies

1.14 It is assumed that a competent contractor shall have the necessary PPE, training and skills to undertake the management and maintenance tasks as set out within this LEMP.

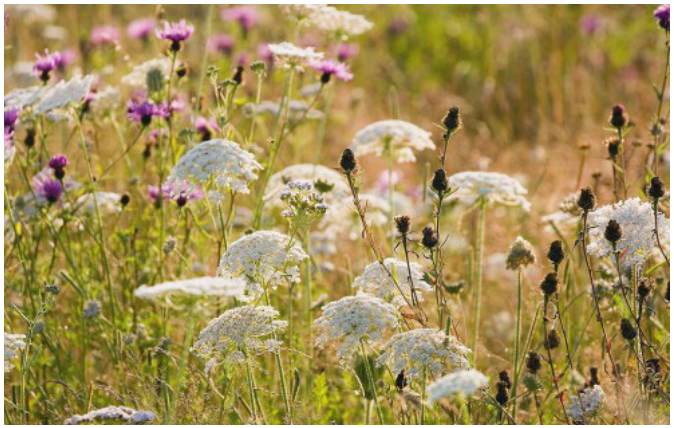
1.15 The landscape management company shall be responsible for undertaking written risk assessments in relation to the landscape, arboricultural and ecological management and maintenance prescriptions detailed within this LEMP (in additional to any other site risks). This shall be provided to the clients prior to the start of works.

Legal and Funding Mechanisms.

1.16 Funding of landscape maintenance will be covered by the site developer, whom will be responsible for appointing a suitable qualified contractor/ management organisation to implement the management and maintenance as set out within this LEMP.

Insolvency/Administration

1.17 Should the landscape maintenance body of one of their subcontractors be made insolvent/ or enter administration, the developer has the ability to re-tender the maintenance contract and engage a suitable alternative contractor to carry out the landscape maintenance works as set out within the LEMP. This will ensure that the maintenance regime is delivered.







2 Site Description and Proposals

Existing Site Conditions

2.1 The application site comprises agricultural land with a combined area of approximately 96.32ha (including land within which the proposed cable route will run, but which does not form part of the solar layout), located west of the village of Lacock, approximately 4km south of Chippenham.

2.2 Habitats within the site and immediate surroundings include arable; dense scrub, short ephemeral/perennial, poor semi-improved grassland, tall ruderals, broadleaved woodland, species-rich and species-poor hedgerows, ponds, ditches and scattered trees within field boundary hedgerows. In the wider context, the site is surrounded by further extensive areas of arable farmland and scattered pockets of deciduous woodland.

2.3 There are several Public Rights of Way (PRoW) footpaths that run through and in close proximity to the site. Footpaths LAC02 and LAC 05 run from Folly Lane West and converge in the north. Footpath LAC02 continues across the site in a southwesterly direction towards The Rookery. Footpath LAC01A travels from Catridge Farm and crosses the centre of the site, joining with footpath MELW99 just beyond the eastern boundary of the site. Footpath MELW85 crosses the very southern extent near Melksham National Grid Substation.

2.4 The site is not located within any statutory and non-statutory designated sites for nature conservation. One statutory designated site: Spye Park Site of Special Scientific Interest (SSSI) is located approximately 3km east of the site. Two non-statutory designated sites are situated immediately adjacent to the site: Daniel's Wood Local Wildlife Site (LWS) and Inwood, Lacock LWS.

2.5 In combination, the existing vegetated field boundaries, small copses and watercourses provide well-connected, high value habitats, likely to be well-utilised by local bird, bat and other species.

Key Design Principles

2.6 Key design principles guiding landscape proposals for the site are:

- Identify important local biodiversity and landscape features within and around the site to inform suitable ecology and landscape elements for integration;
- Identify opportunities and risks to local biodiversity and select mitigation and enhancement measures resilient to change, sustainable and workable in local context;
- Ensure enhancements are in line with mitigation hierarchy, avoid adverse effects on natural environments, and achieve biodiversity net gain targets; and
- Ensure longevity of enhancements through effective long-term management and monitoring programme.

2.7 In line with mitigation hierarchy - to avoid, protect, and enhance natural habitats and the species they support - a series of measures shall be in place to safe-guard biodiversity during site operation, in line with widely adopted good practice measures. These shall protect and minimise adverse impacts on high value habitats and species on site.

2.8 A series of landscape proposals shall also be delivered (and sustained over the lifetime of site operations via the objectives of this LEMP) to enhance habitats and ecological connectivity across the site, and maintain the biodiversity net gain on site.

2.9 These measures, combined with an associated reduction in intensive agricultural management practices (such as chemical spray applications and ploughing) will provide dispersal, breeding, foraging and overwintering habitat for a variety of wildlife including invertebrates, birds, small mammals, amphibians and reptiles, if present. The continuous new grassland habitat under and around the solar panels, and species-rich field margins will provide improved connectivity and opportunities for a range of wildlife to forage, shelter and freely disperse across the site. In addition, the strengthened hedgerow network will also benefit habitat linkages in the local landscape.

Landscape Proposals

2.10 The landscape proposals shown on the adjacent proposals plan comprise the following elements, with each in turn discussed in the following section.

- Grassland creation below and around the arrays;
- Hedgerow creation along with supplementary infill planting within existing hedgerows;
- Tree planting to bolster existing trees within the site; and
- Integration of existing PRoWs with new hedgerow planting alongside to provide a green corridor for users.

