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APPENDIX A





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Appendix 4.2

LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN



National significant infrastructure project in the Energy Sector Little Crow Solar Park, Scunthorpe

LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

On behalf of INRG Solar (Little Crow) Ltd

November 2018





LANDSCAPE AND ECOLOGICAL

MANAGEMENT PLAN

LITTLE CROW SOLAR, SANTON, LINCOLNSHIRE

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Appe	ndix A – Landscape and Ecological Management Proposals	1

Project	Little Crow Solar, San	ittle Crow Solar, Santon, Lincolnshire					
Document	Landscape and Ecolog	jical Managemer	nt Plan (LEMP)				
Client	INRG Solar (Little Cro	w) Ltd					
Author	Peter Timms & Kate C	Curtis					
Status	Checked (C&W)	Date	Date				
V1	The-Oh-	05/09/18					
V2 Area under Countryside Stewardship Scheme described and mapped	1120	30/10/18					
V3 Details of watercourse management expanded	11/2	08/11/18					

Surveys are undertaken on the understanding that nothing in the final report will be omitted, amended or misrepresented by the client or any other interested party. This report and its contents remain the property of Clarkson and Woods and Pegasus Group until payment has been made in full.





1 INTRODUCTION

- 1.1.1 This 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 planning application and Environmental Statement (ES) for the installation of a solar photovoltaic (PV) development at land proposed to accommodate Little Crow Solar Farm near Santon, 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 site boundary;
 - 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
 - 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) is to be carried out by Pegasus Group, the findings of which will be outlined in the subsequent Environmental Statement.
- 1.1.4 The National Planning Policy Framework (NPPF), issued in July 2018, 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.
- 1.1.5 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.
- 1.1.6 Established guidance² 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.
- 1.1.7 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:

Common Name	Latin Name	Small Heath		ie Small Heath		Gray	/ling	W	all
		(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					Х			
Common knapweed	Centaurea nigra						Х		
Red clover	Trifolium pratense				Х				
Yarrow	Achillea millefolium		x				Х		

Table 1: Plant Species with Acid Grassland Seed Mix





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

4.1.1 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.

%	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

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

Ground Preparation

- 4.1.3 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.
- 4.1.4 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



- 4.1.5 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.
- 4.1.6 All planting stock will be protected from rabbit damage using approved proprietary 600mm 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.
- 4.1.7 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

- 4.1.8 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.
- 4.1.9 The site will be visited quarterly to undertake the following operations:
- 4.1.10 Weed clearance: all planting lines to be to be kept weed free by hand weeding or approved herbicide treatment.
- 4.1.11 **Checking plant stations:** all shelters and stakes to be checked and adjusted or replaced as required.
- 4.1.12 **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.

Pegasus





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.

#	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.

Table 2 Bird Box Specifications





#	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 S	pecifications
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#	Description and Image	Positioning
6	Bark Boxes –	Nail onto the main trunk of mature trees 4 to 5m high, on south,
	Bat Chamber	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	Nail onto the main trunk of mature trees 4 to 5m high, on south,
	Bat Box	south west or south eastern aspects, ideally in a sunny location.
		Suitable for crevice dwelling species such as pipistrelle bats.
6	Bark Boxes –	Nail onto the main trunk of mature trees 4 to 5m high, on south,
	Kent Type Twin	south west or south eastern aspects, ideally in a sunny location.
	Crevice	. 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,
	1	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)

<u>Years 1 & 2</u>

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:

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.					

Table 4: Management of Conservation Grazing Areas

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)

<u>Years 1 & 2</u>

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 Agreement³.

³ Countryside Stewardship agreement reference 308924/AG00706540





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 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

- 4.1.13 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.
- 4.1.14 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.

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:

Species/Group	Monitoring Methodology
	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.
Botany (including arable plants) (June/July) – years 1, 2, 3, 5	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.
and IU	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 each season -Spring (late April-May) Summer (June to August) and Autumn (September/Early –October)

Table	5:	Monitorina	Schedule
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Species/Group	Monitoring Methodology
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

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 MANAGEMENT PLAN DIARY

Prescriptions		Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Νον	Dec
PR1	Sowing of grassland mix Grassland seed mix to be sown across the majority of existing arable fields												
PR1	Seeding of bare areas Bare areas created in existing grassland during construction to be reseeded once construction is complete												
PR2	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.												
PR3	Hedgerow/Tree Planting Setting out and planting of locally appropriate native hedgerows adjacent to the footpath and identification of areas to be gapped up.												
PR4	Installation of Bird and Boxes Locations to be agreed by an ecologist while on site.	During or post-construction											
PR5	Creation of Hibernacula Hibernacula to utilise materials generated from construction where possible.	During or post-construction											
	Prescriptions	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Νον	Dec
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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	Light gr any nev	azing on v growth						Hay cut (optio nal)		Main graz	ing perioc	1
	Years 3-10 Management over subsequent years								nary				
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								Optional	Hay Cut			
	Years 3-10 Management over subsequent years					Mair	n grazing p	period					

	Prescriptions	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Νον	Dec
PR7	Management of Ground Nesting Bird Areas Years 3 - 10 Management over subsequent years	Light gr any nev	razing on v growth						Hay cut to 15cm (optio nal)		Main graz	ing perioa	,
PR8	Management of Field Margins Cut/ grazed on 2 year rotation												
PR9	Management of Arable Plant Areas – Area A Cultivation regime to provide suitable condition for henbane to survive			Cultiva depth of	ite to 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												
PR13	Watercourse Management Rotational cutting of bankside vegetation and cleaning/dredging of channels												

	Prescriptions	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Νον	Dec
PR14	Monitoring To be carried out in years 1,2,3,5 and 10						Bota Quadra Fixed Photog	nical hts and Point graphy					
PR14		Winteri (2 v	ng Birds isits)		В	reeding Bi (2 Visits)	rds)					Winterii	ng Birds
	Monitoring				Ba (t Surveys (Spring)	E	3at Survey (Summer)	S	Bat Surve (Autum	ys nn)		
	To be carried out in years 2 and 5						Invert Trai	'ebrate nsect					
		Box hiber inspec maint	es / nacula ction & enance						B	oxes / hib n	ernacula i naintenan	inspection ce	&



APPENDIX A – LANDSCAPE AND ECOLOGICAL MANAGEMENT PROPOSALS





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A 30/10/18 Minor addition

Scale: 1:9,000 @ A3

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Appendix 4.3

DECOMMISSIONING PLAN



National significant infrastructure project in the Energy Sector Little Crow Solar Park, Scunthorpe

DECOMMISSIONING PLAN

On behalf of INRG Solar (Little Crow) Ltd

November 2018

LITTLE CROW SOLAR FARM

DECOMMISSIONING PLAN

Status: 8.11.18

Content

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4	ARCHAEOLOGICALLY SENSITVE AREAS	11
5	ANNEXES	12

1 INTRODUCTION

- 1.1 This document presents the decommissioning strategy for the Little Crow Solar park, a renewable led energy scheme.
- 1.2 The proposed solar park at Little Crow will comprise c6500 mounting frames, that will carry 54 solar modules and c350 mounting frames, that will carry 30 solar modules. These will be arranged in rows running East-West across agricultural fields. The proposed development is expected to generate an electrical output of c135 MW of electricity. It is accompanied by up to 50 Megawatts of battery-based electricity storage facility.
- 1.3 The proposed development site is located on land to the east of the British Steel site at Scunthorpe, North Lincolnshire.

a) Introduction

2.1 This Section sets out the details of the decommissioning programme of the solar farm to be carried out after a 35 year generation period, the proposed lifetime of the Development Consent Order, or following a prolonged period of cessation, whichever is the earliest. It includes the method for the removal of all the solar panels, cabins, structures, enclosures, equipment and all other apparatus above and below ground level from the site and details of their destination in terms of waste/recycling, and details of how the site is to be restored to its original condition.

