Little Crow
Solar Park

Little Crow Solar Park, Scunthorpe

ENVIRONMENTAL STATEMENT: TECHNICAL APPENDICES

APPENDIX 7.8

OUTLINE LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

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APPENDIX 7.8: OUTLINE LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

LITTLE CROW SOLAR PARK, SCUNTHORPE, LINCOLNSHIRE

CONTENTS

Project	Little Crow Solar, Scunthorpe, Lincolnshire			
Document	Outline Landscape and Ecological Management Plan (LEMP)			
Client	INRG Solar (Little Crow) Ltd			
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1 INTRODUCTION

1.1.1 This Outline Landscape and Ecological Management Plan (LEMP) has been jointly prepared by Clarkson and Woods and Pegasus Group on behalf of INRG Solar (Little Crow) Ltd. in support of the application and Environmental Statement (ES) (Document Ref: LC ES CH) for the installation of a solar photovoltaic (PV) development at land proposed to accommodate Little Crow Solar Park near Scunthorpe, within the North Lincolnshire Council (NLC) administrative area.

1.1.2 Ecological surveys have revealed the following notable habitats/species within the site:

- Extensive plantation woodland surrounding the site, much of which is included within locally-designated sites for nature conservation and some of which is representative of Plantation on Ancient Woodland Sites (PAWS). Smaller blocks of plantation woodland and semi-natural woodland also present within the Order Limits;
- Hedgerows, some of which are species rich and 'Important' under the Hedgerow Regulations (1997);
- Ponds and ditches, some of which are permanently filled with water and some of which are seasonally dry;
- Arable plants of conservation priority, notably henbane *Hyoscyamus niger,* as well as a wide range of typical arable marginal flowering plants;
- Badger setts within and adjacent to the site;
- Bats which may roost within trees and have been recorded foraging along the hedgerow, woodland edge and aquatic habitats;

- A population of brown hare using the site;
- Overwintering birds, including a range of farmland bird species of conservation concern;
- Birds breeding in woodland, hedgerows and open fields, including a range of farmland bird species of conservation concern; and
- Great crested newts within a pond 330m south of the site and therefore potentially present within all habitat within 500m of this pond – there is approx. 7ha of the site which lies within this 500m radius.
- Widespread amphibians and reptile species likely to be utilising hedgerows, woodland edges, field margins and ditches/ponds.

1.1.3 A separate Landscape and Visual Impact Assessment (LVIA) has been carried out by Pegasus Group, the findings of which are outlined in the Chapter 6 of the Environmental Statement (Document Ref: 6.6 LC ES CH6).

1.1.4 For the outer edge of the development, a typical development buffer of 10m is to be provided between the edge of the Order Limits and the perimeter fencing. This allows the provision of future mitigation planting should it be required during the lifetime of the development. This buffer increases to 15m where the development site adjoins Scheduled Ancient Woodland.

1.1.5 The revised National Planning Policy Framework (NPPF), issued in February 2019, provides guidance on consideration of biodiversity in the planning process and states that the planning system should contribute to and enhance the natural and local environment by "minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures". It also states that "opportunities to

incorporate biodiversity in and around developments should be encouraged". This LEMP seeks to maximise the ecological benefits which the development may offer.

1.1.6 The Lincolnshire Biodiversity Action Plan (2011-2020)[1] identifies the issues facing the habitats and species of Greater Lincolnshire and sets the direction for nature conservation action within the county. The LEMP draws on this document and seeks to contribute to local conservation targets.

1.1.7 Established guidance[2] sets out a series of opportunities to enhance solar farms for local wildlife and contribute to national biodiversity targets. This LEMP reflects the recommendations set out within the guidance document.

1.1.8 This report sets out the aims and objectives, followed by detailed management prescriptions. A timetable of works is given in Section 5 and the plan provided within Appendix A at the end of this report shows the locations for the proposed enhancements.

[1] Lincolnshire Biodiversity Action Plan 3rd Edition (2011) Lincolnshire Biodiversity Partnership
[2] BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene

2 AIMS & OBJECTIVES

2.1.1 The proposed solar farm is an example of a development which presents considerable opportunity for landscape and biodiversity mitigation and enhancement. This LEMP has been prepared to ensure that the opportunities for mitigation and enhancement are realised. The aim of this LEMP is to:

- Set out the agreed objectives for landscape management of the site;
- Set clear standards for the performance of landscape maintenance work;
- Assist in the development of work programmes for landscape maintenance staff;
- Establish landscape maintenance responsibilities; and
- Help monitor success and progress against the aims and objectives.

2.1.2 The following objectives have been identified which, when implemented, will ensure the overarching aims of the Plan are achieved.

Objective 1: To create new grassland habitats through seeding existing arable land with of locally appropriate native species

2.1.3 Following installation of the solar array, the grassland within and beneath the array will be seeded with a seed mix containing a variety of native grasses and wildflowers suitable for grazing.

2.1.4 Easements throughout the site will be seeded with a lowland acid grassland mix which contains the larval and adult foodplants of wall *Lasiommata megera*, grayling *Hipparchia semele* and small heath *Coenonympha pamphilus* butterflies, which are species targeted for conservation nationally and which are known to occur within the locality.

Objective 2: Hedgerow planting

2.1.5 Following the installation of the security fencing adjacent to the public footpath, native hedgerows containing locally appropriate species including Spindle and Purging Buckthorn will be planted in front of the fencing.

Objective 3: To manage the grassland to establish a diverse sward beneath the solar panel arrays

2.1.6 Parts of the site within the array areas will be managed to create a diverse grassland habitat, which will benefit a wide range of wildlife. Within these areas, grazing will be restricted during the summer months to allow plants to flower and set seed, and also to provide optimal conditions for ground nesting farmland bird species. The remaining fields on site will be used for grazing sheep beneath the solar panels during the summer months, to allow rotational grazing throughout the year.

Objective 4: To manage grassland outside the array for wildlife

2.1.7 The grassland within the field margins will be managed as rough tussocky grassland that will benefit a range of species including birds, bats, small mammals, invertebrates, reptiles and amphibians.