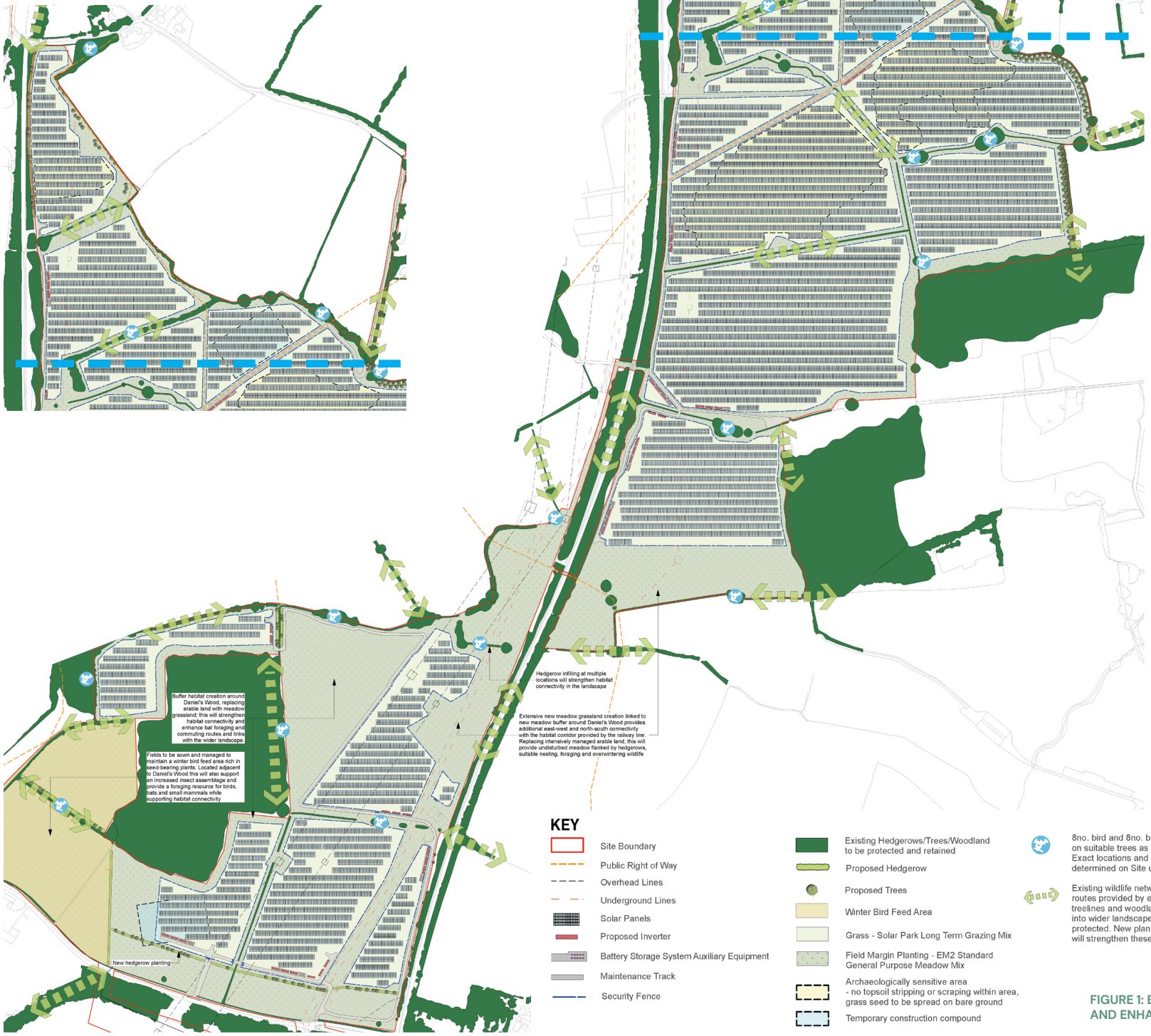


FIGURE 1: BIODIVERSITY MITIGATION AND ENHANCEMENT PLAN

Management Strategy

2.11 The design and long term landscape management strategy seeks to maintain and improve the functionality of existing landscape features and habitats through protection and enhancement of potentially valuable wildlife corridors by strengthening hedgerow networks within and around the site.

2.12 Habitat enhancements include: new lengths of hedgerow planting; enhancement of existing hedgerows where fragmented (through infilling with native species); and creation of species diverse meadow grassland to replace arable land.

2.13 The habitat enhancement measures and ongoing management practices are proposed in line with the guidance produced by BRE guidance Biodiversity Guidance for Solar Developments (BRE, 2014) that aim to enhance and safeguard key habitats for the benefit of wildlife, and ecological value of land currently under agricultural use.

Tree and Hedgerow Planting

2.14 All existing boundary and internal field hedgerows will be retained and reinforced (as necessary) with native hedgerow planting and trees (of local provenance) to: strengthen field patterns and local landscape character; screen views of the development from nearby PRoW and dwellings; and increase valuable habitat provision and connectivity.

2.15 Strengthening the hedgerow network within and around the site (through enhanced and proposed hedgerows) seeks to protect and enhance potentially valuable wildlife corridors.

2.16 Tree and shrub species are consistent with the local landscape, with a variety of species to increase species diversity across the Site and contribute towards a biodiversity net gain.

Grassland Creation

2.17 BRE guidance state that as panels are raised above the ground on posts, over 95% of a site used for solar farm development is still accessible for plant growth and complementary agricultural activities, such as conservation grazing (BRE, 2014). The RSPB briefing note on Solar Energy also states that biodiversity gains are possible where intensively cultivated arable or grassland is converted to extensive grassland and/or wildflower meadows between and/or beneath solar panels and in field margins (RSPB, 2014). A significant benefit to wildlife will therefore be achieved through creation of botanically diverse grassland within the site, favourable to birds, mammals, amphibians, reptiles and invertebrates.

2.18 Inside security fenced solar panel enclosures will be sown with Solar Park Long Term Grazing Mixture (or similar) which is suitable for sheep grazing, and will be managed through low intensity pulse growing using sheep.

2.19 Field margins and meadow areas will be sown with EM2 Standard General Purpose Meadow Mix (or similar), and be subject to very low intensity, intermittent management to encourage a range of invertebrates and other wildlife to benefit from the species variety and structural diversity that will develop in the sward.



Indicative image of wildflower grassland to be created



Indicative image of bird boxes to be erected on site

Birds

2.20 Bird nesting provision will be increased with 8 bird boxes (suitable for a variety of farmland bird species) erected on suitably-sized trees on site peripheries (precise locations subject to confirmation during installation depending on tree condition at that time). Following cessation of construction works, boxes should ideally be installed September-November, at 1-5m height, angled facing away from prevailing wind (or in a semi-sheltered environment), within or close to hedgerows where possible, by the appointed contractor under advice of a suitably competent ecologist.

2.21 Refer to table on page 8 for proposed bird box types.

Bats

2.22 Bat roost provision will be increased with 8 bat roost boxes erected on suitable trees, ideally above 4m high, with clear flight paths along site boundaries/hedgerows (precise locations will be subject to confirmation during the installation depending on tree condition at that time), by the appointed contractor under advice of a suitably competent ecologist.

2.23 Refer to table on page 8 for proposed bat box types.

Amphibians

2.24 The creation of diverse grassland sward and new hedgerow, tree and thicket planting will benefit amphibian species for foraging purposes.

2.25 Habitat piles and hibernacula will also be constructed along boundary features such as hedgerows as well as in the vicinity of ponds, providing additional terrestrial refuge habitat for amphibians.

Other species

2.26 Hedgerow, tree and thicket planting as well as grassland/wildflower meadow creation will benefit a range of species including small mammals such as hedgehog, brown hare and invertebrate species.

2.27 Perimeter fences will incorporate suitably sized (approximately 20cm x 25cm) gaps or gates at its base at suitable locations around the site to allow free movement of wildlife, including badger and small mammals, thereby maintaining and strengthening habitat connectivity and dispersal opportunities across and through the site.

2.28 Vegetation cuttings will be retained in the site and piled at selected locations along field margins to provide additional undisturbed refuge opportunities for wildlife including invertebrates, small mammals, reptiles and amphibians where present.