b) Access Arrangements

- 2.2 It is proposed that access to the solar farm during decommissioning is via an existing entrance from the road located to the east the solar park.
- 2.3 The access to the development and the roads leading to it are suitable for accommodating the movement of HGVs and other decommissioning vehicles.

c) Operation times

2.4 Decommissioning of the facility will be undertaken from Monday to Saturday. The working hours will be between 8am – 6pm Monday – Friday and 8am – 1pm on Saturdays, avoiding early morning and late evening hours.

d) Staff

2.5 During the decommissioning period it is expected that there will be approximately 30 staff on site at a time.

e) <u>Schedule</u>

- 2.6 The decommissioning of the solar farm is expected to take around 12 weeks.
- 2.7 There will be approximately 80 vehicle movement per week for 12 weeks.

f) Outline of Main Decommissioning Activities

- 2.8 All waste disposal works will be carried out to be fully compliant with the duty of Care requirements for the disposal of waste, as applicable at time of decommissioning.
- 2.9 Disposal sites for the disposal of waste will have a relevant authorisation from Environment Agency (or such other body that is applicable at time of decommissioning) and waste transfer records will be kept.
- 2.10 Outlined below are the individual component treatments as known today, these may vary if at time of decommissioning legislation requires alternative waste treatments

- (1) <u>Electrical cable between the Sub-Station Cabin and the grid connection cable</u> Northern Power Grid will be asked to attend site to disconnect power to and from the site, this will electrically isolate the solar farm. The cable will then be dug out in a trench using excavation machinery and placed in a suitable re-cycling skip or container and then disposed from site at a suitable waste recycling centre. The trench will be back-filled to pre-existing ground levels
- (2) <u>Sub-Station Cabins Equipment</u> Cabins will have all equipment removed by suitably skilled staff. This equipment will consist of Switchgear, Electrical Panels and Battery Chargers and associated sockets, switches and cables. Where possible and when items have an ongoing life-span they will be removed from site in whole units and re-used in current form. Where units do not have an on-going life-cycle they will be placed into a suitable re-cycling skip or container and then removed from site to a suitable waste recycling centre.
 - (a) In the instance where Battery Chargers are being disposed of the Batteries will be removed from the chargers on-site and taken via a fully registered waste company to a recycling centre and disposed of under the legislation applicable at that time for batteries. Removal from units will be carried out by a suitably competent employee or contractor.
 - (b) In the instance where any gas is within the switchgear units and the units are end of lifecycle. The gas will be drained by a suitably qualified contractor or employee and disposed of under the legislation applicable at that time for gases.
- (3) <u>Sub-Station Cabins/Enclosures</u> The Cabins will be dealt with separately dependant on if they are of brick construction or if they are GRP/metal container construction
 - (a) Brick buildings will be demolished on-site and all building rubble will be placed into a suitable re-cycling skip or container and then disposed from site at a suitable waste recycling centre.
 - (b) GRP/metal containers will be removed from site whole, where they have an ongoing lifespan they will be removed from site in whole units and re-used in current form. Where containers do not have an on-going life-cycle they will be transported to and disposed of at a suitable waste recycling centre
- (4) <u>Concrete foundations/bases</u> will be demolished on-site using small tracked excavators with pneumatic vibtration hammers attached and also using air compressors. All building rubble will be placed into a suitable re-cycling skip or container and then disposed from site at a suitable waste recycling centre. The holes left will be backfilled to pre-existing ground levels with soil from site or from a suitably source local top-soil.
- (5) <u>Mounting System Structures</u> the mounting system structures (metal) will be taken apart by hand using hand power tools and placed into a suitable re-cycling skip or container and then disposed from site at a suitable waste recycling centre. The metal posts in the ground will be removed by vibrating the post and lifting it at the same time using a post removal tool attached to a small tracked excavator. This will ensure minimal impact on the surrounding soil. The holes left after removal of the posts will be backfilled to pre-existing ground levels with soil from site or from a suitably source local top-soil.

- (6) <u>Cables & Duct</u> The cable and associated ducting will be accurately located using as-built drawings and CAT detectors. The trenches will be set-out and excavated to the depth of the existing cable and duct using medium sized tracked excavators. The cables and ducts will be separated and placed in a suitable re-cycling skip or container and then be disposed of from site to a suitable waste recycling centre. The trench will be back-filled to pre-existing ground levels
- (7) <u>Plastic connector and cable ties</u> These will be gathered and placed in a suitable re-cycling skip or container and then disposed from site at a suitable waste recycling centre.
- (8) <u>Fencing</u> the metal fencing mesh will be removed from the wooden fence posts by hand and placed into a suitable re-cycling container. All fencing posts (wooden) will be removed from the ground by lightly vibrating the and lifting the post using a fence post removal tool attached to a small tracked excavator. The fence posts will be put into a suitable re-cycling skip or container and the posts and mesh will then be removed from site to a suitable waste recycling centre.
- (9) <u>CCTV</u> CCTV cameras will be removed from site in whole units and re-used in current form where they have an on-going lifecycle. Where units do not have an on-going life-cycle they will be placed into a suitable re-cycling skip or container and the disposed from site at a suitable waste recycling centre. The CCTV poles will be unbolted from the concrete bases and put into suitable containers for future re-cycling. The concrete bases will be removed using small tracked excavators with pneumatic vibration hammers attached and also using air compressors. The concrete will be placed into a suitable re-cycling skip or container and then disposed of from site at a suitable waste recycling centre.
- (10) <u>New Internal Access Roads</u> All new internal access roads will be excavated to formation level (original excavation depth) on-site using medium sized tracked excavators and all excavated stone will be placed into a suitable re-cycling skip or container and then removed from site to a suitable waste recycling centre. The excavated areas will be backfilled to preexisting ground levels with soil from site or from a suitably source local top-soil.
- 2.11 All waste materials will be separated into their relevant waste types in separate skips and containers, as a minimum there will be material, wood, cable and building materials. All waste will be disposed of as per their waste stream and will have the relevant waste transfer note (<u>Annex 3</u> (<u>Draft Site Waste Management Plan</u>)).
- 2.12 Upon completion and removal of all equipment and material from site, the full site will be either ploughed or power harrowed dependant on conditions and landowner requirements.

g) Specific Environmental Protection Measures

- 2.13 There are main areas of sensitivity on the site: The hedges and trees around and within the development as well as a water-courses running through the site.
- 2.14 The hedgerows will have a decommissioning exclusion zone typically of a minimum of 5m from the face of either side of the hedge. The exclusion zone will be increased to 15m along the perimeter adjacent to the Ancient Woodland.

- 2.15 The same decommissioning exclusion zone of a minimum of 5m either side will be applied from the centre of the watercourses running through the site. For the protection of the watercourses from any suspended solids run-off during decommissioning an adequate temporary bund will be erected between the decommissioning site and the site boundary.
- 2.16 In accordance with the recommendations for tree protection (and hedgerows) within B.S. 5837: 2005, the decommissioning exclusion zone will be protected by the retention of the existing security fencing preventing access into the area. The existing perimeter security fence will be maintained during all other on-site decommissioning operations. This fencing would serve to protect the decommissioning exclusion zone, thereby preventing the requirement to erect further temporary protective fencing. Only on completion of all other decommissioning works will the fencing then be removed.