Objective 5: To manage areas to provide suitable conditions for arable flora

2.1.8 Parts of the site will continue to be cultivated to allow rare arable plants to persist at the site following the cessation of arable farming. A particular focus will be given to providing conditions suitable for henbane *Hyoscyamus niger*, which is a species vulnerable to future extinction in the wild and was the species of highest priority to nature conservation recorded at the site. Arable field margins are a habitat type targeted for conservation both locally and nationally

Objective 6: To manage hedgerows to provide habitat for a range of species and ensure visual screening of the site from the footpath

2.1.9 The hedgerows will be allowed to grow to the full height of the security fencing, (approximately 2m high) and will be trimmed on a rotational basis, to maintain a tight form, outside the bird nesting season.

Objective 7: To manage aquatic habitats as necessary

2.1.10 Ponds and watercourses will be monitored and managed where necessary; scrub encroachment and colonisation from harmful alien species will be dealt with as appropriate.

Objective 8: To provide sheltering features around the site for nearby populations of bats, birds and other notable faunal species

2.1.11 A variety of bird boxes will be installed on mature trees throughout the site for farmland and woodland bird species such as barn owl *Tyto alba,* little owl *Athene noctua* nuthatch *Sitta europaea,* robin *Erithacus rubecula* and a variety of small passerines, as well as tree sparrow Passer montanus and starling *Sturnus vulgaris*, which are both Lincolnshire BAP priority species.

2.1.12 Bat boxes will be installed onto mature trees within the site. These will include boxes at the edge of woodland habitats which be suitable for woodland species (such as noctule *Nyctalus noctua*, brown long-eared bats *Plecotus auritus* and Natterers bats *Myotis nattereri*). All bats species are included within the Lincolnshire BAP.

2.1.13 Five partially buried hibernacula, as well as log and brash piles, will be installed around the site in order to provide habitat for invertebrates, amphibians and reptiles.

Objective 9: To monitor the site and assess the success of management and adherence to the prescribed management

2.1.14 In order to deliver the proposed ecological objectives, monitoring of the effects of management prescriptions will be required to ensure that these are effective, and to inform any necessary refinement of the site management.

3 RESPONSIBLE PERSONNEL & LINES OF COMMUNICATION

3.1 INRG Solar (Little Crow) Ltd

3.1.1 INRG Solar (Little Crow) Ltd shall be responsible for the implementation of this LEMP and will appoint a land manager to carry out the objectives of this document. Should the site be sold, it will be the responsibility of LEMP would be passed on to the new owner.

3.2 Land Manager

3.2.1 The land manager would be responsible for the implementation of the LEMP during the operational phase. The land manager will be provided with a copy of this LEMP and liaise with INRG Solar (Little Crow) Ltd and consultant ecologist where required to ensure that the stipulated measures are being implemented correctly.

3.3 Ecologist

3.3.1 The Ecologist shall be suitably qualified and experienced and be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM). When undertaking monitoring, a Natural England bat licence will be required. Additionally, a licence is required should the barn owl box require opening. Clarkson & Woods are currently employed as the ecologist providing advice on this project, though the land manager may appoint another suitably qualified ecologist to fulfil this role.

3.3.2 The Ecologist will be appointed to carry out the monitoring as set out within this LEMP. They will also be required to provide advice on positioning of habitat boxes and potentially advise on other aspects of habitat creation and management.

4 MANAGEMENT PRESCRIPTIONS

PR1: Sowing of Grassland Seed Mix

Contributes to Objective 1

On the completion of construction, a grassland seed mix will be sown in the majority of existing arable fields, which are outside arable plant areas (see PR5) and easements to be sown with the acid grassland mixture (PR2).

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 company such as Habitat Aid should be appointed to complete soil tests and source an appropriate seed mix for the ground conditions. Prior to sowing, the seed mix will be agreed with the LPA once the landscape contractor has been appointed. The seed mix will contain a minimum of 10 grass and/or herbaceous species.

Prior to seeding, the ground will be harrowed and rolled, using a tine harrow in order 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 autumn (August or September) following completion of construction, and be broadcast by machine (including fertiliser spreader, slug pellet applicator, grass seed box) and rolled where possible. The gaps between strings of panels are to be wide enough to accommodate a tractor travelling between them for cultivation, sowing and rolling purposes. In areas where a machine is unable to access, such as far underneath panels, seeding in these areas will be broadcast by hand.

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.

Any areas of bare ground created during the construction stage within existing grassland areas (for instance in the three southwestern most fields) will be reseeded as soon as possible post construction to ensure injurious or ruderal weeds do not establish. A diverse wildflower seed mix will be used in order to increase the diversity of the grassland in these areas. Emorsgate EM7 or Habitat Aid 'Sandy Soil Meadow Seed Mix' would be suitable for this purpose. Yellow rattle *Rhinanthus minor* seed can also be sown within the seed mixture to reduce the vigour of competitive grasses and increase the diversity of the sward.

PR2: Lowland Acid Grassland Creation

Contributes to Objective 1

Wide easements within the array will be sown with a diverse grassland species-mix representative of dry lowland acid grassland, which is a Lincolnshire BAP priority habitat.

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 company such as Habitat Aid can be utilised to test the soil and source appropriate seed. Prior to sowing, the seed mix will be agreed with the LPA once the landscape contractor has been appointed.

The final seed mix chosen will contain the plant species shown in Table 1, which are known to be favoured as larval food plants (L) or sources of nectar for Adults (A) for small heath, grayling and wall butterflies, which are national priority species for conservation and are present at Yarborough Quarry, to the north west of the site:

Table 1: Plant Species with Acid Grassland Seed Mix

Common Name	Latin Name	Small Heath		Grayling		Wall	
		(L)	(A)	(L)	(A)	(L)	(A)
Common bent	Agrostis capillaris	x				x	
Red fescue	Festuca rubra	x		x			
Sheep's fescue	Festuca ovina	x		x			
Wavy hair grass	Deschampsia flexuosa					x	
Common knapweed	Centaurea nigra						x
Red clover	Trifolium pratense				x		
Yarrow	Achillea millefolium		x				x
Meadow buttercup	Ranunculus acris		x				
Bulbous buttercup	Ranunculus bulbosus		x				

Emorsgate seed mix EM7 would be an appropriate mix to fulfil this prescription, sown at a rate of 40kg/ha.