Indicative image of habitat piles to be created on site

TABLE 1: Ecological Enhancement Features			
No	Box Type	Photo	Description
3	Schwegler 1B Bird Box (32mm entrance)		To be placed at least 2m above the ground in a quiet and sheltered area of site on mature trees. Ensure the boxes are covered from the rain by facing the entrance down slightly in order to prevent rain seeping in and so encourage use and increase the longevity of the box. Ensure there is clear access to the box entrance at all times. Best placed on a north or easterly aspect. NB where this box is not available, a suitable alternative will be installed (as approved by the ecologist).
3	Schwegler 1B Bird Box (26mm entrance)		To be placed at least 2m above the ground in a quiet and sheltered area of site on mature trees. Ensure the boxes are covered from the rain by facing the entrance down slightly in order to prevent rain seeping in and so encourage use and increase the longevity of the box. Ensure there is clear access to the box entrance at all times. Best placed on a north or easterly aspect. NB where this box is not available, a suitable alternative will be installed (as approved by the ecologist).
2	Schwegler 3S Starling Nest Box		To be placed at least 2m above the ground in a quiet and sheltered area of site on mature trees. Ensure the boxes are covered from the rain by facing the entrance down slightly in order to prevent rain seeping in and so encourage use and increase the longevity of the box. Ensure there is clear access to the box entrance at all times. Best placed on a north or easterly aspect. NB where this box is not available, a suitable alternative will be installed (as approved by the ecologist).
4	Schwegler 2F with double front panel		Nail onto the main trunk of mature trees 4 to 5m high, on south, south west or south eastern aspects, ideally in a sunny location. Suitable for smaller species of bats and the internal panels dissuade birds from nesting within this box. NB where this box is not available, a suitable alternative will be installed (as approved by the ecologist).
4	Schwegler 1FS large colony bat box		This box provides bats with a very large internal space allowing high numbers of bats to congregate together, suitable for both summer and winter quarters. Supplied with a galvanised hanger, mounting block and aluminium nail, to be hung as the 2F bat boxes. NB where this box is not available, a suitable alternative will be installed (as approved by the ecologist).

Ecologist to check section (and whole template document) re. Biodiversity wording:

- Details of habitat features to be retained/created/restored and their long-term management (10-40 years)
- Summary of the Biodiversity Net Gain (noting 10% is the current target, but this varies across the country) objectives and a proposed timeline for realisation, showing useful mapping of baseline scores and targets to obtain (with input from the ecologist / ecology documents)
- Details of monitoring the site to assess Biodiversity Net Gain achievement (with input from the ecologist / ecology documents) – additional table to set out monitoring requirement
- Details of maintenance regimes of distinct habitats demonstrating how this would ensure Biodiversity Net Gain achievement (with input from the ecologist / ecology documents)
- An ecological calendar showing maintenance schedule, surveying requirement and any temporary footpath closures to restrict disturbance during the bird breeding season (with input from the ecologist / ecology documents)

3 Environmental Considerations

3.1 This section details environmental factors requiring consideration to enable a thorough landscape management strategy for the site.

Horticultural Peat

3.2 Horticultural peat is not to be used as mulch on any planting areas or as a soil conditioner. Wherever possible plants grown without peat will be preferred to those grown using peat.

Recycled Materials

3.3 Where appropriate, components made of recycled or biodegradable materials should be used, e.g. wood chip mulch, biodegradable spiral shrub/tree guards.

Pesticides/Herbicides

3.4 A minimal intervention and organic approach will be used in terms of weed control. In areas of transplant tree, ornamental shrub and herbaceous planting, this is to be achieved by using mulch mats and hand weeding. Weed killer and other chemicals will be used as little as possible on site. Spot removal of weeds will be carried out by hand removal as necessary.

Water Management

3.5 Where necessary, maintenance staff are to water plants at appropriate times of the day to ensure minimum water evaporation.



Indicative image of native hedgerow and trees to be planted on site

Habitat management

3.6 All arisings should be retained on site where suitable, e.g. for ecological benefit such as creating hibernacula and habitat piles. If unsuitable, remove from site and dispose of at a registered facility. Allow deadwood, jagged stumps, splits, fungal growths/fruiting bodies and holes in tree trunks to remain unless they are creating a safety hazard.

3.7 Where appropriate habitat creation could include working with the Wildlife Trust and local wildlife groups to create log piles and hibernacula.

Utilities

3.8 Suitable planting shall be selected above underground utilities to minimise risk of damage due to roots/soil shrinkage. Slow growing/low species shall be used beneath overhead utilities and maintained at an appropriate height to minimise risk of interference/damage.

Areas of Archaeological Sensitivity

3.9 Development is proposed across the area of transitional Iron Age to Roman settlement in multiple fields. For these areas of archaeological sensitivity (as identified on the detailed planting plans), disturbance of soils is restricted in line with project archaeologist's recommendations (refer to Archaeological Mitigation and Management Plan for further details):

- There will be no topsoil stripping or tilling. Above-ground foundations and cable suspension will be deployed to avoid truncation of buried archaeological deposits in identified areas.
- The chosen above-ground foundation system is 'Monobloc'. This comprises ballast slabs measuring 1m in width x 2.4m in length x 0.18m in depth, which sit on a 100mm thick, porous gravel sub-base overlying a geotextile membrane laid directly onto the current ground surface. Piles supporting the PV panels will be mounted to the ballast slabs. Each slab will carry 15 panels, and a single inverter/combiner box will be mounted to one of the piles.
- Grass seed will be spread either using a lightweight ride-on or hand-pushed spreader.
- Hedgerows will be 'notch planted' and so the ground will only be dug to a spade depth. An L-shaped notch is cut into the ground with the spade and the ground is held open while the shrub is slipped in (unlike a tree pit where a hole is dug and then backfilled with soil).

4 General Maintenance Requirements

General Maintenance

4.1 It is recommended that all new planting on site is subject to on going management to maximise the value of these habitats to wildlife. Minimal use of pesticides and ensuring vegetation pruning works take place outside of the bird nesting season will aid this approach.

4.2 Maintenance operations are to be carried out in accordance with BS 4428: Code of Practice for General Landscape Operations. Maintenance of soft landscaping to be in accordance with BS 7370-4: Grounds Maintenance. Recommendations for Maintenance of Soft Landscape.

4.3 Planting shall not be carried out when ground is water-logged, frost bound or during periods of cold drying winds. All bare-root plant stock shall be kept covered until planted in order to minimise water-loss and prevent roots drying out. Bare root stock shall be planted while dormant (November-April) or alternatively cell/container grown stock to be used.

Litter and Arisings

4.4 Litter and debris shall be cleared by hand and removed from site (disposed of at a registered facility) on a monthly basis, and prior to mowing operations. All arisings should be retained on site where suitable, e.g. for ecological benefit such as creating hibernacula, herpetofauna or loggeries.

Trees and Associated Works

4.5 No pruning works to trees or hedgerows are to be undertaken during the general bird nesting season of 1st March to 31st August inclusive. Works within this time period should be subject to checks by an ecologist to ensure there are no nesting birds present.

4.6 All tree surgery work is to be carried out to BS 3998:2010 Tree Work– Recommendations (or any subsequent updates) and should be undertaken by a suitably qualified operative. Where a tree poses a health and safety hazard, advice will be sought from an arboriculturist.

4.7 Retention (as far as possible) of existing vegetation is considered an important part of the development: such areas will be managed appropriately to maintain and develop their value. Trees should not be felled unless they are classified as dangerous. Where a tree poses as a health and safety hazard ie. along or near public rights of way, advice shall be sought immediately from an arboriculturist. Ivy should only be severed where it is growing into tree canopies and is likely to create a sail hazard.

New Planting

4.8 All seeding shall be carried out in accordance with BS4428:1989 Code of Practice for general landscape operations or the most relevant and current British Standard and in accordance with the seed supplier's technical advice.

4.9 Planting of new trees should have regard to Section 10 of BS 8545:2014 Trees: from nursery to independence in the landscape. All planting stock supplied shall be healthy, viable, and conform to BS 3936, BS 4043 and be in accordance with the National Plant Specification published by the Horticultural Trade Association (HTA), as appropriate.