3 METHOD STATEMENT FOR POLLUTION PREVENTION

- 3.1 During the 12 week decommissioning period there will be vehicle traffic to and around the site including trench digging/re-filling and excavation work all around the site. In order to minimise the effects on the neighbourly premises, the existing security fencing will be maintained to avoid unauthorized access.
- 3.2 The site will not require any specific oils/liquids during operation. During the decommissioning phase any oils/liquids that could potentially be harmful to the environment will be stored in a bundled container or removed off site to the storage facility at the civil works company.

Spill kits will be on site during construction in the locations where oils / liquids are handled. All staff will be instructed where the spill kits are located and how they are to be used in case of emergency.

3.3 The access routes will be erected in a way to allow loading all Lorries (HGVs) at a temporary compound on site. The temporary compound will consist of a geotextile base and a layer of hard standing. It will be situated next to the eastern access to the site and comprise an area of approx. 6000 square metres (Annex 2 (Location of Compound)). These will allow offloading and also turning of HGVs on site during decommissioning to minimise nuisance.

Also a wheel washing facility will be in place there to make sure that all leaving vehicle will reach the road in a tidy way. It will be ensured that the water from the wash down area is not allowed to soak into surrounding ground or to reach the watercourse to the south of the construction site. The wash down area will therefore be equipped with an appropriate drain on its lower lying boundary which leads to a containment tank. The containment tank is regularly pumped out. The water can be recycled and used several times. After final usage the water will be disposed at an appropriate disposal site which holds a relevant authorisation from National Resources Wales (or such other body that exists at time of decommissioning).

- 3.4 In additional to the pollution prevention measures for site leaving vehicles it is foreseen to sweep the road during decommissioning using a road sweeping machine at least weekly and also more often if necessary.
- 3.5 It is not expected for contaminated material to be found on site and also not during excavation of cable trenches for removal of cables and duct. Cable trenches are kept in central strings within the development (i.e. cable/strings are bundled to keep ingress into the ground at a minimum).
- 3.6 Waste will mostly be solar panels, metal mounting structures, concrete/building spoil, stone from roads, fencing, cabling, containers, switchgear and other associated connectors and will be brought off site via containers to be supplied by registered recycling companies (as per clause 2.10). A SWMP document will list all removed containers noting which kind of material left site and which company removed waste from site and where it is transported to (Annex 3 (Draft Site Waste Management Plan)).
- 3.7 Specific Method Statements for the single kind of works needed on site will be prepared by the contractors before commencing the work as required (<u>Annex 4 (Draft Method Statements for onsite works)</u>).

Hydrology

- 3.8 During decommissioning of the access roads it is possible to find existing (sub surface) water drains. In case a drain is cut by the line of the road these drain will be replaced by a duct in a suitable dimension to carry the current and possibly awaited water flow. The existing plant hydrology will be preserved as much as possible and mitigation will be undertaken in the way suggested in the flood risk assessment and included in the layout drawing.
- 3.9 To avoid deep tracks allowing collection of water and running water over the site during decommissioning it is or will be advised to use tracked vehicles outside the roads and outside the compound areas for all works.

5 ARCHAEOLOGICALLY SENSITIVE AREAS

The post and mesh fencing around the Gokewell Priory Exclusion Zone (brown line on the plan below) erected prior to construction of the solar farm will remain in place throughout the decommissioning period to ensure no access is possible into this area.

When all other decommissioning works are completed the mesh and posts will be removed hand tools and separated into suitable re-cycling skips or containers and will then be removed from site to a suitable waste recycling centre. All works to remove the fencing will be completed by working outside the exclusion zone.

If any further archaeologically sensitive areas are identified during the ongoing assessment work or as a result of unexpected discoveries during construction, this decommissioning plan will be updated to ensure that these features/areas are subject to the appropriate measures or restrictions during decommissioning activity. Such measures might include restricting vehicle movements, restricting activity if weather conditions are not conducive and greater use of hand removal of equipment



5 ANNEXES

Annex 1: Site Location Plan

Annex 2 Location of Compound

	V	Actions Erek Actual Witter	the search of th						ΧŢ	s SPV 18 Limited plass Solar Park
l have: described each waste	e tyne exnected to he	e produced in the course of the p	roiect	YPR						
Forecast Was	te			2		Fore Quan	ecast htities	Calcu Quan (Conv between	lated tities erting m ^s and t)	
C, D or E Activity	Waste Stream	Material Type	Further description of waste - optional	Suggested LOW Code	Waste or Re-Use	(m ³)	(tonnes)	(m ³)	(tonnes)	Forecast provided by
Excavation	Packaging	plastic packaging	plastic packaging	15 02 02	Off-site destination	##	#	##	##	
Construction	Packaging	plastic packaging		15 01 02	off-site segregated	30		30	###	
	Packaging	woodem packaging		15 01 03	off-site segregated	45		45	###	
								#	#	
								#	#	
								#	#	
								#	#	
								#	#	
								####	####	

Plan Waste Destin

Please note:

- All activities must be compliant with the Duty of Care Requirements for the disposal of waste.

- All dipsosal sites must hold a relevant authorisation from National Resources Wales

- Waste transfer records must be kept.

Annex 3 Draft Site Waste Management Plan

Annex 4 - Draft Method Statements for onsite works

Issue Date:	Drawing No:		Drg Rev No:
Prepared By:		Approved By: (Signature) Date:	

Title of this Method Statement	
EXCAVATION AND FILLING CABLE TRENCHES	

NOTE:

The contents of this Method Statement are to be verbally communicated to the affected workforce by the Site Manager at the start of the working day, to ensure that the requirements within are fully understood. <u>Feedback from the workforce is to be encouraged.</u>

NOTE:

The risks must be re-assessed if there is a change in circumstances or knowledge.

IMPORTANT

Any changes to working methods not identified within this method statement, will involve cessation of works until a full risk assessment has been conducted on these changes and the method statement has been altered accordingly to reflect these changes. Also <u>approval to proceed must be obtained from the Contracts</u> <u>Director/Line Manager</u>. Advice from the Health and Safety Manager should also be sought on these changes.

- 1.0 Introduction
- 2.0 Definitions
- 3.0 Responsibilities
- 4.0 Procedures
- 5.0 Method Statement
- 6.0 Appendices

1.0 INTRODUCTION

This procedure prescribes in general terms the methods to be used and the precaution to be employed in the carrying out of the works.

2.0 DEFINITIONS

Must : this clause must be obeyed.

Should : this clause implies the requirement for compliance.

3.0 **RESPONSIBILITIES**

Site Manager : For ensuring, via the Contractor, that the work is carried out in strict accordance with the requirements of this procedure.

4.0 PROCEDURE

4.1 <u>Permit to Work Procedure</u>

'A Permit to Work' must be obtained before any work is started if 'A Permit to Work' procedure is in operation on this Contract. If applicable, refer to Section 5.0 of this Method Statement.

4.2 Risk Assessment

The Contractor must carry out a Risk Assessment. A copy of this Risk Assessment must be attached to this procedure as Appendix A.

5.0 METHOD STATEMENT

Other Relevant Method Statements to be read along with this Method Statement:

Labour - All personnel will have the relevant competency certificates.

Grade	Tick	Grade	Tick
Foreman	Yes	Skilled Operative	Yes
Supervisor		Operative	
Ganger		Electrician	
Plant Operator	Yes		
Crane Operator			
Plant - Condition to be checked prior t	o use. 2 X	7 Tonne excavators, 1 X 5 tonne excavator 3	
x 6t dumper, Telenandler with bucket			
Materials - COSHH Assessment Shee	ets include	ed, as applicable, in Appendix	
	Cofety Do	liou in addition the following.	
PFE - All In accordance with realth &	Salely PO	ncy, in addition the following.	