Prior to seeding, the ground will be harrowed and rolled, using a tine harrow in order 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 autumn (August or September) following completion of construction, and be broadcast by machine (including fertiliser spreader, slug pellet applicator, grass seed box) 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.

PR3: Hedgerow Planting

Contributes to Objective 2

Native hedgerow planting will be established adjacent to the security fencing along the route of the public footpath. Hedgerow planting will be carried out during the first growing season following construction, between the months of October to March. Gaps in existing hedgerows will be replanted with material from the same mix.

The following native species with be utilised at the rates outlined:

%	Common Name	Latin Name
5	Dogwood	Cornus sanguineum
50	Hawthorn	Crataegus monogyna
10	Holly	Ilex aquifolium
15	Blackthorn	Prunus spinosa
5	Spindle	Euonymus europaea
5	Purging buckthorn	Rhamnus cathartica
10	Hazel	Corrylus avellana

Ground Preparation

Adjacent to the installed security fencing a 1m strip will be cleared of vegetation in the areas of proposed hedge planting. All extraneous matter such as plastic, wood, metal and stones greater than 100mm in diameter will be removed from the planting areas and disposed of off-site. When gapping up a section will be prepared between strong sections of established hedgerow identified on site before works commence.

Areas of proposed planting will be carefully sprayed with an approved systemic herbicide by an approved landscape contractor in order to clear any extraneous vegetation. Once any remaining plant material has died back the length of the hedge is to be rotovated to create a planting trench down the middle of the 1m wide line.

Planting

Hedgerow species, detailed above will be planted at a rate of 5 per linear metre in a double staggered row, with rows 500mm apart with species distributed randomly throughout. The hedgerow stock will typically be planted as bare-root transplants except for holly which will be planted as 2/3 litre container grown plants. The bare root plants will be planted into the rotovated ground using the notch technique. The planting notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted to that the root collar is exactly level with the ground surface. The notch must be closed and the soil well firmed around the roots in accordance with BS4428 Code of Practice for General Landscape Operations 1989.

All planting stock will be protected from rabbit damage using approved proprietary 600mmm clear plastic spiral guards, supported with 900mm 12/14lb canes as advised by the manufacturer. All container grown shrubs will be protected from rabbit damage using approved proprietary 600mm plastic shrub shelters, supported with 900mm x 32mm x 32mm softwood stakes as advised by the manufacturer.

All plants shall be watered in at the end of each day of planting. All newly planted hedgerows will be mulched with approved composted bark material 50mm deep and 1m wide along the entire length of the hedge line.

Maintenance during first growing season

All planting will be assessed at the end of the growing season in the September after planting by the Landscape Architect. All dead, dying or diseased material will be replaced during the following planting season by material to the original specification.

The site will be visited quarterly to undertake the following operations:

Weed clearance: all planting lines to be to be kept weed free by hand weeding or approved herbicide treatment.

Checking plant stations: all shelters and stakes to be checked and adjusted or replaced as required.

Watering: weather conditions are to be monitored by the landscape contractor during the first two growing seasons following planting. Hedge lines are to be watered to field capacity each time a two week period of no or little rainfall has occurred.

PR4: Installation of Habitat Boxes

Contributes to Objective 8

The 30 no. bird boxes described in Table 2 will be installed onto mature trees/hedgerows within the site, in approximate locations shown in the Plan at the end of this document. Exact locations for these boxes will be agreed on site with an Ecologist. All models specified are subject to availability; alternative models can be used if necessary on the advice of an ecologist.

Table 2 Bird Box Specifications

#	Description and Image	Positioning
2	Barn Owl Trust Barn Owl Box 	To be purchased from Barn Owl Trust or handmade using specifications as shown at: http://www.barnowltrust.org.uk/infopage.html?Id=42) The Barn Owl Boxes are to be placed on a large mature tree in the open, with unobstructed access to the entrance.
3	Schwegler Little Owl Box 20B 	To be installed 4-6m above ground on a mature tree with unobstructed access to the box. Mount on a horizontal branch using the metal strips supplied. Boxes placed on a south western orientation should be avoided. The boxes should be placed close together, as little owls require sites for stockpiling food as well as for daytime roosting close to their nesting sites.
5	Schwegler 3SV Nest Box (34mm hole) 	Suitable for a wide range of tree-hole dwelling nesting bird species which use the site including nuthatches, tits and tree sparrows. 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
5	Bark Boxes – House sparrow box 	32mm entrance hole suitable for a wide range of tree-hole dwelling nesting bird species Should be placed at least 2m off the ground. Best placed on a north or easterly aspect. 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.

#	Description and Image	Positioning
5	Bark Boxes- Great Tit/Tree Sparrow Box 	28mm entrance hole is suitable for tree sparrows and members of the tit family. 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.
5	Bark Boxes – Open Fronted Nest Box 	The open fronted box will attract robins, redstarts and spotted flycatcher among other species. To be placed at least 2m above the ground in a quiet and sheltered areas of the site. 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.
5	Bark Boxes – Starling Box 	To be placed at least 2m high on the trunk of a suitably mature tree Ensure there is clear access to be box entrance at all times. Best places on a north or easterly aspect Sawdust should be left within the box to allow the bird to

The 20 no. bat boxes described in Table 3 will be installed onto mature trees/hedgerows within the site, in approximate locations shown in the Plan at the end of this document. Exact locations for these boxes will be agreed by an ecologist whilst on site. All models specified are subject to availability; alternative models can be used if necessary on the advice of an ecologist.

