

Heckington Fen Solar Park

EN010123

Outline Landscape Ecological Management Plan

Applicant: Ecotricity (Heck Fen Solar) Limited

Document Reference: 7.8

Pursuant to: APFP Regulation 5(2)(q)

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OUTLINE LANDSCAPE ECOLOGICAL MANAGEMENT PLAN

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Applicant: **ecotricity**

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Environment





Pegasus House
Querns Business Centre
Whitworth Road
Cirencester
Gloucestershire
GL7 1RT
www.pegasusgroup.co.uk | T 01285 641717

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Author	IHW
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1 Introduction

- 1.1 The objective of this Outline Landscape and Ecological Management Plan (oLEMP) is to set out the management and maintenance procedure for the solar park development at Heckington Fen. It is designed for the operational phase and will commence from the handover date from the landscape contractor to the operations and maintenance team.
- 1.2 This OLEMP is a live document, the content of which will continue to be updated, refined and (where necessary) added to, based on ongoing discussions between the Applicant and statutory bodies and relevant Local Planning Authorities during the DCO examination process. It will be updated by the Applicant into a final detailed Landscape and Ecology Management Plan (LEMP) prior to the commencement of works in accordance with the Requirements contained in Schedule 2 of the draft Development Consent Order (DCO) (document reference 3.1).
- 1.3 This document is supported by the Landscape Strategy Plan, drawing no. P20-2370_76 (DCO document reference DCO 6.2.6; APFP regulation 5[2] [a]).

Landscape and Ecological Management Plan

- 1.4 The purpose of this oLEMP is:
 - To ensure that clear objectives for this new solar park at Heckington Fen are agreed.
 - To set clear standards for the performance of landscape maintenance work prior to the handover to the operations and maintenance team.
 - 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 help in the allocation of financial resources for landscape maintenance.
 - To help monitor success and progress against management targets.

Planning

- 1.5 This oLEMP has been prepared to aid the Development Consent Order (DCO) application for this new development at Heckington Fen, described as:

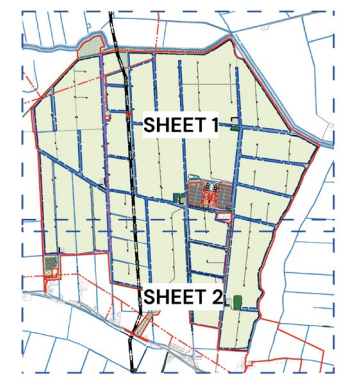
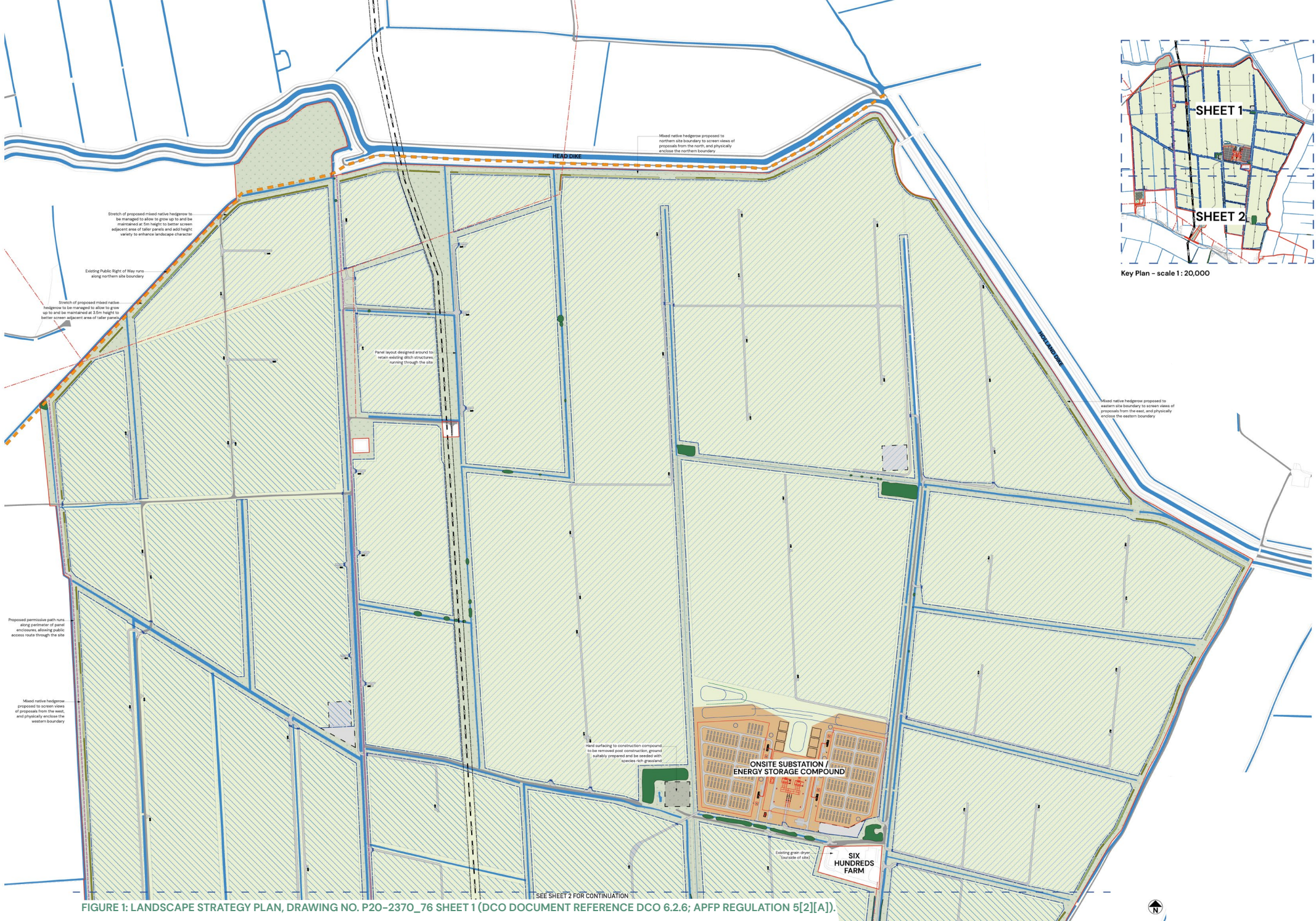
“Development Consent Order Application for Ground Mounted Solar Panels, Energy Storage Facility, Below Ground Grid Connection to Bicker Fen Substation and All Associated Infrastructure Works. The Proposed Development comprises a number of parts, but can be summarised into three main sections: 1. The ‘Energy Park’ which includes the solar panels, energy storage and associated equipment on the main site listed below; 2. the Grid Connection, and 3. extension works at National Grid’s Bicker Fen Substation.”
- 1.6 A Development Consent Order has been prepared alongside an Environmental Statement for submission to the Planning Inspectorate on behalf of the Secretary of State for the above Development. If approved the Development could start construction in 2025 and be operational in 2027.