5.0 **METHOD STATEMENT** (Continued)

Statutory Requirements

Welfare - Facilities – 1 x offices, 3 x canteen units, 1 x toilet unit

- a) Site Utilities Water supply from farm
- b) Notices, Posters and information held in file on site

Access

- a) Access Route Via U6306 and access track as necessary. Gate to be kept closed
- b) Compound Layout: Accommodation units to be sited at western side of compound area

Site Induction

All operatives will receive a site induction outlining the general safety procedures/hazards of the site.

CONSTRUCTION OF CABLE TRENCHES WITHIN SITE BOUNDARY

The contract requires the removal of cables to the solar panels and inverter housings.

The Engineer will mark out the route for each trench. Trenches vary from 200mm wide x 600mm deep to 800mm wide x 1200mm deep.

The site area will be checked for existing services using CAT scan and use of services drawings.

Any services located will be hand excavated to expose.

Each gang will be instructed on trench width etc. The topsoil will be stripped and placed adjacent to the trench ready for reuse. The soil will be placed a minimum 1m from edge of trench.

The trench will be excavated by machine to required depth with the remaining depth required to expose the cable being done hand. A proportion of excavated material will be placed 1m from side of trench for backfilling. The remainder will be loaded onto dumpers and transported to temporary stock pile for disposal off site. The disposal site must be Certified to accept material and haulier must have valid Waste Carrier License.

Following removal the cables will be back filled with excavated material. Marker tape laid and top soil reinstated.

Banksman to be watching all machine movements.

Trenches to be backfilled as work proceeds. Trench depths are shallow but Site Manager to inspect and approve entry into trench subject to ground conditions. Where trench is 1200mm deep Site Manager to inspect and decide extent of earthwork support required. Any open trenches to be left safe at end of shift

Care must be taken when working adjacent to existing hedges to prevent damage to hedgerows.

5.0 **METHOD STATEMENT** (Continued)

Site Specific Method

6.0 **APPENDICES** (Those that are ticked are mandatory. Tick the remainder that are relevant to the works, add any other records that may be required, and enter the Appendices alphabetically.)

18

Appendix	Title	Tick if
		required
Α	Risk Assessment Checklist Form (F469). Also refer to	
	relevant risk assessment.	\checkmark
В	Toolbox Talk Register (F487)	√
	Relevant Correspondence	
	Method Statements	
	Notices, Posters and Information to be	
	Displayed/Available (F407)	\checkmark
	Specifications	
	Drawings	\checkmark
	Sketches	
	Notes	
	COSHH Assessment Sheets	✓
	Inspection/Test Results	
	Environmental Aspects and Impacts Register - Form	
	(F554) (address the key environmental risks	
	identified within the Environmental Action Plan and the	\checkmark
	construction activities)	
	Waste Management Plan	
	Hazardous Waste Registration No:	
	Waste transfer notes	\checkmark
	Waste Carriers License	\checkmark

Dealing with accidental leaks and skills

SPILLAGES OF OIL OR FUEL ARE POLLUTING THE ENVIRONMENT (THE WATER) VERY STRONG. SPILLAGES OF FUEL OR OIL INTO WATERCOURSES OR THE SEA OR ON LAND MAY CONSTITUTE AN OFFENCE UNDER ENVIRONMENTAL LEGISLATION. ALL COMPANIES ON SITE HAS TO MAKE SUITABLE CONTINGENCY ARRANGEMENTS IN THE EVENT OF A SPILLAGE.

SPILL KITS ARE TO BE LOCATED IN THE LOCATIONS WHERE LIQUIDS ARE HANDLED. IT IS REQUIRED THAT ALL STAFF OF ALL COMPANIES ON SITE WILL BE INFORMED ABOUT THE LOCATION OF SPILL KITS AND HOW TO USE THEM IN CASE OF EMERGENCY.

EMERGENCY SPILL PROCEDURE

1. ALL SITE PERSONNEL - DECIDE WHETHER THE SPILL IS WITHIN THEIR CONTROL OR OUTSIDE OF THEIR IMMEDIATE CONTROL.

IF SPILL IS WITHIN CONTROL, CONTAIN THE FLOW AND PREVENT ITFROM REACHING A WATERCOURSE OR ENTERING A DRAIN. COVER SPILL WITH ABSORBENT MATERIAL OR SAND. PROCEED WITH CLEAN UP (ENSURING THE CORRECT PPE IS WORN), AND THEN NOTIFY FOREMAN/AGENT.

USE THE SPILL KITS ON SITE. DISPOSE OF CLEAN UP MATERIALS AS HAZARDOUS WASTE.

IF OUTSIDE OF IMMEDIATE CONTROL, THEN;

RAISE ALARM - ADVISE FOREMAN/AGENT, AND CALL THE ENVIRONMENT AGENCY ON 0800 - 80 70 60.

ASSIST IN CLEAN UP PROCESS AS DIRECTED BY EMERGENCY SERVICES

- 2. IN THE EVENT OF MAJOR SPILLS, FOREMAN/AGENT WILL CONTACT SPECIALIST POLLUTION CONTROL EXPERTS.
- 3. FOREMAN/AGENT NOTIFY SITE MANAGER AND ENSURE AN INCIDENT REPORT FORM IS COMPLETED.

*WHENEVER POSSIBLE PLANT WILL BE USING IODEGRADABLE

HYDRAULIC OIL.

Appendix 4.4

NETWORK CONSTRAINTS



National significant infrastructure project in the Energy Sector Little Crow Solar Park, Scunthorpe

NETWORK CONSTRAINTS

On behalf of INRG Solar (Little Crow) Ltd

November 2018

1 Connection Details

The proposed Little Crow Solar Farm on the Land around High Santon Farm, Santon, Scunthorpe DN16 1XP, will be an electrical (grid) looped connection to the existing short section of underground 132kV cables within the proposed land parcel. Typically, the point of connection (POC) for a project of this size would be located outside the site boundary and in many instances would necessitate the laying of kilometres of underground cable at a substantial cost to connect to the electricity network and potentially rendering projects unviable.

The Northern Power Grid (NPG) network section is known as Keadby – Broughton – Teed – Scawby Brook overhead 132kV line circuit.

INRG has accepted the grid offer from NPG and secured the 99.9MW export capacity required for a project of this size. The grid offer accepted by INRG can only be used for the Little Crow Solar Farm and cannot under be transferred to any other site, as this would be deemed by the DNO as a significant alteration to the original application. The only viable connection voltage for a project of this size is 132kV and it requires the construction of a new 132kV sub-station on-site.



2 Local Network Constraints

The NPG Network Constraints Heat Map indicate that there are no further suitable points of connection (POC) from the Grid supply 132kV network following INRGs acceptance of the grid offer for the Little Crow project.

A further update of the Modification Works (Modd App) required by National Grid Electricity Transmission (NGET) design is being carried out by the NGET and NPG design team and is likely to be issued by the end of December 2018.

This status update is expected to confirm that the supply point (Keadby) has both a fault level and thermal capacity constraint. It is expected that the status update will propose that a new Super Grid Transformer (SGT) will be required possibly with a new 132kV switchboard to upgrade the Keadby substation prior to any additional projects connecting into that network. This will have a direct impact on the connection costs and timeline for future projects and may render them unviable in terms of cost and timescales.



www.sms-plc.com

Keadby Substation detailed technical Information

The lower voltage busbars of the Keadby substation:



Downstream Overall Classification: RED

Fault Level (%): 100%

This is the measure of the level of energy that could be supplied to a fault on the network. NPG's equipment is rated to withstand a given amount of fault level energy. Distributed Generation (DG) contributes to this energy during fault conditions and hence it has the potential to take it higher than the equipment is rated for. The current rating of the equipment is rated at 100%, therefore the equipment is at its maximum and no further DG can be installed on this network until NPG reinforce their network.