Table 3: Bat Box Specifications

#	Description and Image	Positioning
6	Bark Boxes – Bat Chamber 	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 a variety of bats, may also be used by roosting birds.
6	Schwegler 1FF Bat Box 	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 crevice dwelling species such as pipistrelle bats.
6	Bark Boxes – Kent Type Twin Crevice 	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 crevice dwelling species such as pipistrelle bats.
2	Schwegler 1FS 	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 larger colonies of small bats such as pipistrelles.

PR5: Creation of Hibernacula

Contributes to Objective 8

Five wildlife hibernacula will be created, comprising partially buried logs and rubble, to provide shelter and an over-wintering refuge for reptiles, amphibians and invertebrates. Appropriate locations for the hibernacula are shown in the Plan at the end of this LEMP. The creation of the refuges will take place at the end of the construction stage and will ideally utilise existing wood and stone generated during site preparation, ground excavation and hedgerow removal works. However, should this not exist, materials necessary to create the refuges will be brought onto site.

A diagram showing the construction of a hibernaculum is shown in Figure 1:

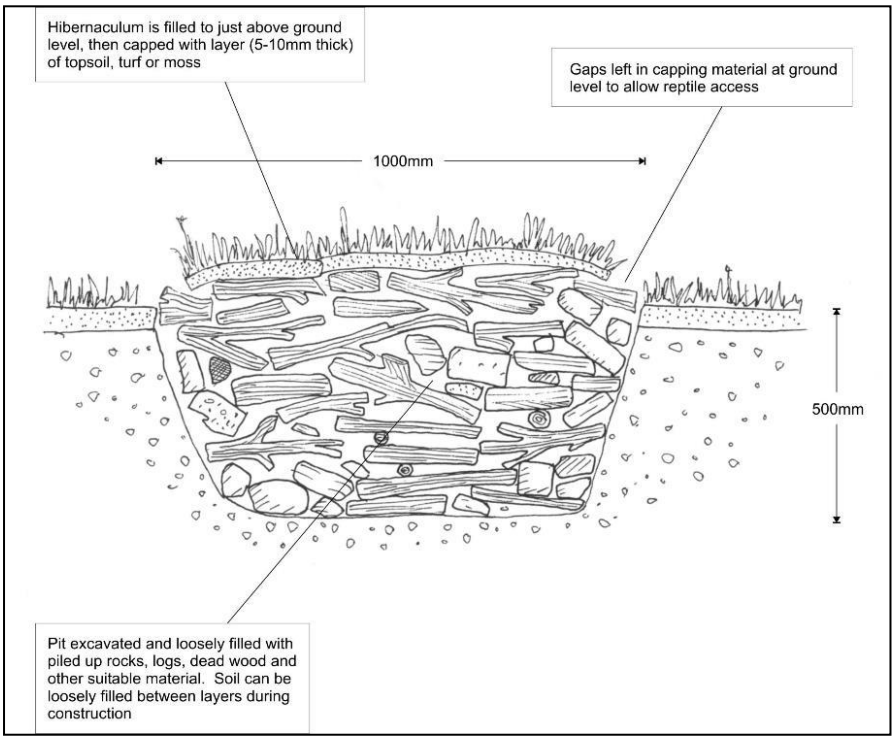


Figure 1: Hibernaculum Specification

Around the edges of each hibernacula, mounds of sandy and stony substrate will be deployed to create areas of bare ground measuring at least 2x1m (with a depth of approx. 30mm) to provide basking areas for grayling butterfly. Substrate will ideally be taken from elsewhere within

the site (during swale creation etc.). Alternatively suitable substrate will be sourced locally and brought on to site during hibernacula creation.

PR6: Management of Grassland Beneath Solar Panels

Contributes to Objective 3

The proposed solar PV development has been divided into fields targeted for conservation grazing, and those which may be grazed for agricultural grazing (as shown within the LEMP Plan in Appendix A).

All newly seeded grassland areas

Newly seeded grassland areas are unlikely to remain bare for extended periods of time. In the unlikely event that grassland fails to become established upon areas of bare ground created during the works, these areas should be lightly scarified and reseeded with the same seed mix used to seed the site at the during the construction phase.

An inspection will be undertaken in early August following completion of the installation. The inspection will be undertaken by the operating company. Should the proportion of bare ground be greater than 20% sowing should be repeated in these areas. Reseeding in August is likely to be particularly appropriate where the months of May, June and July have been very dry. The operating company will assess the proportion of bare ground on the site.

Areas Grazed During late August - March (Conservation Grazing Areas)

Years 1 & 2

Newly seeded grassland will be subject to regular cutting to a height of 40-60mm during the first two years of establishment in order to prevent annual weeds from establishing.

Arisings will be collected with a baler or rake to remove nutrients and thereby promote the establishment of a biodiverse sward. Alternatively if this is not possible the frequency of mowing should be increased so that cuttings can be dispersed without leaving a significant mulch layer.

The frequency of cutting will be dependent on the establishment of the sward and will be more regular should annual weeds establish or if arisings cannot be removed from the site.

This treatment may need to be continued for several years until the grassland sward is sufficiently developed to supress development of undesirable weed species.

Subsequent Years

After the initial seeding and management period (1 or 2 years after seeding) grassland within the conservation grazing area will be this area will be managed through low intensity pulse grazing using sheep, which could be supplemented by mowing via a hay cut in August with subsequent aftermath grazing to remove arisings. The combined approach of mowing and grazing is presented Table 4 below:

Table 4: Management of Conservation Grazing Areas

January-February	Light grazing on any new growth
Early March	Remove grazing; this allows plants to grow and creates good habitat for ground nesting birds
End August	An optional hay cut may be taken. Cut hay once the wildflowers have seeded; cut meadow slowly and allow opportunities for animals and birds to escape. Arisings to be collected or aftermath grazing adopted to avoid harmful effects of grass mulch on grassland diversity.
September to end of December	Main grazing period with light grazing down to a short sward height; a mosaic of plant heights helps encourage insects.

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

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.