Management Aims

- 1.7 The main aims for the site landscape and ecological management and maintenance are:
 - To assimilate the solar park into the local landscape, thereby minimising any effects on local landscape character, landscape elements and visual receptors;
 - To manage operational activities associated with the solar park so as to protect existing retained trees and hedgerows and prevent short term damage and longer term adverse impacts;
 - To manage existing trees so as to minimise any unacceptable risks that they may present for operational staff associated with the solar park;
 - To maintain new hedgerows and grassland in order to maximise their landscape and ecological benefits; and
 - To provide new foraging, nesting, roosting and sheltering opportunities for a range of wildlife species.

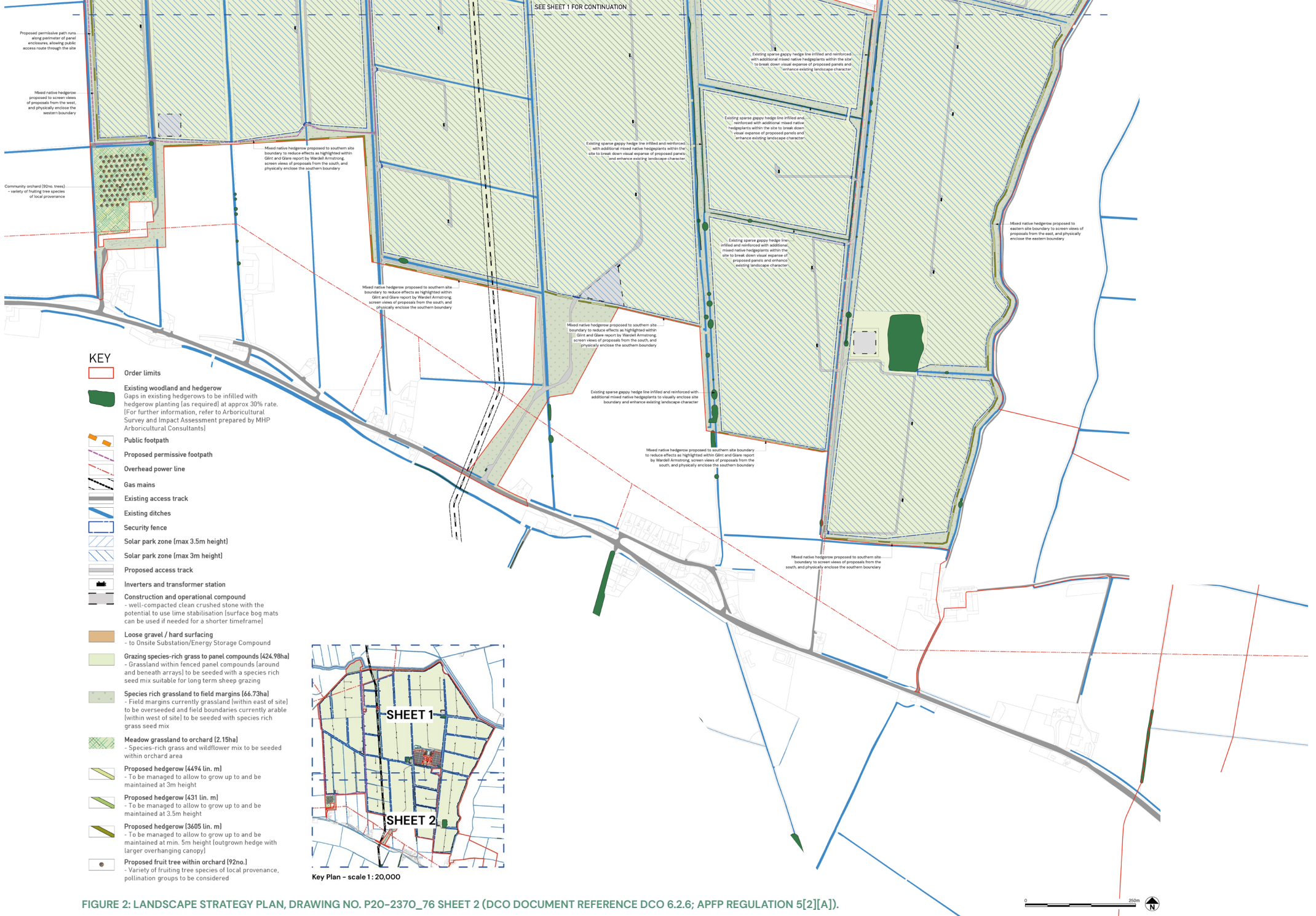
Review

- 1.8 This document should be seen as an operational guide for maintaining the landscape and ecological proposals for the lifetime of the solar park and is subject to change and improvement as the different landscape features mature and develop. Ecotricity (Heck Fen Solar) Limited (the 'Applicant') shall be responsible for its implementation and will appoint a land manager (likely as part of the Operations and Maintenance Team) to carry out the objectives and an ecologist to undertake monitoring and provide professional advice to the land manager.
- 1.9 The land manager would be responsible for the implementation of the oLEMP during the operational phase. The land manager will be provided with a copy of this oLEMP and liaise with the Applicant and follow professional advice provided by the ecologist where required to ensure that the stipulated measures are being implemented correctly. The land manager will liaise with the tenant sheep farmer and any community groups to ensure sheep farming practices and use of the community orchard are compliant with measures set out in this oLEMP.
- 1.10 The ecologist shall be suitably qualified and experienced, and hold the appropriate licences from Natural England when undertaking monitoring of protected species. The ecologist will be appointed to provide professional advice to the land manager on all aspects of habitat creation and management and carry out the monitoring as set out within this oLEMP.



Key Plan - scale 1:20,000

FIGURE 1: LANDSCAPE STRATEGY PLAN, DRAWING NO. P20-2370_76 SHEET 1 (DCO DOCUMENT REFERENCE DCO 6.2.6; APFP REGULATION 5[2][A]).



2 Site Description

Landscape Proposals

- 2.1 There are no internationally important statutory designated sites (Ramsar, SAC & SPA) or national sites (SSSI, NNR, LNR) within 10km of the site, and no non-statutory designations within or adjacent.
- 2.2 A series of ecological surveys have been conducted on the site; which covers 524ha, and is currently a large, intensive, arable farm growing winter wheat, primarily for the animal feed market. The site is made up of numerous fields, with western fields generally cultivated up to field margins, and eastern fields (in a Mid Tier Stewardship scheme) with 4–6m strips of rough grassland around most fields.
- 2.3 The majority of fields are separated by drainage ditches (and few sparse remnant hedge lines); many less than 1m in depth and 1.5m in width, dry during summer, and mostly choked with vegetation. There is one farm pond within the site which supported a small population of Smooth newt, Common Frog and Common Toad.
- 2.4 There are four larger Internal Drain Board managed drains which are more than 2m in depth and up to 3.5m in width which permanently hold water and support a restricted range of common aquatic plants. No notable aquatic species were recorded and there were extensive sections dominated by duckweed and floating algae (indicating eutrophic conditions). Whilst the Internal Drain Board managed drains provide suitable habitat for Otter and Water Voles no evidence of this species was recorded – although American Mink were recorded.