Voltage Constraint Issue: NO VOLTAGE CONSTRAINT



Physical Constraints: No Physical Constraint

The higher voltage circuits feeding the Keadby substation:

- Upstream Overall Classification: RED
- Voltage constraint issue: NO VOLTAGE CONSTRAINT
 - Potential for new Substation (MVA): 0

This is an indication of maximum DG that could be connected on the higher side of the local substation subject to thermal and voltage rise limitations on the circuit. This shows that zero (0) DG connections can be made on to Keadby substation.

4



Upstream Constraints Levels (MVA): 30

Key



Some Export Capacity

Export Capacity

3 Conclusion

The 99.9MW capacity which has been secured by INRG, has taken the NPG electricity network to its maximum fault level. Therefore, no further DG connections can be connected on to NPG's existing electricity network, within the area highlighted red in figure 2.

The 99.9MW capacity has also taken the NGET electricity network very close to and possibly over its network capability and will likely mean that NGET will need to install one SGT and in addition a 132kV switchboard to upgrade the Keadby substation. At the end of December 2018, NPG and NGET will be able to confirm if NGET need to reinforce their network, possibly making future projects in the region unviable due to costs and timescales.

Appendix 4.5

AIR QUALITY AND CARBON ASSESSMENT



National significant infrastructure project in the Energy Sector Little Crow Solar Park, Scunthorpe

AIR QUALITY AND CARBON ASSESSMENT

On behalf of INRG Solar (Little Crow) Ltd

November 2018

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Executive Summary

Bureau Veritas UK Ltd has been commissioned by INRG Solar (Little Crow) Ltd. to undertake an air quality assessment of construction traffic emissions together with a carbon offset assessment as a result of the proposed Little Crow Solar Park. The development site is located to the east of Scunthorpe, adjacent to the Harsco Steel works and is accessed via the B1208. The nearby settlement of Raventhorpe (<5 miles south of the proposed development) contains an existing 78.5ha solar farm

The development site currently consists of disused grassland/farmland and is bordered by the proposed construction traffic route, which is to run along the B1208 in the direction of the A18, A15 and M180. This route bypasses a number of pollution receptors; residential properties in Broughton, located 1km east of the proposed site boundary. The closest properties to the proposed site consists of two farm structures with at least one structure being used as a residential dwelling and are located east of the proposed site and North of Broughton at distances of 280m and 415m from the site boundary. The proposed Solar Park area is located within the boundary of an Air Quality Management Area (AQMA) declared by North Lincolnshire Council. The AQMA was declared due to exceedances of the 24-hour mean air quality objective for PM₁₀. The most recently recorded annual mean concentration of PM₁₀ from the closest monitoring site, CM3, reported an annual mean concentration of PM₁₀ from the closest monitoring site, CM3, reported an annual mean concentration of PM₁₀ annual mean AQS objective of $40\mu g/m^3$. Furthermore, there were no reported exceedances of the NO₂ annual mean air quality objective at any monitoring location within the council area.

Defra's 2017 background air pollution data for the proposed site suggests an annual mean background concentration of $11.2\mu g/m^3$ for NO₂ and $15.2\mu g/m^3$ for PM₁₀, which are both below the respective objectives (40µg/m³).

A qualitative dust and air quality assessment has been prepared to determine the significance of air quality and construction traffic dust impacts during the construction and operational phases of the proposed development, in addition to an assessment of the carbon footprint and potential savings introduced as a result of the site's introduction.

A qualitative assessment of impacts of construction activities upon air quality was undertaken following the Institute of Air Quality Management (IAQM) guidance methodology.

The main findings of the air quality assessment are summarised as follows:

- Following the construction dust assessment the development site is found, in relation to dust soiling, to be **negligible** during the construction phase of the proposed site. For the earthworks and trackout activities, the impact was found to be a **low risk**. In relation to human health impacts, the risk ratings are the same as with dust soiling for each of the three activities.
- Providing effective mitigation measures are implemented, such as those outlined in Section 5.1 of this report, impacts from dust emissions during the construction phase would be **not significant**.
- The estimated CO₂ offset from the Little Crow Solar Park is 35,186 tonnes for the first year taking into consideration the CO₂ produced as a result of the construction vehicle movements during the construction phase. The following years CO₂ offset will be greater as the construction phase works will have been completed.



1 Introduction

Bureau Veritas UK Ltd has been commissioned by INRG Solar (Little Crow) Ltd. to undertake an air quality assessment of construction traffic emissions together with a carbon offset assessment as a result of the proposed Little Crow Solar Park. The development site is located to the east of Scunthorpe, adjacent to the Harsco Steel works and is accessed via the B1208. The proposed Solar Park is approximated at 226.8ha with a maximum of 150MW generation per annum from the solar modules and 90MW pa from its battery storage facility. The nearby settlement of Raventhorpe (<5 miles south of the proposed development) contains an existing 78.5ha solar farm.

The most significant source of air pollution is likely to derive from construction related traffic during the construction phase of the development. The construction traffic route is proposed to run along the B1208 in the direction of the A18, A15 and M180. This route bypasses the closest pollution receptors; residential properties in Broughton, located to the east of the proposed site boundary.

North Lincolnshire Council has declared an Air Quality Management Area (AQMA), which incorporates part of Scunthorpe town centre and an area east of Scunthorpe, including the Harsco Steel works site. The proposed Solar Park is located within this AQMA. The AQMA was declared due to exceedances of the 24-hour mean air quality objective for PM₁₀. The most recently recorded annual mean concentration of PM₁₀ from the closest monitoring site, CM3, reported an annual mean concentration of 22µg/m³ in 2016 together with 25 exceedances of the 24-hour mean objective (50μ g/m³ not to be exceeded more than 35 times a year). All nearby monitoring locations also reported below the PM₁₀ annual mean AQS objective of 40μ g/m³. Furthermore, there were no reported exceedances of the NO₂ annual mean air quality objective at any monitoring location within the council area.

1.1 Scope of Assessment

Defra's 2017 background air pollution data for the proposed site suggests an annual mean background concentration of $11.2\mu g/m^3$ for NO₂ and $15.2\mu g/m^3$ for PM₁₀, which are both below the respective objectives (40µg/m³).

As it is anticipated that the proposed development will introduce additional road traffic and construction dust and, with consideration to the nearby AQMA, a construction phase impact assessment is to firstly be undertaken together with the carbon offset assessment. The scope of this assessment is therefore to undertake:

- A qualitative assessment of dust and air quality impacts during the construction works. The construction dust assessment will involve the use of a Geographic Information System (GIS) and be undertaken with reference to current best-practice guidance, such as those published by the Institute of Air Quality Management (IAQM).
- Construction related road traffic emissions will be considered relative to published guidance. Based upon the preliminary construction traffic management plan and indicative flows provided therein, Bureau Veritas do not consider there to be a requirement for detailed assessment of the road traffic emissions, rather a screening based assessment against IAQM criteria is considered sufficient.
- Mitigation measures during the construction phase including measures to control the emission of dust and dirt during construction and demolition.
- The carbon footprint of the construction phase activities, in the context of the associated traffic generation, will be calculated and subtracted against the carbon savings associated with the generation of electricity via solar power.

The Site plan and location is illustrated in Figure 1.1.

BUREAU VERITAS

Figure 1.1 – Site Location





2 Air Quality – Legislative Context

2.1 Air Quality Strategy

The importance of existing and future pollutant concentrations can be assessed in relation to the national air quality standards and objectives established by Government. The Air Quality Strategy (AQS) provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations to protect human health. The air quality objectives incorporated in the AQS and the UK Legislation are derived from Limit Values prescribed in the EU Directives transposed into national legislation by Member States.