4.10 All new tree planting shall be checked at each maintenance visit for damage, security, firmness, fixing and support. Any trees that fail to thrive in the first year shall be replaced with the same species and variety at the size specified on the original landscape planting plans.

4.11 Trees should be checked between September and February i.e. outside the bird nesting season, and marked with tags, paint and/or noted on a plan, as necessary. Replacements will be planted during the following planting season. If a particular species fails to establish successfully then an alternative, comparable species should be considered as replacement, in agreement with the landscape consultant (and the LPA advised if necessary). Replacement planting of container plants to be undertaken as required, root-ball/bare root planting to be undertaken November to March.

4.12 Amenity bark mulch shall be topped up as required to a depth of 50mm to ensure maximum coverage as specified and areas of bare soil is prevented. To avoid accidentally damaging plants, herbicides will not be used to control weeds once foliage covers 75% of the ground surface. An 800mm diameter circle of bark mulch to a depth of 50mm will be retained around individual trees in grass in order to suppress grass and weed growth and minimise the risk of mower/strimmer damage.

4.13 Care should be taken not to over-water planting. Until well established all trees are to be watered during the growing season. Following any dry periods of 7-10 days, soil moisture content should be assessed and watering undertaken as necessary. Each tree is to receive 40 litres of water or as required to ensure all tree planted areas are brought up to field capacity at each visit. If trees are showing signs of drought stress the watering regime should be reviewed and increased as required. Care should be taken to ensure applied water is absorbed into the root-zone and does not run off the surface.

5 Maintenance Specifications

5.1 Retained Native Tree & Shrub Hedgerow Boundaries

Management Aim

- To maintain the existing areas of tree and hedgerow planting to maximise biodiversity and habitat value;
- To ensure the on going health and longevity; and
- To maintain high quality visual appearance.

Management Objectives

- To maintain existing trees to ensure a maximum healthy development;
- To maintain the visual amenity and good diversity of species of the retained tree and shrub hedgerow boundaries;
- To ensure a healthy, dense, bushy, tree and shrub understorey with good species mix and no gaps;
- To maintain appropriate forms of trees for future growth;
- To ensure trees do not present a hazard to site users.
- To ensure access links are kept clear from boundary vegetation growth;
- To take care in construction and maintenance operations near boundary planting;
- To enhance ecological value; and
- To manage boundaries at appropriate times to avoid impacts to nesting birds and to ensure the provision of winter foraging resources.

5.1.1 To avoid disturbing nesting birds, maintenance to the tree and shrub boundaries should take place between September and February i.e. outside the bird nesting season. Works outside of this time period should be subject to checks by an ecologist to ensure there are no nesting birds present.



Typical image of native hedgerow and trees to be retained

5.1.2 Hedgerows shall be managed to allow to grow up to 2-3m height and 2-3m width, and be maintained to retain these dimensions as specified on detailed planting plans (ref P20-0137_09)

5.1.3 All trees are to be subject to an annual basic walk-by visual inspection to identify any obvious hazard/defects (fungal brackets, splits/cracks in branches/stems etc.) that may require remedial works/further arboricultural assessment. Only trees identified with defects/hazards are to be recorded and further assessment is to be made by a qualified and competent person. A detailed condition survey/risk assessment is to be carried out by a qualified arboriculturist at least every 3-5 years (or as advised by the arboriculturist). Any necessary remedial works are to be carried out by a suitably competent and qualified contractor/arborist in accordance with BS 3998:2010.

5.1.4 Where the existing vegetation abuts footpath links and access roads, the portion of vegetation adjacent to the links shall be cut-back annually to maintain free access.

5.2 New Tree Planting

Management Aim

- To successfully establish new tree planting;
- To maintain tree planting ensuring a treescape rich in seasonal interest and future longevity; and
- To present and maintain high quality visual appearance of new tree planting.

Management Objectives

- To maintain newly planted trees to ensure good survival rate and development;
- To minimise competition from grass and weeds in the immediate vicinity of newly planted trees;
- To maintain the health and visual amenity of the new trees;
- To maintain appropriate forms of trees for future growth; and
- To ensure trees do not present a hazard to site users.

5.2.1 New trees will be staked (and tied using proprietary rubber /or hessian ties) and regularly checked during the establishment period, adjusted as necessary to ensure developing trees are not damaged. Trees will establish successful anchor roots, increase stem girth and form a better stem taper if allowed to move in the wind, whilst remaining secured at ground level.

5.2.2 There will be a minimal pruning policy for trees as pruning wounds can provide a source of infection. Formative pruning of new trees will only be carried out to remove dead and diseased wood and to create a well balanced tree with a single leader. Clear stems of 1.8 metres will be maintained by rubbing off any shoots and when the trees reach 5 to 6 metres high lower branches will be removed to give a canopy height of approximately 2.4 metres.

5.2.3 In the event of tree death, the reason for growth failure shall be investigated and addressed before replanting a replacement. If death is due to the planting conditions, these shall be ameliorated. If death is due to pests or disease and likely to be present in the future, a resistant species of an alternative similar tree shall be selected.

5.2.4 Once trees are established such that tree stakes, ties and spacers are no longer required, these shall be removed and disposed of off site.

5.3 Reinforcement & New Native Hedgerow Planting

Management Aim

- To successfully reinforce and establish areas of native hedgerow tree and shrub planting to the site boundaries;
- To present and maintain a high quality visual appearance of the native tree and shrubs within the buffer edge planting, that provides both opportunities for wildlife foraging and habitat, as well as seasonal interest and colour.

Management Objectives

- To maintain newly planted native shrubs to ensure successful establishment and longevity;
- To minimise competition from grass and weeds;
- To keep planted areas tidy and free from litter and;
- To manage boundaries at appropriate times to avoid impacting nesting birds and to ensure provision of winter foraging resources.

5.3.1 New planting will be checked regularly throughout the growing season for pests and diseases and treated as necessary. Plant losses should be monitored and recorded. If a particular plant becomes subject to a fatal pest or disease it shall be replaced by an alternative resistant plant with a similar form and habit.

5.3.2 The native shrubs used to supplement the existing boundaries will be maintained to match the existing heights of the boundaries (2-3m). This will be achieved by an appropriate cutting regime.

5.3.3 Within the native hedgerows to the boundaries, if new shrub specimens are identified as future standard trees they will be allowed to mature. In the long-term trees within the buffer, could potentially be managed as pollards adding structural diversity.

5.3.4 Newly planted stock within the hedgerow gaps will be protected from animal damage by the use of individual tree / shrub guards.

5.3.5 All new native planted areas will be maintained by weeding, pest & disease control and adjustment /removal of guards/stakes. Once established such that tree / shrub stakes, ties and spacers are no longer required, these shall be removed and disposed of off site.

5.4 Grassland Areas

Management Aim

- To increase the biodiversity value of the grassland and prevent the sward from obscuring the panels.

Management Objectives

- To ensure grassland areas successfully establish;
- To increase biodiversity and species diversity;
- To control weeds and opportunistic or invasive species;
- To manage the grassland sensitively to establish a rich sward and ensure that wildflowers can set seed;
- To manage grasslands outside arrays to establish rough tussocky sward

5.4.1 Grassland will be managed to provide a varied habitat structure providing nesting opportunities for birds and nectar, pollen and shelter for invertebrates, amphibians, reptiles and small mammals. Taller wildflower and tussock grassland vegetation will be encouraged to develop along the base of hedgerows to provide additional dispersal, foraging and shelter opportunities for wildlife.