- 2.5 There is population of brown hare, roe deer and a number of active badger setts within the site. There was a low level of foraging activity of up 12 bat species recorded over the site – although the vast majority was by Common Pipistrelle bats. Two Common Pipistrelle and one brown long eared bat were recorded emerging from the derelict building in the centre of the site.
- 2.6 A total of 39 bird species were found breeding on and immediately adjacent to the proposed Energy Park Site. The majority of these were common farmland birds nesting the banks of drainage ditches, woodland, copses and farm buildings or along hedgerows. Two schedule 1/Annex 1 bird species with recorded breeding in the area (barn owl and kingfisher). Seven BOCC Red List species (Stanbury *et al* 2021; Grey Partridge, Skylark, Starling, Tree Sparrow, Yellow Wagtail, Linnet and Yellowhammer) were found breeding. The range and number of bird species found breeding and foraging on the Energy Park Site are typical of the arable landscape within Lincolnshire and are assessed as being of local importance.
- 2.7 There are seven species poor gappy defunct hedgerows, one line of trees and four small deciduous plantation woodland blocks within the site. Proposals have been designed to retain all existing vegetation.
- 2.8 Separate assessments of Landscape and Visual (Chapter 6), Residential Visual Amenity (Chapter 7) and Cultural Heritage (Chapter 10) have identified mitigation measures. These include:
 - Protection and enhancement of selected existing hedgerows by infilling and reinforcing with native species hedge plants of local provenance (to match existing hedgerow);
 - New hedgerows with along site boundaries to strengthen local landscape character (by reinforcing field patterns), provide visual screening of development, and increase ecological connectivity;
 - A community orchard, using fruiting species of local provenance.
- 2.9 It is desirable to maintain proposed tree and shrub species consistent with the landscape character, however, enhancing and reinforcing the ecology and biodiversity of the site has also been at the forefront of the design intent. Proposing species consistent with the character of area but also valuable for wildlife and habitat, provides ecological benefits and biodiversity gains.
- 2.10 Within the fenced solar enclosures grazing species rich seed mix is specified, which is suitable for long term sheep grazing without addition of fertilizers. The seed mix chosen will reflect the soil conditions of the site and species present in the local area and should be locally sourced if possible. A specialist company will be appointed to complete soil tests and source an appropriate seed mix for the ground conditions.
- 2.11 External to the fenced enclosure, a species rich grassland mixture is proposed, which seeks to enhance biodiversity and ecological corridors around the site to the base of the boundary hedgerow planting.
- 2.12 A number of plots (essentially small areas of bare ground) providing nesting opportunities for breeding Skylark shall also be incorporated in areas that will continue to be in arable cultivation within the Applicant's control.
- 2.13 Additionally, within the community orchard area, a species rich meadow grassland is proposed to a flower rich meadow beneath and around the orchard.
- 2.14 This document should also be read in conjunction with the Outline Construction Environmental Management Plan produced by Pegasus Group.

3 Environmental Considerations

- 3.1 This section details the environmental considerations that need to be examined to enable a thorough landscaping management strategy for the site.

Recycled and Biodegradable Materials

- 3.2 Where appropriate, use should be made of materials made from recycled components e.g. wood chip mulch or biodegradable mulch mats.