The CAFE (Clean Air for Europe) programme was initiated in the late 1990s to draw together previous directives into a single EU Directive on air quality. The CAFE Directive¹ has been adopted and replaces all previous air quality Directives, except the 4th Daughter Directive². The Directive introduces new obligatory standards for PM_{2.5} for Government but places no statutory duty on local government to work towards achievement of these standards.

The EU Limit Values are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites).

The air quality objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. Typically these include residential properties and schools/care homes for long-term (i.e. annual mean) pollutant objectives and high streets for short-term (i.e. 1-hour) pollutant objectives. Table 2.1 taken from LAQM.TG(16) provides an indication of those locations that may or may not be relevant for each averaging period. Typically these include residential properties and schools/care homes for long-term (i.e. annual mean) pollutant objectives.

This assessment focuses on, NO_2 , PM_{10} and $PM_{2.5}$ as these are the pollutants of principal concern arising from road traffic and construction dust.

Averaging Period	AQ Objectives should apply at:	AQ Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed Building facades of residential properties, schools, hospitals,	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence.
	care homes etc.	Gardens of residential properties.
		Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

Table 2.1 – Examples of where the Air Qual	lity Objectives should apply
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¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

² Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic hydrocarbons in ambient air.



Averaging Period	AQ Objectives should apply at:	AQ Objectives should generally not apply at:
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties ¹ .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets).	Kerbside sites where the public would not be expected to have regular access.
	Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more.	
	Any outdoor locations at which the public may be expected to spend one hour or longer.	
15-minute mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

Note ¹ For gardens and playgrounds, such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

Pollutant	AQS Objective	Concentration Measured as:	Date for Achievement	
Nitrogen Dioxide (NO₂)	200µg/m³ not to be exceeded more than 18 times per year	1-hour mean	31 December 2005	
	40µg/m³	Annual mean	31 December 2005	
Particles	50µg/m³ not to be exceeded more than 7 times per year	24-hour mean	31 st December 2004	
(PM ₁₀)	40µg/m³	Annual mean	31 st December 2004	
	25µg/m³	Annual mean	2020	
Particles (PM _{2.5})	Target of 15% reduction in concentrations at urban background	Annual Mean	2020	

Table 2.2 – Relevant National AQ Objectives for the Assessed Pollutants

2.2 Local Air Quality Management (LAQM)

Part IV of the Environment Act 1995³ places a statutory duty on local authorities to periodically Review and Assess the current and future air quality within their area, and determine whether they are likely to meet the objectives set down by Government for a number of pollutants – a process known a Local Air Quality Management (LAQM). The objectives that apply to LAQM are defined for seven pollutants: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulate matter.

Where the results of the Review and Assessment process highlight that problems in the attainment of health-based objectives for air quality will arise, the authority is required to declare an AQMA – a

³ <u>http://www.legislation.gov.uk/ukpga/1995/25/part/IV</u>



geographic area defined by high concentrations of pollution and exceedances of health-based standards.

Where an authority has declared an AQMA, and development is proposed to take place either within or near the declared area, further deterioration to air quality resulting from a proposed development can be a potential barrier to gaining consent for the development proposal. Similarly, where a development would lead to an increase of the population within an AQMA, the protection of residents against the adverse long-term impacts of exposure to existing poor air quality can provide the barrier to consent. As such, after a high number of declarations across the UK, it has become standard practice for planning authorities to require an air quality assessment to be carried out for a proposed development (even where the size and nature of the development indicates that a formal Environmental Impact Assessment (EIA) is not required).

One of the objectives of the LAQM regime is for local authorities to enhance integration of air quality into the planning process. Current LAQM Policy Guidance⁴ clearly recognises land-use planning as having a significant role in terms of reducing population exposure to elevated pollutant concentrations. Generally, the decisions made on land-use allocation can play a major role in improving the health of the population, particularly at sensitive locations – such as schools, hospitals and dense residential areas.

2.3 Air Quality Guidance for Construction Sites

There are a number of regulatory and legislative constraints in place to control pollution from construction and demolition activities. The Building Act 1984 and subsequent Building Regulations 2000 are in place to ensure the safety of people in and around the building during work. Part III of the Environmental Protection Act (EPA) 1990 identifies the emission of dust from construction sites as having the potential to be a statutory nuisance and requires its control under Section 80.

A number of best practice guides are available⁵, which provide a basis against which Codes of Construction Practice may be benchmarked. The Greater London Authority (GLA) in partnership with London Councils has produced a guidance document⁶ that recommends mitigation measures, depending upon the scale of development and its location, to control nuisance dust from various activities during construction and demolition phases.

BRE (Building Research Establishment) has also produced a report⁷ that outlines the measures to control the emissions of nuisance dust.

In December 2011, the IAQM published a guidance document to assess the impact of construction on air quality. The guidance was reviewed in January 2012⁸ and updated in February 2014 to incorporate new evidence⁹. The approach adopted in this assessment is based on adopting the methodology published in the 2014 version of the IAQM guidance.

The significance of the impact of the construction phase on air quality has been determined through application of the criteria outlined in IAQM construction guidance.

⁴ LAQM Policy Guidance LAQM.PG(16) – April 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.

⁵ Kukadia, Upton, Grimwood and Yu (2003) BRE Pollution Control Guides: Controlling particles, vapours and noise pollution from construction sites. BRE Publications.

⁶ Mayor of London (2014). The control of dust and emissions during construction and demolition – Supplementary Planning Guidance. Produced in partnership by the Greater London Authority and London Councils.

⁷ Kukadia V, Upton S, Hall D (2003). Control of dust from construction and demolition activities. BRE Publications.

⁸ Institute of Air Quality Management (IAQM) (2012) Guidance on the Assessment of the Impacts of Construction on Air

⁹ Institute of Air Quality Management (IAQM) (2014) *Guidance on the Assessment of Dust from Demolition and Construction.*



2.4 Background Concentrations Used in the Assessment

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution. The data sets include annual average concentration estimates for NO_x, NO₂, PM₁₀ and PM_{2.5}, using a base year of 2015. The Pollution Climate Mapping (PCM) model on which these are based is semi-empirical in nature; it uses the National Atmospheric Emissions Inventory (NAEI) emissions to model-predict the concentrations of pollutants at the centroid of each 1km grid square, but then calibrates these concentrations in relation to actual monitoring data.

Annual mean background concentrations for use in this assessment for NO_x, NO₂, PM_{2.5} and PM₁₀ have derived from the background maps available on the Defra UK-Air website¹⁰. Sample locations include 1km grid squares within the proposed development itself and two receptor sites located 280m and 1km east of the proposed site.

The mapped background concentrations for the base year of 2017 and the sample year of 2020 are presented in Table 2.3.

Grid Square (X,Y)	2017 Annual Mean Background Concentration (µg/m³)			2020 Annual Mean Background Concentration (µg/m³)				
	NOx	NO ₂	PM ₁₀	PM _{2.5}	NOx	NO ₂	PM 10	PM _{2.5}
494500, 410500	15.2	11.2	15.2	9.5	13.9	10.3	15.0	9.3
494500, 409500	15.0	11.1	14.8	9.4	13.6	10.1	14.5	9.1
494500, 408500	14.8	10.9	13.5	8.7	13.1	9.8	13.2	8.5
AQS objective	-	40	40	25	-	40	40	25

Table 2.3 – Defra Background Pollutant Concentrations

All of the mapped background concentrations presented are well below the respective annual mean air quality objectives.