Areas Grazed During March to August (Agricultural Grazing Areas)

Years 1 & 2

Newly seeded grassland will be subject to regular cutting to a height of 40-60mm during the first two years of establishment in order to prevent

annual weeds from establishing. Arisings will be collected with a baler or rake to remove nutrients and thereby promote the establishment of a biodiverse sward. Alternatively if this is not possible the frequency of mowing should be increased so that cuttings can be dispersed without leaving a significant mulch layer.

The frequency of cutting will be dependent on the establishment of the sward and will be more regular should annual weeds establish or if arisings cannot be removed from the site.

Subsequent Years

This area will not have any restrictions on grazing and it is assumed that the sheep moved from the conservation area in early March would be relocated into this area until late August when they can be moved back.

Caution is advised when grazing ewes with small lambs due to the presence of small gaps beneath security fencing at certain locations. Being herd animals with a strong flocking instinct, any lambs which do escape would be expected to make their own way back in to the site via the gaps.

In addition to grazing, an optional hay cut may be taken between 1st July and 31st October. The sward may be cut once flowers have been allowed to seed, and the grass will be cut slowly to allow opportunities for animals to escape. Following the cut the land will be grazed to remove arisings and prevent nutrient enrichment.

Area under Existing Higher Tier Countryside Stewardship

An area of grassland measuring approximately 3ha in the east of the site is currently managed under the Higher Tier Countryside Stewardship Agreement Option 'Management of grassland for target features'

Although following installation of the solar array the land will be ineligible for Countryside Stewardship, the management of this land will be similar to the existing management and will seek to provide suitable conditions for lowland acid grassland indicator species present in the sward to continue to persist. The land will fall within the Agricultural Grazing Area and the operational management prescriptions will be complementary to the existing management prescriptions for this as set out in the Countryside Stewardship Agreement[3].

For the lifetime of the array a permanent grassland sward will be maintained through grazing and/or a late summer cut. No pesticide or fertiliser will be added to the sward, and herbicide use will be restricted and only used to control the spread of injurious weeds, as set out in PR10. Any bare areas created as a result of construction activities will be seeded with an appropriate lowland acid grassland mix as prescribed in PR1. The grassland sward will be monitored (see PR14) to assess whether management of this area continues to provide suitable conditions for lowland acid grassland establish, and identify whether management may need to be modified, for instance by restricting grazing and/or adopting a cutting only regime which is prohibited in the early summer.

PR7: Management of Ground Nesting Bird Areas

Contributes to Objective 3

The habitat within these areas will be managed in the same way as the rest of the conservation -grazed grassland (see PR6), with an aim of maintaining a sward height of 10-50cm between April and August. An earlier cut to 15cm can be carried out between July and August, should the sward become too high (>50cm), however, this should be done slowly to enable birds and other animals to move out of the way (the

[3] Countryside Stewardship agreement reference 308924/AG00706540

RSPB advise that skylarks can nest successfully in a hay field as long as it remains uncut during April and May).

PR8: Management of Field Margins

Contributes to Objective 4

Coarse, tussocky grassland will be allowed to develop between the security fencing and the field boundary hedgerows. In order to prevent the encroachment of scrub, rotational cutting will be applied. Half of the site will be cut per year to approximately 15cm, allowing two years growth to establish before cutting.

Mowing will take place outside of the bird nesting season (March to August inclusive) during periods of dry weather to ensure that waterlogged ground is not damaged by machinery.

Due to the potentially tall grass/scrub and amount of arisings that would need to be collected, two options are available:

- A flail mower and collector is utilised and arisings are removed to be composted or baled for silage; or
- A disk-cutter is utilised and arisings are left in situ, turned, then collected and baled for use as hay.

Sheep grazing may also be utilised in combination with the above to reduce the amount of arisings to be collected. Sheep will only be utilised between September and February inclusive at a stocking density of around 5 – 10 animals per hectare.

Swales along certain field boundaries will be created in order to aid water attenuation. The swales will comprise a shallow depression approximately 400mm deep in the centre. Management of these features will be as per the rest of the field margins, ensuring swales do not becoming choked with scrub growth.

PR9: Management of Arable Plant Areas

Contributes to Objective 5

Land to be managed for arable plants will be separated into the following four areas:

- Area A: Triangular parcel of land in the north west or the site, outside of the array, to be managed specifically to encourage henbane, which was been recorded in this area in June 2018.
- Area B: Existing arable marginal land within the north western part of the array.
- Area C: 2x 10m wide strips of land alongside the track to be constructed for battery storage access, located within an area of existing arable land surrounded by woodland to the north of the array
- Area D: 2x 3m wide strips of land situated on either side of the existing track/PRoW, to lie between the newly planted double hedgerow.

For all Arable Plant Areas there will be no routine application of herbicides, but where a pernicious weed burden becomes an issue, targeted herbicide application and or hand pulling will be necessary (see PR10). No seed or crop will be added to these areas, to encourage the existing seed bank to germinate, grow and re-seed.

Arable Plant Area A will be cultivated in spring (March-April) each year for the lifetime of the array, to a depth of 150mm to establish a firm, fine tilth. This will then be left undisturbed to naturally regenerate, which will provide suitable conditions for henbane to thrive annually.

Arable Plant Areas B, C and D may be cultivated either in spring (March-April) or autumn (September-November), which will be rotated yearly to provide conditions for a variety of arable marginal species to persist at

the site. The cultivation depth can also be adjusted to control germination of problematic weeds.

The management is in accordance with that described within Natural England Entry Level Stewardship Option EF11.

The management described would provide favourable conditions for arable weed species (including henbane) as well as preventing these areas becoming overrun by problem species.

PR10: Management of Injurious Weeds

Contributes to Objective 3 & 5

The land will be managed to ensure that any of the five injurious weeds (Weeds Act 1959) do not proliferate or spread on the site. The five species include:

- Common ragwort Senecio jacobaea
- Spear thistle Cirsium vulgare
- Creeping or field thistle *Cirsium arvense*
- Broad-leaved dock *Rumex obtusifolius*
- Curled dock Rumex crispus

Should any of these species become problematic (i.e. a spread to more than 10% of the total field), management prescriptions may need to be altered.