Pesticides/Herbicides

- 3.3 A minimal intervention and organic approach will be used in terms of weed control. In areas of hedgerow planting this is to be achieved by using mulch mats and hand weeding. Weed killer and other chemicals use will be minimised.

Lighting

- 3.4 There is no permanent lighting proposed for the operational phase of the Proposed Development, except for the localised emergency security lighting in proximity to the substation, energy storage and control buildings. Such lighting would be triggered by movement only or manually turned on, and so would not be active for all hours of darkness. CCTV to be installed along the security fencing associated with the Onsite Substation and Energy Storage System would utilise infrared technology.

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 biodiversity value of these habitats, with minimal use of pesticides and herbicide, and ensuring vegetation works take place outside of the bird nesting season.

Trees and Associated Works

- 4.2 Tree or hedgerow management will not normally be undertaken during the bird nesting season of 1st March to 31st August inclusive. If works are required during this period this will only be after appropriate survey and advice from the site ecologist to confirm there is no risk of harm to wildlife or risk of contravention of the wildlife legislation .
- 4.3 All tree surgery work is to be carried out to BS 3998:2010 Tree Work–Recommendations, 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.

New Planting

- 4.4 All new orchard 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. Trees should be checked in September and marked with paint, 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 variety should be considered as replacement.
- 4.5 Biodegradable mulch matt or bark mulch to a depth of 50mm will be maintained to the base of hedgerows in order to suppress grass and weed growth.

Grazing

- 4.6 The Option agreement with the landowner provides the ability to graze the land. The Applicant has been engaging with a local shepherd in order to progress discussions on the availability of sheep and the possible densities of flock. This oLEMP provides detail of the discussions to date at Table 1:

Table 1: Management of Grassland under and around solar arrays

Date	Discussion
November 2021	During the non-statutory consultation details of three parties who could graze the Energy Park were provided to the Applicant and the Landowner, either personally or via contacts in the community.
December 2021	Contact made between Landowner and individuals – telephone calls, Applicant not party to.
23 March 2022	Site visit with prospective shepherd arranged with Landowner and Applicant.
10 May 2022	Confirmation of staff requirements (1.5 FTE) by prospective tenant shepherd.
7 June 2022	Discussion about grass mixes, fencing requirements and managing areas for biodiversity in the south and west (now removed from the Order limits).
14 July 2022	Further discussions on stocking densities and published guidance. Shepherd confirms he agrees with the guidance by NFU about stocking densities throughout the year (between 4 and 8 sheep/hectare achievable, or 2–3 sheep/ha on newly-established pasture, similar to stocking rates on conventional grassland, i.e. between about March and November in the southwest and May to October in North-East England).
September 2022	Details about reservoir shared – prospective shepherd's land is in the area under consideration by Anglian Water.
October 2022	Discussion about value of sheep farming when compared to other types of agriculture – shepherd noted his sheep were comparable financially to wheat production.

5 Maintenance Specification

5.1 Retained Native Trees & Hedgerows

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 biodiversity value of boundary feature;
- 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 will be subject to checks by an ecologist to ensure there are no nesting birds present.
- 5.1.2 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. A competent ecologist will need to inspect trees prior to any remedial work to check for roosting bats.
- 5.1.3 Where the existing vegetation abuts footpath links, Internal Drainage Board ditches and access roads, the portion of vegetation adjacent the links shall be cut-back annually (if required) to maintain free access.
- 5.1.4 All arisings should be removed from site, unless suitable to retain on site, e.g. for ecological benefits such as creating hibernacula for herpetofauna and loggeries for invertebrates.

5.2 New Orchard Tree Planting

Management Aim

- To successfully establish new orchard tree planting;
- To maintain orchard tree planting ensuring future longevity; and
- To present and maintain high biodiversity value visual appearance of new orchard tree planting.

Management Objectives

- To maintain newly planted orchard 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 appropriate forms of trees for future growth; and
- To ensure trees do not present a hazard to site users.

Hedgerow Trees

- 5.2.1 Existing hedgerow trees will be maintained to continue to provide visual screening enhance the biodiversity of the site whilst minimising the risk of providing new nesting habitat for predator bird species (eg. crow or magpies) or shading over the solar park

Orchard Trees

- 5.2.2 The community orchard will be planted and maintained following Natural England Guidance TIN014- standard guidance.
- 5.2.3 Tree stakes and ties will be regularly checked during the establishment period and adjusted as necessary to ensure that the developing trees are not damaged.
- 5.2.4 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 variety of fruit tree of an alternative similar tree shall be selected.
- 5.2.5 Tree stakes will be securely fixed to new tree planting using proprietary rubber ties with spacers to prevent chaffing and damage to the tree.
- 5.2.6 Any necessary remedial works will be carried out as soon as possible. All tree work should be carried out in accordance with Natural England Guidance (TIN017, TIN018, TIN019). All arisings will be either used to create compost heaps within the orchard.

5.3 Reinforcement & New Native Hedgerow Planting

Management Aim

- To successfully reinforce internal field boundaries;
- To present and maintain a high quality visual appearance of the native shrubs within the buffer edge planting, that provides both opportunities for wildlife foraging and nesting habitat, visual screening 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 impacts to nesting birds, foraging insects and bats and to ensure the provision of winter foraging resources birds.

- 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. This will be achieved by an appropriate cutting regime.
- 5.3.3 Newly planted stock within the hedgerow gaps will be protected from animal damage by the use of individual tree guards.
- 5.3.4 All new native planted areas will be maintained by use of biodegradable mulch matt and if required weeding, pest & disease control and adjustment /removal of ties/stakes.