5.4.2 Occasional small areas of bare patches, either naturally arising or created in the course of management, will be tolerated and allowed to remain. These increase micro-topographic diversity and variety of ground conditions which can be essential for the life-cycle of many invertebrate species and also may potentially be utilised by bird species for nesting and foraging purposes. These small areas also provide periodic disturbed ground conditions necessary to develop and maintain margin grasses and wildflower communities. In the unlikely event that the grassland / meadow planting fails and the area of bare ground is greater than 10%, these areas will be re-seeded.

5.4.3 Specific attention should be paid to the potential presence of injurious (harmful) weeds: common ragwort (Senecio jacobaea), spear thistle (Cirsium vulgare), creeping thistle (Cirsium arvense) curled dock (Rumex crispus) and broad-leaved dock (Rumex obtusifolius); which are all listed within the Weeds Act 1959. These species should be removed from the grassland areas prior to enhancement works commencing.

Areas of Archaeological Sensitivity

5.4.4 Within areas of archaeological sensitivity soil preparation is restricted in line with project archaeologist's recommendations - refer to Archaeological Mitigation and Management Plan for further details on methodology.

5.4.5 Within areas of archaeological sensitivity, grassed areas are to be maintained using ride on mowers and hand held strimmers only.

Initial Management

5.4.6 Grassland management will be carried out in accordance with the seed suppliers technical advice during the establishment phase as set out below.

5.4.7 During the first year of establishment, both EM2 General Purpose Meadow Mix (or similar) and Solar Park Long Term Grazing Mixture (or similar) will require cutting at regular intervals. Initially, in the first year following sowing, checks will be made to assess and control annual weeds. Problem perennial weeds will be controlled by hand pulling or if necessary careful targeted application of a non-residual herbicide by way of spot spraying with a knapsack (low pressure to avoid spray drift) or weed wiping (no herbicide application within the vicinity of ditches and watercourses) herbicide application may be used in April, June and August. Alternatively, annual weeds can be managed by topping and mowing prior to setting seed which will encourage lateral development of the grasses. Any topping undertaken between April and July should be no lower than 200mm to prevent harm to any ground nesting birds.

5.4.8 Solar Park Long Term Grazing Mixture (or similar) areas should not be grazed until grassland is sufficiently established.



Indicative image of grassland within panel enclosure

Long-term Management - Grazing (around solar array)

5.4.9 The area will be managed through low intensity pulse growing using sheep, which could be supplemented by mowing via an optional hay cut in September with subsequent aftermath grazing to further reduce fertility.

TABLE 2: Management of Grassland within Array via Grazing regime

January-February	Light grazing on any new growth
Early March	Remove grazing; this allows forbs to grow and allows a good habitat for ground nesting birds to develop.
September	An optional hay cut may be taken. Cut hay once the wildflowers have seeded from August onwards. The arisings can be collected as a hay crop, mechanically raked and piled up or removed. Arisings must be removed with one or more of these methods to avoid harmful effects of grass mulch on plant species diversity.
September to end of December	Main grazing period with light grazing down to a short sward height; mosaic plant heights encourage insects.

5.4.10 The intended outcome of a conservation grazing scheme will be to have a sward of the following height structure at the beginning of March:

- 75% at a height of approximately 5cm
- 25% at a height of approximately 25cm

5.4.11 Grazing is only to be undertaken by sheep due to the damage cattle may cause to equipment A stocking density of between 0.5 – 1 Livestock units (LSUs) per hectare is recommended between late September and February. This is a typical stocking density for conservation grazing. However, the stocking density and timing of grazing will be at the discretion of the land manager, in order to achieve the desired sward structure given above. More animals could be used for shorter grazing periods.

5.4.12 Should sward height become a problem, with plants starting to shade lower levels of panels, a strip of no more than 1m wide can be cut at the base of panel to shorten sward height. This cutting can occur at any time and arisings will be either used to create habitat piles within the site or removed and disposed of at a registered facility. During breeding bird season, grass cutting must be to approximately 150-200mm height.

5.4.13 For more information on stocking levels, see guidance from the Lowland Grassland Management Handbook produced by Natural England.

Long-term Management - Mechanical (Outside Solar Array)

5.4.14 A different seed mix, as well as mechanical cutting of the grassland established outside of the security fence, will create a different sward structure to the pasture, supporting different plants and invertebrates.

5.4.15 When mechanical cutting is used, one or possibly two cuts will be taken per year comprising an early cut in February (if necessary) to manage regrowth, and a second later in the season between August and September (each cut reducing sward to approximately 150mm). During breeding bird season, grass cutting must be to approximately 150-200mm height. No cutting will take place throughout the summer to allow the seeds of the later flowering species to fall prior to the cut.

5.4.16 Cutting should adopt a systematic method, i.e. working outwards to towards the boundary features, allowing fauna such as invertebrates, birds and small mammals to temporarily and safely vacate the area.

5.4.17 Exact dates will be dependent upon weather conditions. A phased (rotational) cutting regime is recommended, i.e. the entire area should not be cut at the same time, in order to allow for more structured grassland.

5.4.18 Cuttings should remain for 3-5 days allowing seeds to disperse. Arisings must then be removed to promote the development of a species-rich sward. These will be either used to create habitat piles within the site or removed from the site and disposed of at a registered facility.

5.4.19 Field margin grassland once established can be cut every few years to prevent scrub encroachments or excessive grass growth to create a tussocky species diverse edge habitat.



Indicative image of grassland margins to site boundaries

5.5 Ecology & Habitat

Management Aim

- To extend and consolidate the hedgerow network for wildlife;
- To maintain and enhance potential commuting routes and foraging opportunities for badgers, bats, reptiles, otters, water voles and other small mammals;
- To maintain and enhance potential foraging habitats for badgers, bats, reptiles, birds, invertebrates and other small mammals;
- To maintain and increase potential shelter/hibernation/breeding provision for a range of species including bats, birds, hedgehogs, invertebrates and other small mammals.

Management Objectives

- To safeguard, establish and maintain substantial ecological buffer zones to ecologically sensitive areas/features;
- To establish and maintain new species-rich hedgerows;
- To strengthen the hedgerow corridors via new hedgerow creation and in-fill planting;
- To establish and maintain species diverse grassland beneath the solar array and field boundaries;
- To ensure ecological corridors are protected and enhanced to increase foraging and commuting potential;
- To ensure that safeguarded existing and newly created habitats are managed appropriately to provide long-term biodiversity benefits for wildlife;
- To introduce new potential roost/ nest/ shelter sites for protected species; and
- To monitor the success of the management plan by undertaking monitoring of habitats and species.

Monitoring

5.5.1 Monitoring arrangements will be put in place to ensure that the ecological aims and objectives of the landscape proposals are implemented fully and that they are successful. Where a change in the management of landscape / ecological features is required this will be discussed with the estate management company to agree revisions to the plan.