¹⁰ https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015



3 Assessment Methodology

The approach applied to this assessment has been based on the following:

- A qualitative assessment of dust and air quality impacts during the construction works. The construction dust assessment will involve the use of a Geographic Information System (GIS) and be undertaken with reference to current best-practice guidance, such as those published by the Institute of Air Quality Management (IAQM).
- Construction related road traffic emissions will be considered relative to published guidance. Based upon the preliminary construction traffic management plan and indicative flows provided therein, Bureau Veritas do not consider there to be a requirement for detailed assessment of the road traffic emissions, rather a screening based assessment against IAQM criteria is considered sufficient.
- Mitigation measures during the construction phase including measures to control the emission of dust and dirt during construction and demolition.
- The carbon footprint of the construction phase activities, in the context of the associated traffic generation, will be calculated and subtracted against the carbon savings associated with the generation of electricity via solar power.

3.1 Construction Effects

The assessment of potential dust/PM₁₀ effects in relation to the development's construction phase has been undertaken qualitatively in accordance with IAQM Guidance¹¹. The guidance proposes a method to assess the significance of construction dust impacts by considering the annoyance due to dust soiling, as well as harm to ecological receptors and the risk of health effects due to significant increases in dust/PM₁₀ concentrations.

Construction site activities are divided into four types to reflect their different potential impacts. These activities are:

- Demolition an activity involved with the removal of an existing structure or structures;
- Earthworks the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction an activity involved in the provision of a new structure; and
- Trackout the transport of dust and dirt from the site onto the public road network. This arises when lorries leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.

A detailed assessment is required where a sensitive human receptor is located within 350m from the Site boundary and/or within 50m of the route(s) used by vehicles on the public highway, up to 500m from the Site entrance(s).

There are no notable ecological receptors within a 200m vicinity of the development. There are, however, two residential properties less than 350m from the boundary of the Site. There are a number of properties approximately1km of the Site, notably the residential town of Broughton, located east of the proposed development.

¹¹ Institute of Air Quality Management (IAQM) (2014) *Guidance on the Assessment of Dust from Demolition and Construction.*



The first step of the detailed assessment is to assess the risk of dust impacts. This is undertaken separately for each of the four activities (demolition, earthworks, construction and trackout) and takes account of:

- The scale and nature of the works, which determines the potential dust emission magnitude; and
- The sensitivity of the area.

These factors are combined to give an estimate of the risk of dust impacts occurring. Risks are described in terms of there being a low, medium or high risk of dust impact for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgment, one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.

Site-specific mitigation for each of the four potential activities is then determined based on the risk of dust impacts identified. Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be taken into account. Professional judgment is then employed to examine the residual dust effects assuming mitigation to determine whether or not they are significant.

In regards to construction phase vehicle movements, the Land-Use Planning & Development Control: Planning for Air Quality IAQM guidance has been used to assess the change in traffic flow during the construction period. The development will cause a significant change in Heavy Duty Vehicles (HDVs) if the change of HDV flow is greater than 100 annual average daily traffic (AADT) outside of an AQMA. Estimated vehicle numbers as specified in the Construction Management Transport Plan will be compared against this criterion to assess whether construction vehicles will result in a significant impact on the surrounding area.

3.2 Carbon Footprint

There are various degrees of detail which can be employed to calculating the carbon offset of a development. However, due to the nature of the site and the type of construction phase activities undertaken, the carbon offset assessment will focus on the traffic generation associated with the construction phase.

The carbon dioxide (CO₂) generated from the construction traffic will be calculated using the UK Government Greenhouse Gas (GHG) conversion factors provided by Defra for company reporting¹². The most recent factors were published in July 2018 and are deemed to be the most relevant for the study. Factors were provided for a breakdown of vehicle types. The total CO₂ produced was calculated based on the total kilometres/miles each vehicle type travelled.

The total CO_2 generated as a result of the construction phase vehicle movements will be subtracted against the carbon saving associated with the generation of electricity via solar power. The carbon savings will be quantified based on a direct comparison against the amount of CO_2 produced if an equal amount of electricity was produced using alternative fuels operated on the National Grid. The July 2018 GHG conversion factor spread sheet includes an estimated average amount of CO_2 emitted for each kWh of electricity produced for the grid assuming a range of energy sources e.g. coal, gas and renewable electricity generation.

The total annual CO_2 offset from the Little Crow Solar Park will then be calculated taking into account the CO_2 generated during the construction phase.

¹² https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018



4 Results

4.1 Construction Phase

4.1.1 Dust/PM₁₀ Emissions

This assessment of dust/PM₁₀ presents the effects which are likely to be relevant both prior to and following the use of the appropriate mitigation measures on-site, which would be outlined by the site contractor and in a site Dust Management Plan (DMP). As per the IAQM guidance¹², the risk associated with the site to potentially generate dust/PM₁₀ is identified. Potential unmitigated effects at receptor locations are determined, and site-specific recommendations are then made to ensure residual dust/PM₁₀ effects associated with the construction phase are not significant.

The assessment of construction dust will focus on dust arising from three of the dust producing construction activities outlined in the IAQM guidance¹² (i.e. earthworks, construction and trackout). No demolition is proposed on site and therefore has been scoped out of the assessment.

Earthworks

Potential sources of impacts associated with earthworks/ground preparation activities include fugitive dust/ PM_{10} emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. The total site area is greater than $10,000m^2$ and although it is not anticipated that there will be anything larger than a moderate number of earth moving vehicles on site at any one time, the worst case scenario has been assumed due to the scale of the site. The dust emission magnitude for earthworks is therefore considered to be large.

Construction

Potential sources of impacts associated with construction activities include fugitive dust/PM₁₀ emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. Construction activities at the development site are expected to include a total building volume of less than 25,000 with a low potential for dust release as the solar panels to be installed will be largely metal structures secured with metal bolts into the ground. The dust emission magnitude for construction is therefore considered to be small.

Trackout

Dust emissions during trackout from the site may occur from the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. The number of predicted outward HDV (i.e. >3.5 tonne) movements in any one day is not anticipated to be in excess of 50 at any point during construction, however as the unpaved roadways are in excess of 100m, a worst case assumption must be employed. The dust emission magnitude for trackout is therefore considered to be large.

Summary

A summary of the dust emission magnitude for the four activities is detailed in Table 4.1.

Table 4.1 – Construction Dust Emission Magnitude

Activity	Dust Emission Magnitude
Earthworks	Large
Construction	Small
Trackout	Large



Sensitivity of the Area

The residential area of Broughton is located in excess of 1km east of the site and resides a population of over 5,000 residents, which is supported by a relative number of properties and services¹³. The closest properties to the proposed site consists of two farm structures with at least one structure being used as a residential dwelling and are located east of the proposed site and North of Broughton at distances of 280m and 415m from the site boundary. These two properties are accessible from the main site access route B1207 road and are bordered to the north by a narrower loose tracked road which is also to be used for site access during and following construction. Due to the nature and proximity of nearby properties, given the low number of nearby receptors identified, the sensitivity of the area with respect to the dust soiling effects on people and property in relation to earthworks, construction and trackout activities is therefore considered to be low.

The existing background PM_{10} concentration is 15.2µg/m³; which is below the AQS objective. Given the above information regarding the number of receptors in excess of 200m of the Site boundary and within 60m from the main access route, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is therefore low.

There are no designated ecological sites within 50m of the development Site as listed on the Defra Magic Map resource¹⁴. In accordance with the IAQM methodology¹², there is no need to consider potential dust effects on ecological receptors further as part of this assessment.

A summary of the sensitivity of the surrounding area is detailed in Table 4.2 below.

Table 4.2 – Sensitivity of Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area		
Potential impact	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Low
Human Health	Low	Low	Low

Risk of Dust Impacts

The risk of dust impacts is defined using Tables 7, 8 and 9 in the IAQM guidance¹² for earthworks, construction and trackout respectively. The dust emission magnitude classes in Table 4.1 combined with the sensitivity of surrounding area classes in Table 4.2, result in the site risk categories as shown in Table 4.3.