FIGURE 3: NATIVE HEDGEROW

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 value of the land;
- To manage grassland, controlling weeds and opportunistic or invasive species;
- To manage the grassland sensitively to establish a rich sward to provide suitable long term grazing pasture;
- To manage grassland areas outside the arrays to establish a species rich sward and ensure wildflowers can set seed.

Initial Management

- 5.4.1 Grassland management will be carried out in accordance with the seed suppliers technical advice during the establishment phase.
- 5.4.2 During the first year of establishment, these grass mixes will require time to establish before grazing or cutting. These mixes are largely of perennial species and as such, slow to germinate and grow and will not usually flower in the first growing season.

Solar Park Long Term Grazing Mixture

- 5.4.3 During the first year of establishment, management will be required to ensure the sward never exceeds a height that obstructs the panels. These areas are to be grazed within the first year, allowing 10–12 weeks for initial establishment then sheep are able to graze.

Long-term Management Around Solar Array

- 5.4.4 The pasture within the solar array will form part of Sheep farming enterprise. The land will provide grazing when the “flying flocks” are not on other land in the area. Sheep will be moved around the site to optimise use of the pasture, to ensure no over shading of the solar panels and maximise biodiversity. The exact grazing regime will be developed in partnership with the shepherd, site ecologist, site manager, and site owner.

- 5.4.5 The pasture grazing of new grassland within the arrays will create a sward of a particular character. Mechanical cutting and any light grazing of the grassland established outside of the security fence will create a different sward structure to the pasture, potentially supporting some different plants and invertebrates.

Long-term Conservation Management Outside Solar Array

- 5.4.6 The area will be managed through a combination of cutting and low intensity grazing. 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
- 5.4.7 Grazing is only to be undertaken by sheep. Cattle grazing will not be possible due to the damage this livestock may cause to the solar panel equipment.

Table 2: Management of Grassland outside solar array

January – February	Early spring cut in early March or light grazing
Early March	No cutting or remove grazing; this allows forbs to grow and allows a good habitat for ground nesting birds to develop.
July / August	A hay cut may be taken. Cut hay once the wildflowers have seeded from August onwards. The arisings can be collected as a hay crop
September to end of December	A further autumn cut or light grazing down to a short sward height; a mosaic of plant heights helps encourage insects.

5.5 Ecology & Habitat

Management Aim

- To extend and consolidate the hedgerow network for wildlife;
- To maintain and enhance aquatic habitats (ponds and watercourses);
- To maintain and enhance potential commuting routes for badgers, bats, reptiles, and amphibians;
- To enhance foraging opportunities along hedgerows for invertebrates bats and birds;
- To maintain and enhance potential foraging areas in open habitats for badgers, European hare, bats, birds and invertebrates;
- To maintain and increase potential bat, and bird roost/ nest sites; and
- To maintain and increase potential sheltering sites for amphibians.

Management Objectives

- To establish and maintain substantial ecological buffer zones to site boundaries;
- To establish and maintain new hedgerows around the boundary of the site;
- To infill/ plant up gaps in existing hedgerows;
- To strengthen the existing hedgerow corridors through in-fill planting and new hedgerow creation ;
- To monitor and manage scrub encroachment and colonisation from harmful alien species within ponds and watercourses;
- To establish and maintain wide species-rich grassland buffers between hedgerows and solar panels;
- To ensure ecological corridors are maintained to increase foraging and commuting potential;
- To maximise the biodiversity value of proposed and existing habitats for reptiles and mammals;
- To ensure that both existing and newly created habitats are managed appropriately to provide long-term biodiversity benefits for wildlife;
- To introduce new potential roost, nest, and shelter sites for protected species; and
- To monitor the success of the management plan by undertaking monitoring of habitats and species.

Habitats

- 5.5.1 The landscape proposals entail the retention of: existing hedgerows and valuable trees; existing ponds, watercourses and ditches. These are alongside: extensive new hedegrow planting; community orchard with fruiting trees of local provenance; and botanically diverse grasslands. These proposals offer enhanced and additional habitats for a variety of wildlife including badgers, brown hare, bats, amphibians, birds, and invertebrates. 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 oLEMP.

Additional Enhancements

Ditch Management

- 5.5.2 The Internal Drainage Board will continue to manage the drains they are responsible for. The internal drains will be managed to enhance biodiversity value. This will involve cutting and removal of existing vegetation within the ditches. This will be carried out on an appropriate cycle to maintain the function of the ditch and to maximise biodiversity value.
- 5.5.3 Surveys will determine the frequency of cutting. Cutting will be carried out in autumn after the bird breeding season, at the same time as cutting grassland outside the Solar arrays.

Enhancements for Species









- 5.5.4 In addition to the landscape enhancement measures proposed, a variety of bird nest boxes will be installed onto mature trees within the four woodland blocks, along with a number of kestrel and barn owl boxes at suitable locations. A variety of bat roosting boxes will be installed in suitable locations at the edge the four blocks of woodland and on old farm buildings. Precise types of boxes / hibernacula and their locations will be determined by the ecologist.
- 5.5.5 A wildlife hibernacula/log stack/brash pile will be created close to the pond in the centre of the site to provide shelter and an over-wintering refuge for remnant amphibian populations and invertebrates. These features will be sited in a free-draining, south-facing location, with logs and branches piled on the ground to create a heap ideally 2–8m long by 1–1.5m high. These features can be loosely back-filled with stones and soil to create insulation.
- 5.5.6 The ecologist will sign off installation of these features during a monitoring visit. All features will be inspected from ground-level between October and February by the management company to confirm their continued presence and good condition. Missing or damaged features will be replaced like-for-like throughout the operational phase of the array.
- 5.5.7 Monitoring will include a check of these features for signs of use and to ensure their continued suitability for the focal species. The bird boxes will not be disturbed between March and August inclusive, when birds may be nesting. Bat boxes will not be internally inspected unless by an appropriately licensed ecologist. Should any boxes needed to be moved for any reason, an experienced ecologist must first be contacted.