Firstly, the weeds will be cut to ground level prior to flowering and the stocking density within that field will be reduced to lessen disturbance to the sward. Ragwort may need to be hand pulled rather than cut.

Should the spread of weeds remain at >10% after two years of cutting/reduction in stocking density, weeds will either be:

- Spot treated with a broad spectrum, non-persistent herbicide; or

- Pulled out by hand; or
- Treated with a species-specific selective weed killer.

The spread of undesirable plants will be monitored by the site operator and through monitoring visits by an ecologist as set out in PR14.

PR11: Hedgerow Management

Contributes to Objective 6

All newly planted hedgerows shall be maintained weed and rubbish free and any loose plants re-firmed. All plant protection measures where employed shall be regularly checked and adjusted or replaced as required. All hedge lines shall be watered to field capacity during the first two seasons after planting, each time periods occur where little or no rain has fallen for two weeks. All hedge lines shall receive an application of slow release fertiliser at the end of the growing season to the manufacturers recommendations. Mulch shall be regularly topped up to original levels. Guards will be removed once the material has established and they are they are no longer required to prevent rabbit damage and before they start to restrict growth.

In the first five seasons following planting hedge lines are to be lightly trimmed to promote healthy bushy growth. Thereafter hedge lines will be managed by rotational cutting (i.e. different sections will be cut in different years to create A-shaped hedges with adequate density throughout their height, measuring approximately 1m at the base and 2m plus height, (to above the adjacent fencing). Hedge cutting will always be timed to avoid the bird nesting season (i.e. not during March to August inclusive). The use of rotational hedge cutting will ensure that there is always some uncut material each year that will provide suitable habitats for mammals invertebrates and nesting birds, whilst also preventing the hedges from becoming gappy and thin at their bases or from projecting into the footpath/ track and verges managed for arable plants.

The requirement for provision of any additional mitigation planting within the site perimeter buffer would be assessed as part of the annual management of hedgerows under the LEMP.

PR12: Pond Management

Contributes to Objective 7

All ponds will be monitored for scrub or invasive species encroachment.

Where scrub encroaches to cover more than two thirds of the pond edge, half of this vegetation will be removed outside of the bird nesting season which runs from March to August inclusive.

Where invasive species colonise any ponds, appropriate control measures will be utilised. Specific control measures will be dependent upon the species present and will be confirmed by an experienced ecologist at the time.

PR13: Watercourse Management

Contributes to Objective 7

Existing ditches and newly created shallow (~300mm depth) swales will be managed in order to maintain their drainage function and value for wildlife.

Management will seek to prevent choking by vegetation, maintain habitat diversity, and encourage settling of sediments and nutrient uptake by vegetation, whilst minimising disturbance to birds, aquatic insects, amphibians and small mammals likely to be present. A minimum of two inspections by the land manager will be made annually to assess the condition of the water courses; one in late spring and one at the start of autumn. More regular inspections may be necessary following severe weather events or prolonged periods of inclement weather.

The banksides will be managed on rotation every 2-5 years depending on the speed of vegetation encroachment. Where excessive vegetation or blockages become a problem identified by the land manager, vegetation can be cut back more regularly to enable water to flow freely.

For each watercourse, alternate banks will undergo management so that only one bank is cut at a time, in order to leave undisturbed areas as a refuge and source for recolonisation. Vegetation will be cleared during the period September to February to minimise adverse effects on wildlife; although access in late summer/early autumn is generally easier because of the drier ground conditions.

In-channel ditches will be cleaned/dredged no more than once every 5 years unless required more often for flood management purposes, for instance if water ponds within ditches for prolonged periods or raised channel beds are noted.

Ditches will be managed in an upstream direction, to enable wildlife to return to the disturbed length downstream.

Herbicides should not be used to control vegetation in watercourse channels or within 4m of their bank tops.

Any spoil from dredging or cutting must not be placed in large piles on top of the banks; instead they should be spread thinly at a distance of at least 1m from the bank top.

As per PR12, where invasive species colonise any watercourses, appropriate control measures will be utilised.

PR14: Monitoring

Contributes to Objective 9

Monitoring will be undertaken by a suitably qualified ecologist to assess the ecological development of the site. Monitoring will focus upon several taxonomic groups, which will act as indicators for the entire site as set out in Table 5 below:

Table 5: Monitoring Schedule

Species/Group	Monitoring Methodology
Botany (including arable plants) (June/July) – years 1, 2, 3, 5 and 10	Targeted quadrats will be utilized within four zones: field margins, beneath panels, between panels, and acid grassland areas. At least 5 quadrats will be recorded from each zone, however, more may be required should there be different habitat types within each zone. At least 2 quadrats will be taken from the area under existing Countryside Stewardship Higher Tier Management – one of which will between panels and one beneath panels. A walkover survey of the areas managed for arable plants will also be conducted, with any arable plants species seen recorded (with particular focus on rare species). The monitoring will focus on species diversity and will look to see how the diversity increases over the years.
Ground nesting birds (April to July) - years 2 and 5	Two breeding bird surveys will be carried out in order to monitor the use of the site and in particular the areas managed for these species. The focus of the survey will be on ground nesting birds (skylarks, lapwing and yellow wagtail have been recorded using the site for nesting). The surveys will comprise 2 visits, between April and July.
Wintering birds (November to February) - years 2 and 5	Two wintering bird surveys will be carried out in order to monitor the use of the site and in particular the areas managed for these species. The focus of the survey will be on wintering birds of open grassland (skylarks, and lapwing have been recorded using the site for winter foraging). The surveys will comprise 2 visits, between November and February.
Invertebrate survey (June) – years 2 and 5	10 transects 100m long will be walked with all butterflies and bumblebees recorded. Transects will be walked at a slow pace with all species of butterfly and bumble bee recorded within 2.5m on either side of this transect.
Bat Surveys – 1 per season - years 2 and 5	6 Static detectors to be deployed in the same locations as baseline surveys and left to passively record bat activity for at least 5 nights. The surveys will comprise 1 static detector monitoring period in