Habitats

5.5.2 The landscape proposals entail the retention of the majority of existing hedgerows and valuable trees, alongside extensive new tree planting; new hedgerows and infill hedgerow planting; and botanically diverse grasslands. These proposals offer enhanced and additional habitats for a variety of wildlife including badgers, bats, reptiles, amphibians, birds, invertebrates and small mammals. As such, management and maintenance operations are required to ensure the longevity and diversity of these habitats, to further enhance and benefit this variety of wildlife. Management and maintenance is identified in Section 6 of this LEMP.

Habitat Piles

5.5.3 Any wood and grass removed during habitat management or other operations should be kept in habitat piles along the edge of hedgerows and near ponds to provide valuable invertebrate habitat and shelter for other species including small mammals/amphibians/reptiles. These should be placed in the same locations each year.

Bird and Bat Boxes

5.5.4 All bird and bat boxes should have an external visual inspection to ensure they are intact, secure and clean, with signs of use also recorded. If damaged, boxes are to be replaced.

Perimeter fence gaps/gates

5.5.5 Perimeter fence gaps/gates should be visually checked to ensure they are fully functional, maintaining unimpeded access/passing, with signs of use also recorded. If damaged, gaps/gates are to be replaced.

5.7 Hard landscape – access tracks, footpaths, outdoor classrooms and boundary treatments

Management Aim

- To present the visible indication of high quality, regular site maintenance.

Management Objectives

- To keep hard landscaped areas free of debris, litter, graffiti & dog faeces;
- To keep weed colonisation at a minimum and acceptable level;
- To maintain hard landscaped areas in safe condition; and
- To maintain any seating, litter bins, signage and boundary treatments in good condition and replace if necessary.

5.7.1 Hard areas, furniture elements and boundary treatments will be regularly checked for subsidence, damage and vandalism and will be repaired at the earliest opportunity using the original specified material. Areas where damage poses a hazard to site users shall be cordoned off with bollards and high visibility tape until repair can be organised.



Indicative image of swale

Indicative image of interpretation board

6 Schedule of Management, Maintenance and Monitoring

6.1 Establishment years 0-5

6.1.1 The schedule below sets out how the maintenance tasks for the management aims and objectives will be achieved for the establishment period of years 0-5 inclusive of the contract maintenance period that begins following practical completion.

6.1.2 Following final completion of the contractual works, the contractor will hand over the long term maintenance and ecological management to the clients appointed management company. The operations identified below will form the general requirements of the client appointed management company to ensure the continued successful establishment of the landscape scheme.

6.1.3 Attention should be paid to ensure that maintenance tasks are in line with any ecological restrictions on certain habitat types and areas, i.e. restricting disturbance of specific grassland habitats during bird nesting seasons, or restricting hedge cutting during bird nesting season.

TABLE 3: Establishment Years 0-5

Ref	Management Categories	Timing	Maintenance Task and Method
6.1.1	All planting areas	Every Visit	• Ensure continued healthy growth of all planted stock - water as required to ensure that the planting continues to establish successfully. • Investigate any failed plant growth and take remedial action as necessary.
		Monthly (or as required)	• Removal of rubbish and debris - clear litter and fly-tipped rubbish by hand and remove from site (avoid removing from swales/ditches/ponds during amphibian breeding season, March - June). • Remove rubbish and debris from grass areas before mowing. • Inspect for vandalism - visual inspection of all landscaping for vandalism, report to owner. On instruction, replace any landscaping damaged by vandalism.
		Annually (or as required)	• Monitor, record and report any plant losses to owner - on instruction, remove dead plants and replace as per original approved specification (unless otherwise agreed to plant alternative species). Maintain to ensure survival. Re-planting to be undertaken in following planting season. • Control vigorous plant species that are out competing less vigorous species. • Control invasive species. Reduce/limit encroachment by hand and remove from site.
6.1.2	Trees - retained and newly planted	Monthly (or as required)	• Ensure trees are stable - visually inspect trees to check for signs of bark damage and general tree damage. • Check that stakes, ties and guards are not too loose, too tight or broken: replace or upgrade as necessary. Remove and dispose of off site when no longer required. • Monitor transplants to ensure healthy development - visual inspection of plants, if not stable/ upright rectify by replanting in an upright position and re-firm, if plant remains unstable remove by hand and replace. Undertake for the first two years. • Visual inspection for fungal activity (for trees this is to be performed by a qualified arboriculturist) - remove diseased wood or treat as appropriate. Keep use of pesticides to a minimum. Inspection to be undertaken March to October when trees are still in leaf.

TABLE 3: Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
	Trees - retained and newly planted continued	Annually (or as required)	• Remove dead, damaged or dying branches as appropriate (avoid breeding bird season). • Formative pruning of new trees to be in accordance with BS 3998 (2010).
		Biennial (or as recommended)	• Check tree safety - identify hazards and carry out necessary maintenance works. A visual tree assessment is to be undertaken by a qualified arboriculturist of all new and existing tree planting, with instrumental back up where necessary. Any resulting tree works are to be carried out to BS 3998:2010 (avoid breeding bird season). Keep records up to date.
		3 to 5 years after planting (or as required)	• Confirm root growth is well established and remove shelters, stakes, guards and ties from trees and dispose of off site - to avoid damage cut shelters away then remove stakes • Detailed condition survey for new trees - to be undertaken by a qualified arboriculturist at least once every 5 years, any recommendations to assist with establishment must be undertaken as soon as possible.
6.1.3	Hedgerow Planting - Retained and newly planted	Monthly (or as required)	• Check hedgerows for additional/new gaps, record and infill December - February. Plant replacement tall whips, of a species mix to match the hedgerow or to increase native diversity, in a suitably prepared soil bed. Ensure successful establishment and protect from trampling/use as a shortcut using temporary fence/guards. • Keep hedgerow planting free from weeds - visually inspect bark mulch areas around planting and top up to 50mm depth, if required. Remove any weeds by hand, hoe or fork. Take care not to disturb shrub roots and excessive treading of bed surface. Do not use strimmers or herbicides in these areas - March to October.
		Annually (or as required)	• Prune retained hedgerows to ensure a good shape and healthy growth and control future growth. Management to be undertaken September - February. Face up and top off no more than 1 year in 3 (leaving at least 2/3rds of hedges untrimmed each year), to ensure thick nesting cover is available annually for birds and also to boost the berry crop that often develops on second year growth. Established hedgerows will be cut between late September and February using a tractor mounted flail or by using tractor mounted circular saws to reshape and manage more mature overgrown hedges. • Hedgerows will be retained and maintained at a minimum height of 2-3m to ensure views into the site are filtered. • Identify suitable growth in retained hedgerows to develop into frequent standard trees, maintain as per tree maintenance and management. • Re-plant in an upright position and re-firm plants that suffer from wind-rock - January/February.
		3-5 Years after planting (or as required)	• Confirm root growth is well established and remove shelters, stakes, guards and ties from hedgerow transplants and dispose of off site - to avoid damage cut shelters away then remove stakes.