Skylark Plots

- 5.5.8 Skylark plots provide nesting opportunities for breeding skylark which are in decline across the UK. In line with RSPB Guidance these would essentially entail leaving small areas of bare earth (a minimum of 16m square e.g. 3m wide (or 4x4m or 3x6m) within the arable crop when seeding it to act as plots for skylarks to land and nest. The plots would be located sufficiently distant from field boundaries, tram lines and other skylark plot sites to encourage nesting and provided at a density of two per hectare. The skylark plots could utilise areas within the Applicant's control, this includes the Energy Park site and areas now outside the Order Limits but within the Option Area (Figure 1.4 – Field Plan (document reference 6.2.1)).
- 5.5.9 The Applicant agrees to work with North Kesteven District Council (NKDC) and Lincolnshire Wildlife Trust (LWT) to carry out or contribute to a strategy for the benefit of Skylarks either on land in which the Applicant has an interest, or such other land, or through such other mechanism to be agreed with NKDC in consultation with LWT.

Monitoring

- 5.5.10 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. This will include validating the BNG to Check that the statutory minimum of 10% BNG is achieved (using Metric 3.1). Where a change in the management of landscape / ecological features is required the ecologist will provide the appropriate professional advice to the Land Manager this will be discussed with Ecotricity to agree delivery of revisions to the plan.

Ecological Enhancement Features			
No.	Box Type	Photo	Description
20	Schwegler 1B Bird Box (32mm entrance)		Suitable for a range of hole nesting species. To be placed at least 2m above the ground in a quiet and sheltered area of site, on mature trees and on old farm buildings in the centre of the site, to provide extra potential nesting sites for small Tree Sparrow population. 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.
20	Schwegler 1B Bird Box (26mm entrance)		Suitable for smaller hole nesting birds. To be placed at least 2m above the ground in a quiet and sheltered area of site on mature trees. Once orchard tree begin to mature they will also be placed within the community orchard. 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.
10	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, old farm building in the centre of the site, and with agreement of landowner on the buildings close to the community orchard. 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.
4	Barn Owl Box		Barn Owl Trust nest boxes, to be installed on a mature tree on the edge of woodland, isolated tree or on suitable post. The exact location to agreed with Barn owl Trust Land owner. At least 3m off the ground and with the entrance visible to passing barn owl with overhanging branches or climbers.
2	Kestrel Box		Kestrel nest box , to be installed on a mature tree, suitable post or with agreement from landowner on a building. At least 5m above the ground
10	Schwegler 2F with double front panel		Fixed onto the main trunk of mature trees 4 to 5m high, on south, south-west or south-east aspects, ideally in a sunny location. Suitable for smaller species of bats and the internal panels dissuade birds from nesting within this box.
8	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.
10	Vincent Pro Bat Box		To be installed in hedgerows, onto trees with a diameter of approximately 20-30cm. The distance between the rearmost barrier and the tree trunk should be max 2-2.5cm. Boxes will be placed 1.5 to 3m from ground level.

6 Schedule of Management and Maintenance

6.1 Establishment years 0–5

The schedules 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.

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

Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.1	Ditches	Autumn	<ul style="list-style-type: none"> Internal non-IDB ditches will be cut and cleared on a regular cycle to maintain ditch function and enhance biodiversity by clearing vegetation on a regular cycle. Survey to determine suitable cycle and ditch management.
6.1.2	Hedgerow gapping up		<ul style="list-style-type: none"> Gaps in existing hedgerow will be planted up with suitable hedgerow species. 45–60cm whips will be planted 50cm apart, complete with a rabbit guard, cane and biodegradable mulch matt.
6.1.3	New hedgerow establishment		<ul style="list-style-type: none"> Bare-root 45–60cm whip hedge plants shall be notch planted in a double staggered row at the rate of 5 plants per linear metre (using L-shaped notches) using spades of a design suitable for this purpose. The notches will be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch will then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989). All bare-root hedge planting stock will be protected from rabbit damage using approved proprietary 600mm clear plastic spiral guards, supported with 0.9m 12/14lb canes as advised by the manufacturer.
6.1.4	Orchard tree planting	October / November	<ul style="list-style-type: none"> Orchard trees sourced locally (with advice from East of England apple & Orchard Project) will be planted in October/November in holes 30–40cm deep and 50cm wide. A wooden stake will be inserted prior to placing the tree approx. 10cm away from the stake before back-filling, ensuring graft union is 8–10cm above ground. A biodegradable mulch matt or wood chip mulch will be applied. The trees will be attached to the stake by soft rubber tree ties and protected with a suitable mesh guard to protect against grazing.

Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.5	All planting areas	Every Visit	<ul style="list-style-type: none"> • 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.
		Annually	<ul style="list-style-type: none"> • Monitor and record any plant losses and report to site manager – 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. • Control vigorous plant species that are out competing less vigorous species.
6.1.6	Trees – retained and newly planted	Annually – Orchard Tree planting only	<ul style="list-style-type: none"> • Pruning should be carried out in winter, when the leaves are off the tree. • Best practice should be follow and work is to be undertaken by a person experience in orchard management • Pruning should remove old wood to stimulate new growth and create an open centre to the tree to allow light into the canopy to ripen fruit and improve air movement to discourage disease. • Signage is to be used to inform visitors when fruit trees can be cropped.
		Biennial (or as recommended)	<ul style="list-style-type: none"> • 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.
		3 to 5 years after planting	<ul style="list-style-type: none"> • Confirm root growth is well established and as appropriate remove stakes, guards and ties from orchard trees. Detailed condition survey for orchard trees – to be undertaken by a suitably qualified person with experience in orchard management at least once every 5 years: any recommendations to assist with establishment must be undertaken as soon as possible.

Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.7	Hedgerow Planting – Retained and newly planted	Monthly	<ul style="list-style-type: none"> • Check hedgerows for additional/new gaps, record and infill during late October to March. Plant replacement tall whips, of a species mix to match the hedgerow. 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 /mulch matt areas around planting and top up to 75mm depth or replace mulch matt if required. Remove any weeds by hand, hoe or fork. Take care not to disturb shrub roots and excessive treading of bed surface. – March to October.
		Annually	<ul style="list-style-type: none"> • Cut retained hedgerows to ensure a good shape and healthy growth and control future growth. Management to be undertaken in January/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. • Internal retained field hedgerows shall be cut to a maximum of 3m high and site boundary hedgerows will be retained and maintained at a minimum height of 5m to ensure views into the site are filtered.
		3-5 Years after planting	<ul style="list-style-type: none"> • Confirm root growth is well established and remove shelters, stakes, guards and ties from hedgerow transplants – to avoid damage cut shelters away then remove stakes.

Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.8	Grassland	Seeding	<p>General:</p> <ul style="list-style-type: none"> No chemical fertilisers will be used as this encourages the growth of vigorous grasses and weeds, restricting meadow flowers. Any areas of bare ground created during the construction stage within existing grassland areas (for instance the existing grassy field margins) will be reseeded as soon as possible post construction to ensure injurious or ruderal weeds do not establish. A diverse wildflower-only seed mix will be used in order to increase the diversity of the grassland in these areas. Yellow rattle (<i>Rhinanthus minor</i>) seed can also be sown within the seed mixture to reduce the vigour of competitive grasses and increase the diversity of the sward <p>Within Array (Grazing mix):</p> <ul style="list-style-type: none"> Following completion of construction, a suitable long lasting species rich grazing grass mix will be sown within the existing arable fields within the site perimeter fencing. A long lasting species rich seed mix will be used containing a wide range of grass and herb to establish a sward that will be suitable for long term grazing without addition of fertilizer and will enhance biodiversity value . The exact seed mix chosen will reflect the soil conditions of the site and species present in the local area and should be locally sourced if possible (advice will be taken from Lincolnshire Wildlife Trust and local agronomist to source an appropriate seed mix for the ground conditions). The seed mix will be agreed with the site ecologist, grazing tenant and LPA. Prior to seeding, the ground will be harrowed and rolled, using a tine harrow to avoid damaging underground wiring. However, if there are any areas which have suffered high soil compaction, for instance due to heavy machinery being deployed, additional remedial works may be required to ensure the soil structure is suitable for subsequent sowing. If such a requirement arises, caution should be exercised to ensure newly installed underground services are not damaged during such operations. Seeding will take place in spring (late March to May) or late summer/ autumn (August or September) and rolled where possible. If there is an abundance of annual or perennial weeds within areas to be seeded then consideration may be given to the treatment of these areas with a glyphosate non-residual herbicide prior to the preparation of the ground (harrow and rolling) and subsequent seeding. No chemical fertilisers will be used.

Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.9 cont.	Grassland cont.	Seeding cont.	<p>Outside Array (Species Rich Grassland Seed Mixture):</p> <ul style="list-style-type: none"> Grassland seed mixes will be sown within the existing arable fields which lie outside of the security fencing on the western part of the site. On the eastern part of the site (which is currently in a mid tier stewardship scheme) it will over-seeded into the 4–6m grass margins and sown directly into the arable soils on the remained of the 8–9m buffer. The seed mixes chosen will reflect the soil conditions of the site and species present in the local area and should be locally sourced if possible (advice will be taken from Lincolnshire Wildlife Trust and local agronomist. The seed mix will contain a minimum of 20 species (including yellow rattle) with species that can become established within the existing grass margins as well as establishing on the arable land. Prior to sowing, the seed mix will be agreed with the site ecologist and LPA. Seeding will take place in spring (late March to May) or late summer/ autumn (August or September) in the first available period, and be broadcast by machine and rolled where possible. Within the arable field prior to seeding, where practical the ground will be harrowed and rolled. On the existing grass margins the existing vegetation will be cut very short and bare ground creates by disc or chain harrow prior to seeding. Wildflower seeds need to be sown into the soil to germinate and the land will be rolled following sowing. If there is an abundance of annual or perennial weeds within areas to be seeded then consideration may be given to treatment of these areas with glyphosate non-residual herbicide prior to preparation of the ground (harrow and rolling) and subsequent seeding. <p>Orchard Meadow Seed Mix</p> <ul style="list-style-type: none"> Species-rich grass and wildflower mix will be sown within the orchard. This seed mix will contain a minimum of 20 grass and/or herbaceous species. The exact seed mix chosen will reflect the soil conditions of the site and species present in the local area and should be locally sourced if possible (advice will be taken from Lincolnshire Wildlife Trust and local agronomist). The seed mix will be agreed with the site ecologist and LPA. Seeding will take place in spring (late March to May) in the first available period (prior to planting fruit tree in the following winter) and be broadcast by machine and rolled .

Establishment Years 0-5			
Ref	Management Categories	Timing	Maintenance Task and Method
6.1.10 cont.	Grassland cont.	Management Regime	<ul style="list-style-type: none"> • Refer to the seed supplier's technical advice during the establishment phase and for long term management advice. • Generally, cut all meadow grass mix areas at regular intervals during year 1 after seeding to promote a diverse species-rich sward. • During year 1, the grazing seed mix areas around the solar panels can be very lightly grazed after 12 weeks of initial establishment for a short period in line with seed supplier guidance, then again in late summer and again before winter (subject to weather conditions). • Year 2 onwards, the grassland within the solar array will be managed in partnership with the Tenant farmer and site manager to maintain long term biodiverse grass swards. • Year 2 onwards, the grassland outside the solar array shall be managed to maximise biodiversity value and develop a rich grassland with a varied structure. After flowering take a summer 'hay cut', to be repeated in Spring (late February) if needed. • Allow 'hay' to remain on-site for 3-5 days following the cut to dry and allow seeds to disperse before bailing.
		Annually	<ul style="list-style-type: none"> • Keep grassland areas in good condition – check and report to Ecotricity on damaged areas. On instruction repair damaged/failed areas and re-sow seed. Maintain sward in outside solar array optimum condition whilst enhancing biodiversity. • Within the solar arrays maintain long term biodiverse sward to enhance biodiversity and provide suitable grazing.