Species/Group	Monitoring Methodology
	each season -Spring (late April-May) Summer (June to August) and Autumn (September/Early –October)
Fixed point photography (June/July) – years 1, 2, 3, 5 and 10	10 locations will be selected across the site which represent a range of habitats and a photograph taken from this point on each visit in order to make a visual record of the establishment of habitats within the site.
Bat/Bird Box/Hibernacula (Years 2 and 5)	Inspections of the bat/bird boxes will also take place by the monitoring ecologist to ensure continued presence suitability for target species. If the bat or bird species can be determined, this will be recorded. Monitoring of bat and owl boxes will take place by experienced ecologists with the appropriate Natural England licences. Any damaged or missing boxes will be replaced Hibernaculum with stony/sandy substrates will also be checked, and recommendations for repairing provided as necessary
Great Crested Newt Survey	Great crested newt eDNA survey of ponds on site to be undertaken in years 5, 10, 15 and 20. Surveys to be carried out during 15th April to 30th June as per current best practice guidelines.
Hedgerow Establishment	Years 1,2,3 5 & 10 – 10 locations will be selected across the site to record growth data of hedgerow material over a 5m section in terms of height, width and annual average growth extension, (prior to cutting). Photography will be taken to record effectiveness of screening function

Biological monitoring will ensure the habitat is establishing as intended and will track the development of the sward, which should increase in diversity over time. Monitoring will also give an early-warning of any injurious weeds or vegetation failure that may occur. Over time the monitoring information will build up a picture of the ecological benefits of the site to a broad range of species.

Recommendations may be made to amend the management prescriptions to promote a more diverse sward and/or ensure the LEMP objectives are met. Recommendation may include a change in management or supply of additional seed or planting.

A monitoring report will be supplied to the Local Planning Authority subsequent to each monitoring visit

5 DECOMMISSIONING

5.1.1 At the end of the lifespan of the array and battery storage facility (both currently expected to be 35 years), decommissioning of the site will be undertaken. This will involve the removal of all the solar panels, cabins, structures, fencing, cables, concrete footings, equipment and all other apparatus above and below ground level.

5.1.2 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.

5.1.3 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 (2020) legislative protection, protected species which could be directly impacted by decommissioning activities would include badgers, great crested newts and breeding birds. Further surveys to identify the use of the site by these receptors would therefore also be expected as a minimum.

5.1.4 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 ditches (minimum 6m), hedgerows and woodland (minimum

5m, extending to 15m from PAWS 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.

5.1.5 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.

5.1.6 It may also be necessary to maintain certain habitats at the site following decommissioning for the preservation of wildlife which may be resident, or otherwise provide compensation for loss of habitats via on or off-site measures.

6 MANAGEMENT PLAN DIARY

Prescriptions		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PR 1	Sowing of grassland mix *Grassland seed mix to be sown across the majority of existing arable fields*												
PR 1	Seeding of bare areas Bare areas created in existing grassland during construction to be reseeded once construction is complete												
PR 2	Sowing of acid grassland seed mix Wide easements in several areas to be sown with diverse acid grassland mix containing species of known benefit to target butterfly species.												
PR 3	Hedgerow/Tree Planting Setting out and planting of locally appropriate native hedgerows adjacent to the footpath and identification of areas to be gapped up.												

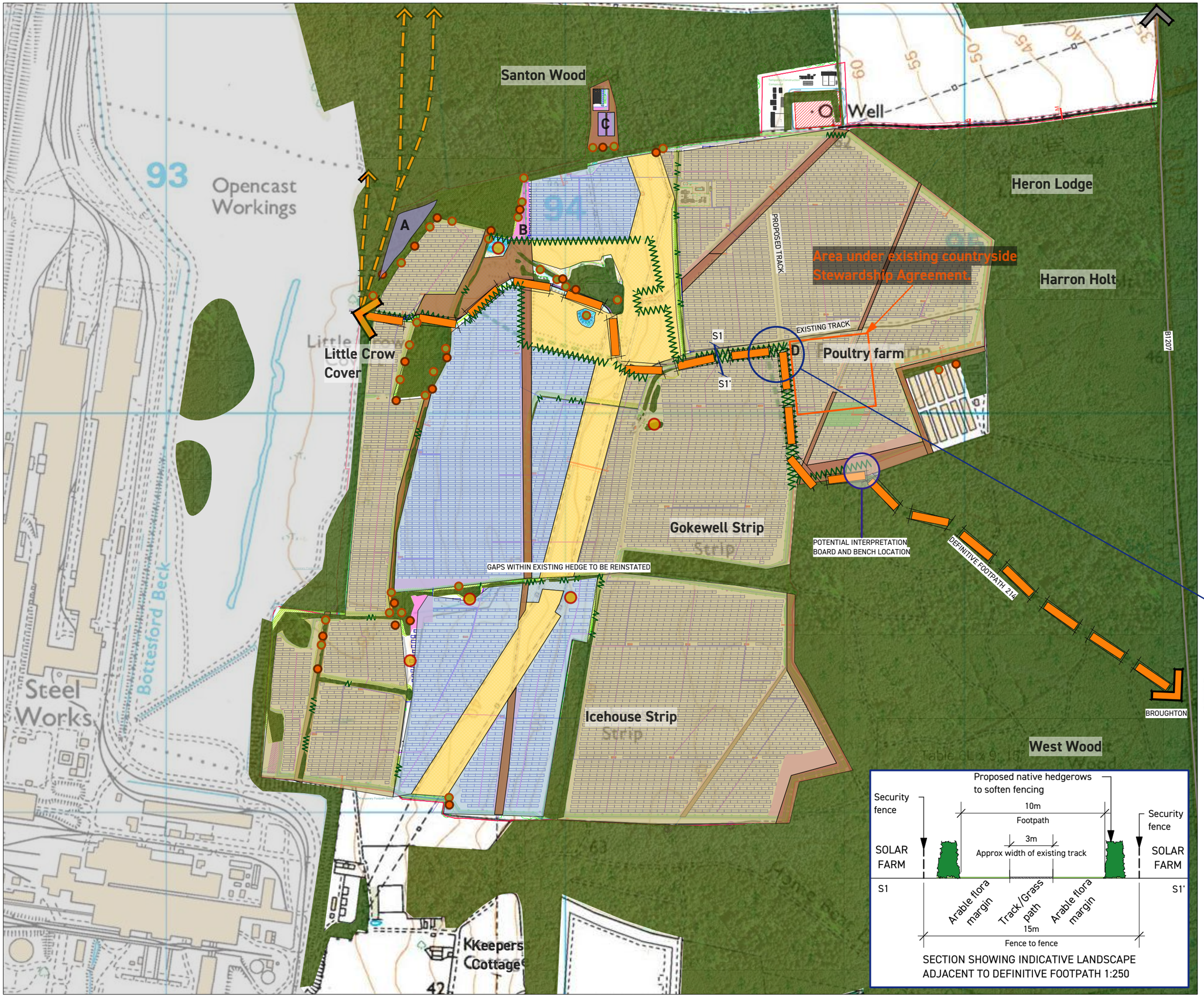
Prescriptions		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PR 4	Installation of Bird and Boxes Locations to be agreed by an ecologist while on site.	*During or post-construction*											
PR 5	Creation of Hibernacula Hibernacula to utilise materials generated from construction where possible.	*During or post-construction*											
PR6	Management of Grassland Beneath Array – **Winter/Conservation Grazed** Year 1-2 Regular cutting during first year with arisings removed												
PR6	Management of Grassland Beneath Array – **Winter/Conservation Grazed** Years 3-10 Management over subsequent years	*Light grazing on any new growth*							*Hay cut (optional)*	*Main grazing period*			