TABLE 3: Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.4	Grassland areas Note: grassland within areas of archaeological sensitivity require a sensitive approach to management	Cutting Regime.	• Always refer to the seed supplier's technical advice during the establishment phase and for long term management advice. • During year 1/until sufficiently established, meadow grass and grazing seed mix areas shall be cut at regular intervals after seeding to promote a diverse species-rich sward. • Year 2 onwards, meadow grass mix areas shall be managed to help develop a rich grassland with a varied structure. After flowering take a summer 'hay cut' (with a scythe, petrol strimmer, or tractor mower) to 150mm in September. This is to be repeated in Spring (late February) if needed. • Once established, grazing seed mix areas around the solar panels will be managed by conservation grazing, in line with *Lowland Grassland Management Handbook, Natural England.* • Grassland within areas of archaeological sensitivity are to be maintained using ride on mowers and hand held strimmers. • Allow 'hay' to remain on-site for 3-5 days following the cut to allow seeds to disperse, and then to be removed to promote a species-rich sward.
		Monthly (or as required)	• Keep grassland free from weeds - remove weeds and encroaching scrub by hand, hoe or fork, or mowing, as appropriate to prevent weeds from obstructing / damaging the solar panels. Undertake monthly from March to October, or as required. • Scrub removal to be undertaken outside of the bird nesting season.
		Annually (or as required)	• Keep grassland areas in good condition - check and report to client on damaged areas. On instruction repair damaged/failed areas and re-sow seed. Undertake aeration and thatch removal if required April or September. • Maintain sward in optimum condition whilst enhancing biodiversity - allow low intensity grazing over a phased (rotational cutting regime, ensuring the entire area is not cut at the same time). Visual inspection to ensure stocking density is correct. Advise owner to reduce or increase if necessary. Only allow sheep to graze late September through to early March (subject to weather conditions).
6.1.5	Ecology and habitat features - Bird/Bat Boxes, Log piles and Hibernacula etc.	Years 1, 3, 5 and 10 (in spring/ summer)	• Undertake an external visual inspection of each ecological feature to ensure they are intact, secured and in working order. Check for signs of use (external visual inspection) and record. Note if need to replace.
6.1.6	Hard landscaping - access tracks, footpaths, outdoor classrooms and boundary treatments	Monthly (or as required)	• Maintain all hard landscape elements (access tracks, footpaths, outdoor classrooms and boundary treatments) in a safe and clean condition - monitor and report to client on damaged areas/items and repair as instructed by the client. Repair using the original material/product to maintain the integrity of the design. Areas where damage poses a hazard to site users shall be cordoned off with bollards and high visibility tape until repair can be organised.

6.2 Landscape Management Beyond Establishment - Years 6-40

Long Term Management (6-40 Years)

General Long Term Management

6.2.1 The schedule below sets out how the maintenance tasks for the management aims and objectives will be achieved for the period beyond establishment from year 5 to 40. Attention should be paid to ensure that maintenance tasks are in line with any ecological restrictions on certain habitat types and areas, i.e. Restricting disturbance of specific grassland habitats during bird nesting seasons, or restricting hedge cutting during bird nesting season.

6.2.2 The maintenance tasks are indicative of the measures anticipated to be required, and should be reviewed as part of the review and monitoring measures to ensure the maintenance regime is still appropriate as the landscaping elements mature, thus this table should be seen as indicative and subject to review as the landscaping matures and evolves in line with best practice guidance and ecological trends.

6.2.3 As the planted stock grows, periodic reviews will continue to take place beyond the initial 5 year period up until 40 years. During this period, the operations highlighted within the adjacent table will continue to be necessary, however, their precise timing will become dependent on a programme of monitoring to ensure the appropriate maintenance operations are carried out at the appropriate time.

6.2.4 As per the monitoring section (section 6.3) periodic reviews should continue to take place beyond the establishment period for years 6-40 in order to check the structure and health of all trees to ensure they are maintained without posing a hazard. Annual reviews of trees, hedgerows and grassland areas should be carried out to identify any necessary remedial works and any works should be undertaken as necessary by a suitably qualified operative.

6.2.5 The cutting/grazing regime should continue as identified. If after year 5 species diversity has reduced with dominant weeds and/or invasive species, it may be necessary to over-seed the grassland to ensure the grassland achieves the habitat condition as set out within the biodiversity metric.

TABLE 4: Establishment Years 6-40			
Ref	Management Categories	Timing	Maintenance Task and Method
6.2.1	All landscaping areas	Monthly (or as required)	• Removal of rubbish and debris - clear litter and fly-tipped rubbish by hand and remove from site (avoid removing from swales/ditches/ponds during amphibian breeding season, March - June) • Inspect for vandalism - visual inspection of all landscaping for vandalism, report to owner. On instruction, replace any landscaping damaged by vandalism.
		Annually (or as required)	• Monitor and record any plant losses (or any new gaps within hedgerows) and report to developer - on instruction, remove dead plants and replace as per original approved specification, unless otherwise agreed to plant alternative species. Maintain to ensure survival. Re-planting to be undertaken in the next following planting season. • Remove dead, damaged or dying branches as appropriate. • Undertake weeding by hand, hoe or fork. Take care not to disturb shrub roots and excessive treading of bed surface. Do not use strimmers or herbicides in these areas - March to October. • Control vigorous plant species that are out competing less vigorous species. • Check all landscaped areas for invasive species e.g. self seeded sycamore, brambles, ground ivy and nettles. Reduce/clear by hand and remove from site.
6.2.2	Trees	Annually (or as required)	• Formative pruning of new trees to be in accordance with BS 3998 (2010). • Visual inspection for fungal activity (for trees this is to be performed by a qualified arboriculturist) - remove diseased wood or treat as appropriate. Keep use of pesticides to a minimum. Inspection to be undertaken March to October when trees are still in leaf.
		Biennial (or as recommended)	• Check tree safety - identify hazards and carry out necessary maintenance works. A visual tree assessment is to be undertaken by a qualified arboriculturist of all new and existing tree planting, with instrumental back up where necessary. Any resulting tree works are to be carried out to BS 3998:2010. Keep records up to date.
6.2.3	Hedgerows	Annually (or as required)	• Prune retained hedgerows to ensure a good shape and healthy growth and control future growth. Management to be undertaken September - February. Face up and top off no more than 1 year in 3 (leaving at least 2/3rd's of hedges untrimmed each year), to ensure thick nesting cover is available annually for birds and also to boost the berry crop that often develops on second year growth. Established hedgerows will be cut between late September and February using a tractor mounted flail or by using tractor mounted circular saws to reshape and manage more mature overgrown hedges. • Internal field hedgerows shall be cut to a maximum of 3.0m high and site boundary hedgerows will be retained and maintained at a minimum height of 5.0m to ensure views into the site are filtered. • Identify suitable growth in retained hedgerows to develop into frequent standard trees, maintain as per tree maintenance and management.