6.2 Monitoring and Review

The below table sets out how the ecologists monitoring method statement, for the lifetime of the array, unless specified. A visit is to be undertaken at the appropriate time of year. The following will be recorded:

Ecological Monitoring Method Statement		
Title	Description	Timing
Standard site/ survey data	<ul style="list-style-type: none"> Date Weather (temp, wind, rain, cloud) Time at start/end of survey (i.e. time spent on site) 	Every visit
Standard Botanical Quadrats	<p>2x2m quadrats at fixed locations with % cover of each plant species recorded using National Vegetation Classification criteria, as well as height of sward and % bare ground and dead thatch.</p> <ul style="list-style-type: none"> 5 quadrats recorded directly beneath panels 5 quadrats recorded in the open, between the strings of panels 5 quadrats recorded in "enhanced" area – selected as the most diverse habitat within the field margin (outside security fencing) <p>The monitoring will focus on species diversity and will monitor how plant communities change over the years. It will also help in the monitoring of injurious weeds.</p>	Every visit. Years 1, 3, 5 then every 5 years
Habitat Assessment	The hedgerows, grassland and other habitats within the site will be assessed against prescriptions set out within this oLEMP. Advice will be given in terms of remedial measures to management, if required.	Every visit (annual)
Soil Survey	Agricultural soil sampling to measure P, K, Mg, pH, Organic Matter (OM) and possibly Potentially Mineralized Nitrogen (PMN).	Every 5 years
Breeding Birds	Breeding bird surveys will be carried out to monitor the use of the Site by breeding birds. The surveys will comprise 4 visits, between April and July.	Year 1, 3, 5 then every 5 years
Bat surveys	Bat surveys will be carried out to monitor the use of the site by bats. Surveys will be by use of static bat detectors and monitoring of bats boxes deployed.	Year 1, 3, 5 then every 5 years
Ad-hoc Sightings	Observations of species are recorded during the time spent on site; this may include sightings of hare, , patches of wildflowers badger, water vole , otter, as well as invertebrates (a tally should be kept for butterflies and bumblebees). This will include a check of habitat boxes, where safe to do so (i.e. safe use of ladders with appropriate equipment and number of people).	Every visit

The below table sets out how the monitoring and review processes:

Monitoring and Review			
Ref	Management Categories	Timing	Maintenance Task and Method
6.2.1	Landscape Management	As necessary	<ul style="list-style-type: none"> Monitor comments/suggestions from users – feedback comments to client and respond as instructed and incorporate into LEMP as required.
6.2.2	LEMP Review	As necessary	<ul style="list-style-type: none"> 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 Long Term Management

Long Term (6–40 Years)

As the planted stock grows, annual reviews will continue to take place beyond the initial 5 year period up until 40 years. During this period, the operations highlighted within 0–5 year period 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.

Annual reviews should continue to take place to check the structure and health of all trees to ensure they are maintained without posing a hazard. Annual reviews of trees and hedgerows should be carried out to identify any necessary remedial works and any works should be undertaken as necessary by a suitably qualified operative.

The cutting/grazing regime should continue. It may be necessary to over-seed some grazed areas after a period of time to renew the quality of the grasslands .

Ditch management will be carried out on a regular cycle to maintain drainage function and maximise biodiversity value.

7 Restoration and Decommissioning

- 7.5 At the end of the lifespan of the solar array, energy storage facility and associated infrastructure (expected to be 40 years), decommissioning of the site will be undertaken. This will involve the removal of all the solar panels, cabins, structures, fencing, cables up to 1.2m in depth, concrete footings, equipment and all other apparatus above and below ground level.
- 7.6 No more than twelve months prior to decommissioning commencing, the site will be visited by an appropriately qualified ecologist to identify any ecological constraints arising from decommissioning activities. Further surveys and/or mitigation measures may then be required.
- 7.7 As a minimum, an extended Phase 1 Habitat survey (or equivalent) will be required to identify the potential presence of protected species and important habitats which could be impacted by decommissioning operations. Based upon current (2022) legislative protection, protected species which could be directly impacted by decommissioning activities would include badgers, and breeding birds.
- 7.8 Appropriate mitigation measures to reduce impacts on identified species and habitats and ensure legal compliance would be developed following all necessary surveys, and would be adopted via appropriate method statement or management plan. Such mitigation measures might include:
- Implementation of exclusion zones and buffers where certain works are restricted. Exclusion zones implemented from ponds, Internal Drainage Board drains, ditches, hedgerows and woodland, and badger setts are likely to be necessary based on current ecological objectives;
 - Sensitive timing of works and restrictions during periods of inclement weather;
 - Conducting works under an ecological watching brief; and
 - Manipulation of habitat to render it unsuitable for target species prior to reversion to arable land.
 - Any requirement to obtain licences from the relevant agencies or statutory nature conservation organisations (e.g. Natural England) to permit otherwise unlawful work would also be determined prior to commencement of decommissioning works.

Office Location

Querns Business Centre,
Whitworth Road,
Cirencester
GL7 1RT
T 01285 641717
cirencester@pegasusgroup.co.uk

Offices throughout the UK and Ireland.

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