Prescriptions		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PR6	Management of Grassland Beneath Array – **Summer/Agricultural Grazing** Year 1-2 Regular cutting during first year with arisings removed												
PR6	Management of Grassland Beneath Array – **Summer/Agricultural Grazing** Years 3-10 Management over subsequent years							*Optional Hay Cut*					
				Main grazing period									
PR7	Management of Ground Nesting Bird Areas Years 3 - 10 Management over subsequent years	*Light grazing on any new growth*							*Hay cut to 15cm (optional)*	*Main grazing period*			
PR8	Management of Field Margins Cut/ grazed on 2 year rotation												

Prescriptions		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PR9	Management of Arable Plant Areas – **Area A** Cultivation regime to provide suitable condition for henbane to survive			*Cultivate to depth of 150mm*									
PR9	Management of Arable Plant Areas – **Areas B, C & D** Cultivation times and depths to be varied												
PR10	Management of Injurious Weeds Weeds to be cut and/ or weed-killed where necessary												
PR11	Hedgerow and Tree Management Management of weed control, checking of shelters, watering, application of fertiliser and hedge cutting as required.												
PR12	Pond Management Management of scrub encroachment and invasive species as necessary												

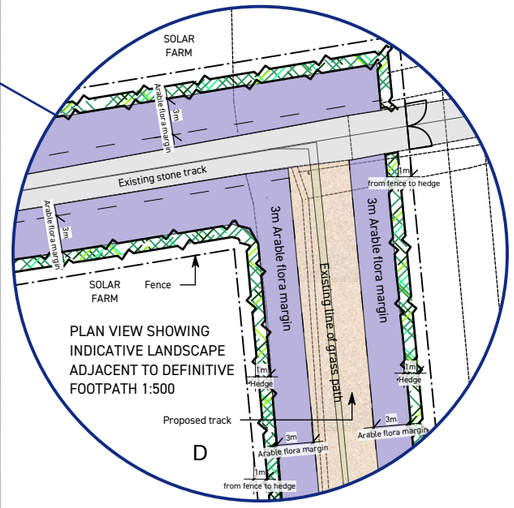
Prescriptions		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PR13	Watercourse Management Rotational cutting of bankside vegetation and cleaning/dredging of channels												
PR14	Monitoring To be carried out in years 1,2,3,5 and 10						*Botanical Quadrats and Fixed Point Photography*						
							Hedgerow Establishment Monitoring						
PR14	Monitoring To be carried out in years 2 and 5	*Wintering Birds (2 visits)*		*Breeding Birds (2 Visits)*								*Wintering Birds*	
						Bat Surveys (Spring)	*Bat Surveys (Summer)*			*Bat Surveys (Autumn)*			
							Invertebrate Transect						
		Boxes / hibernacula inspection & maintenance							*Boxes / hibernacula inspection & maintenance*				
PR14	Monitoring To be carried out in years 5, 10, 15 and 20					*Great crested newt eDNA survey of all on-site ponds*							

APPENDIX A – LANDSCAPE AND ECOLOGICAL MANAGEMENT PROPOSALS



KEY

- Proposed hedges with 3m wide arable flora margins
- Gapping up of hedgerows
- Definitive Footpath
- Other footpaths
- Existing track
- Proposed track
- Existing woodland and hedges
- Areas grazed during the summer
- Areas grazed during the winter
- Areas managed for arable flora
- Areas managed for nesting birds
- Species-rich acid grassland
- Existing Industrial Area with no public access
- Pond Buffer
- Badger Zone
- Bat Boxes (approximate locations)
- Bird Boxes (approximate locations)
- Hibernacula (approximate locations)
- Proposed solar panels



Landscape and Ecological Management Proposals

LITTLE CROW SOLAR PARK

Client: INRG
DRWG No: P17-0718.101
Drawn by : KG/EK
Date: 21/09/2018
Scale: 1:9,000 @ A3

REV: C
Approved by: KC

Pegasus Environment

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

Rev	Date	Note
-	21/09/18	First issue
A	30/10/18	Minor addition
B	14/11/19	New hedge & layout
C	25/11/19	Additional hedge

0 50 100 150 200 m

N