TABLE 4: Establishment Years 6-40			
Ref	Management Categories	Timing	Maintenance Task and Method
6.2.4	Grassland Areas Note: grassland within areas of archaeological sensitivity require a sensitive approach to management	Cutting Regime.	• Year 2 onwards, meadow grass mix areas shall be managed to help develop a rich grassland with a varied structure. After flowering take a summer 'hay cut' (with a scythe, petrol strimmer, or tractor mower) to 150mm in September. This is to be repeated in Spring (late February) if needed. • Once established, grazing seed mix areas around the solar panels will be managed by conservation grazing, in line with *Lowland Grassland Management Handbook, Natural England*. • Grassland within areas of archaeological sensitivity are to be maintained using ride on mowers and hand held strimmers. • Allow 'hay' to remain on-site for 3-5 days following the cut to allow seeds to disperse, and then to be removed to promote a species-rich sward.
		Monthly (or as required)	• Keep grassland reasonably free from weeds - remove weeds and encroaching scrub by hand, hoe or fork, or mowing, as appropriate to prevent weeds from obstructing / damaging the solar panels. Undertake monthly from March to October, or as required. • Scrub removal to be undertaken outside of the bird nesting season.
		Annually (or as required)	• Keep grassland areas in good condition - check and report to client on damaged areas. On instruction repair damaged/failed areas and re-sow seed. Undertake aeration and thatch removal if required April or September. • Maintain sward in optimum condition whilst enhancing biodiversity - allow low intensity grazing over a phased (rotational cutting regime, ensuring the entire area is not cut at the same time). Visual inspection to ensure stocking density is correct. Advise owner to reduce or increase if necessary. Only allow sheep to graze late September through to early March (subject to weather conditions).
6.2.5	Ecology and habitat features - Bird/Bat Boxes, Log piles and Hibernacula etc.	Annually (or as required)	• Undertake an external visual inspection of each ecological feature to ensure they are intact, secured and in working order. Check for signs of use (external visual inspection) and record. Note if need to replace.
6.2.6	Hard landscaping - access tracks, footpaths, outdoor classrooms and boundary treatments	Monthly (or as required)	• Maintain all hard landscape elements (access tracks, footpaths, outdoor classrooms and boundary treatments) in a safe and clean condition - monitor and report to client on damaged areas/items and repair as instructed by the client. Repair using the original material/product to maintain the integrity of the design. Areas where damage poses a hazard to site users shall be cordoned off with bollards and high visibility tape until repair can be organised.

6.3 Monitoring and Review

6.3.1 The below table sets out how the monitoring and review processes. The development of the biodiversity interest within the site will be monitored over time by a suitably experienced ecologist as set out in the below to ensure the biodiversity enhancements and ecological enhancement measures are upheld during the operational phase of the scheme.

TABLE 5: Monitoring and Review

Ref	Management Categories	Timing	Maintenance Task and Method
6.3.1	Landscape management	As necessary	• Monitor comments/suggestions from users - feedback comments to client and respond as instructed and incorporate into LEMP as required.
6.3.2	LEMP review	As necessary	• Suitably experienced ecologist to undertake a review of habitat / landscape establishment and quality, to inspect and sign-off the completion of the various enhancement measures. A report to be prepared for the client and LPA with recommendations for active management as required and incorporate into LEMP as required.
6.3.3	Monitoring ecological Walkover	Year 1, 3, 5, and 10	• Suitably experienced ecologist to undertake inspection of hedgerows, trees, grassland and any other ecological features to ensure that they are being managed in a manner suitable for the enhancement of wildlife interest and in accordance with habitat condition as stated within the biodiversity net gain metric. This will include checking the bird and bat boxes. The results of this monitoring survey will be used to inform future changes in management that will then be updated within this LEMP as necessary.

7 Restoration and Decommissioning

7.1 Compared to other power generation technologies, solar installations can be easily and economically decommissioned and removed from the site at the end of their economic life (or planning permitted period) with the site returned to its original condition (or proposed restoration status), with the aim being that there would be little or no trace that the solar installation had existed following decommissioning.

7.2 There are several aspects involved with the decommissioning phase. The main activities are set out below.

- Panel removal: panelling is unfixed from mounts and then removal to a authorised recycling facility (registered and licenced);
- Support and foundations: solar panels shall be removed via the unscrewing of the arrays from the mounting frames, with the removal of the mounting frame horizontal poles and the removal of the piles from the ground using a tracked pile driver. Where no supporting concrete foundations are used, these can be easily mechanically extracted from the ground and removed for recycling to a registered / licenced facility;
- Electrical equipment: cabling shall be dug up out of the ground and removed, along with all ancillary structures. The disconnection and removal (by opening and pulling from one end of a single trench) of all cabling buried less than 1200mm below ground level shall be the preferred option. Should cabling be required to be dug out, the appropriate machinery should be used to dig a trench along the cabling route to facilitate its removal. The inverter and transformer housing is removed using a crane. The prefabricated concrete slab upon which they are supported can be either lifted or broken up in situ and removed. Material arisings will be removed for recycling to an appropriate facility; and
- Fencing: this is very easily removed from the ground and transported off site; again, materials and concrete foundations will be removed for recycling.

Protection of landscape elements and ecology

7.3 The solar array will be decommissioned at the end of lifespan of development panels and returned to agricultural land. It is not known what the ecological value of the site will be at this point, but if the LEMP is followed it seems likely that the habitat within the area will be considerably more ecologically diverse than at present and protected species may be present within the area.

7.4 Areas of ecological value shall continue to be managed for this purpose during the decommissioning and restoration period.

7.5 Prior to the decommissioning works, any landscape elements such as hedgerows, trees, and areas of habitat should be reviewed (by suitably qualified professionals) to confirm whether any protection measures are required. This includes licences for protected species that may be required from Natural England (or equivalent environmental organisation), or relevant planning approvals.

7.6 Pre-decommissioning ecological surveys will be required in line with guidance, legislation and planning policy available at the point of decommissioning, to ascertain the nature of ecological impacts and what, if any, mitigation measures will be required. A full mitigation plan will be prepared and submitted to the LPA prior to decommissioning.

7.7 Commitment to decommissioning and restoration will also be made a planning condition as required by the LPA Ecologist.



Indicative image of public right of way signage

Public Right of Way

7.8 PRoWs that runs through the site shall be respected during the decommissioning works, with appropriate health and safety signage warning users about the decommissioning works. Access tracks that dissect PRoWs shall be removed according to the original PRoW surface treatment.

Timeframe

7.9 Site decommissioning will take place over a period of no more than six months following the cessation of electricity generation, subject to LPA consultation and requirements.

7.10 All works to decommission the site should be undertaken in optimum ground / weather conditions to help reduce the impact of the groundworks and limit the remedial works.

Restoration of ground

7.11 The ground shall be made good to allow for re-seeding and / or agricultural use to help ensure the soil profile is retained as per the soil management plan/ecology specification. It should be considered that prior to decommissioning the seedbank from the grassland within the site could be harvested or collected via the green hay method so the seedbank can be used for restoration of the site.

7.12 A detailed specification shall be produced for the making good of the landscape elements prior to the decommissioning and shall be undertaken in association with the relevant British Standards and best practice guidance of the time.



Indicative image of potential restored landscape

Office Location
33 Sheep Street,
Cirencester
GL7 1RQ
T 01285 641717
cirencester@pegasusgroup.co.uk

Offices throughout the UK and Ireland.

Expertly Done.

DESIGN | ECONOMICS | ENVIRONMENT | HERITAGE | LAND & PROPERTY | PLANNING | TRANSPORT & INFRASTRUCTURE

All paper sourced from sustainably managed forests.

Pegasus Group is a trading name of Pegasus Planning Group Limited (07277000) registered in England and Wales
Registered Office: Pegasus House, Querns Business Centre, Whitworth Road, Cirencester, Gloucestershire, GL7 1RT

We are ISO certified 9001, 14001, 45001

Pegasus_Group @pegasusgroup Pegasus_Group

PEGASUSGROUP.CO.UK