Table 4.3 – Summary of Dust Risk

Potential Impact	Risk		
Potential impact	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Negligible	Low Risk
Human Health	Low Risk	Negligible	Low Risk

Following the construction dust assessment, the development Site is found to be, at worst, a Low Risk in relation to dust soiling effects on people and property and a Low Risk in relation to human health impacts, as summarised in Table 4.3.

Due to the above designation, mitigation measures are required to ensure that any potential impacts arising from the construction phase of the proposed development are reduced and, where possible, completely removed. Providing effective mitigation measures are implemented, such as those outlined in Section 5.1, construction dust impacts are considered to be not significant.

¹³ https://www.ons.gov.uk/help/localstatistics

¹⁴ Magic Maps (2017), available online at <u>http://www.natureonthemap.naturalengland.org.uk/</u>



4.1.2 Construction Vehicle Emissions

The construction phase is proposed to take place over a 47 week period, with a 26 week period identified for site deliveries¹⁵. During thisperiod there will be a number of HDV movements delivering materials for construction activities on site. It is estimated that the total number of two-way vehicle movements during the construction phase of both the solar farm and battery storage facility will be4,472. It is expected the majority of these will be associated with the delivery of the solar modules and mounting structures. In total a maximum of 25 AADT is expected during the construction phase period.

The average number of two-way vehicle movements per day is well below the 100 AADT criteria. Therefore it is not considered that there will be any potential for significant air quality effects from development related road traffic emissions during the construction phase. Furthermore, the construction vehicle designated route to the site actively avoids residential areas to minimise impacts. Such potential impacts have therefore been scoped out from requiring a detailed assessment on the basis of their low and negligible impacts.

4.2 **Operational Phase**

General maintenance of the site will be carried out by the existing farm tenant and additional equipment maintenance performed approximately four times a year. Therefore it is unlikely that the number of vehicle movements during the operational phase will exceed those of the construction phase. As a result, operational phase impacts associated with road traffic emissions are deemed to be not significant and therefore scoped out of requiring a detailed assessment.

¹⁵ Paragraph 5.1 of TPA's 'Construction Traffic Management Plan', November 2018



5 Recommended Mitigation Measures

5.1 Short-term Impacts during Construction

As discussed in Section 4, construction impacts associated to the proposed development would result in the generation of a small magnitude of dust and PM_{10} . It is considered that employment of construction best practice should ensure that no problematic dust or PM_{10} concentrations occur during the construction process.

IAQM guidance¹² outlines a number of site specific mitigation measures based on the assessed site risk. The measures are grouped into those which are 'highly recommended' (i.e. should be employed) and those which are 'desirable' (i.e. should be considered under best practice).

As the site is classed as low risk the following mitigation measures are highly recommended:

- With respect to communications:
 - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
 - o Display the head or regional office contact information.
- With respect to site management:
 - Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
 - o Make the complaints log available to the local authority when asked.
 - Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- With respect to monitoring:
 - Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
 - Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- With respect to preparing and maintaining the site:
 - Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
 - Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- With respect to operating vehicle/machinery and sustainable travel:
 - o Ensure all vehicles switch off engines when stationary no idling vehicles.
 - Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.



- With respect to operations:
 - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
 - Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
 - o Use enclosed chutes and conveyors and covered skips.
 - Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- With respect to waste management:
 - o Avoid bonfires and burning of waste materials.
 - Additionally as the site is classed as low risk the following mitigation measures are desirable:
- With respect to communications:
 - Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time PM₁₀ continuous monitoring and/or visual inspections.
- With respect to monitoring:
 - Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.
- With respect to preparing and maintaining the site:
 - Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
 - Keep site fencing, barriers and scaffolding clean using wet methods.
 - Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
 - o Cover, seed or fence stockpiles to prevent wind whipping.
- With respect to operating vehicle/machinery and sustainable travel:
 - Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the



approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

- With respect to operations:
 - Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

As the site is classed as low risk for earthworks no mitigation measures are required with respect to earthworks.

As the site is classed as low risk for trackout the following mitigation measures are desirable:

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).



6 Carbon Footprint

The Little Crow Solar Park is expected to generate 150MW of clean, renewable energy from the photovoltaic panels installed at the solar park each year, with an additional 90MW battery storage capability. It is estimated the power generated will be able to service 36,000 homes a year. The electricity generated will connect to the existing local 132kVA electrical network which runs through the proposed site.

In order to assess the carbon savings from solar panels, a calculation can be used which assumes that all of the generated solar electricity directly displaces 'grid' electricity. In regards to the Little Crow Solar Park, the calculation will assume the power stations producing 'grid' electricity will be producing up to 150MW/h less electricity. In order to calculate the saving the 'average grid carbon intensity' i.e. the average amount of CO₂ emitted for each kWh of electricity produced for the grid, is required. According to the July 2018 recommended conversion factors provided by Defra as part of its Environmental Reporting Guidelines¹⁶, it is estimated that approximately 0.283kg of CO₂ is produced per kWh of electricity from the grid.

Table 6.1 shows the expected kWh profile for the first calendar year from January to December (based on a 135MWp) installation. The total CO_2 savings over the year is therefore 0.283kg x 125,834,402kWh = 35,611,136kg CO_2 (35,611 tonnes per year). The efficiency of the solar panels has been calculated as approximately 10%, based on the provided information. This is considered a conservative assumption of the efficiency of the solar panels per annum.

Month	kWh
Jan	3,797,939
Feb	6,074,880
Mar	9,739,809
Apr	14,161,443
Мау	16,605,001
Jun	16,313,813
Jul	17,167,282
Aug	15,302,901
Sep	11,252,122
Oct	7,832,672
Nov	4,686,762
Dec	2,899,778
Total	125,834,402

Table 6.1 – Expected kWh Profile

The construction of the solar park will inevitably generate CO_2 emissions. Therefore, CO_2 generated needs to be factored into the total CO_2 savings from the park. The most significant source of CO_2 emissions during the construction phase will be derived from the construction vehicles travelling to and from the site. Table 6.2 provides details with regards to the estimated total amount of CO_2 generated by the construction vehicles visiting the site. The estimated kg CO_2 per km for each vehicle type has been derived from the July 2018 recommended conversion factors provided by Defra.

¹⁶ https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018



Fable 6.2 – Constructio	n Vehicle Generated C	O 2
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Vehicle Type	Total km travelled*	kg CO₂ per km	Total Number of Vehicles	Total kg CO2
Rigid HGVs	200	0.80746	110	17,764
Articulated HGVs	200	0.93428	4,200	784,795
Vans	200	0.25299	3,290	166,467
			Total Tonnes of CO ₂	969
Notes: * As no distance information was available a distance of 200km has been assumed for each vehicle. ¹ All rigids and average laden ² All artics and average laden				

³ Assumed 50% diesel and 50% petrol vans

Overall, the total CO_2 offset as a result of the Little Crow Solar Park, taking into account the CO_2 generated as a result of the construction vehicle activities, is 34,642 tonnes. It should be noted that the CO_2 generated as a result of the construction vehicles will be a onetime occurrence and should not be factored into future years.



7 Conclusions

Bureau Veritas UK Ltd has been commissioned by INRG Solar (Little Crow) Ltd. to undertake an air quality assessment of construction traffic emissions together with a carbon offset assessment as a result of the proposed Little Crow Solar Park. The development site is located to the east of Scunthorpe, adjacent to the Harsco Steel works and is accessed via the B1208.

An air quality assessment has been prepared to determine the significance of air quality impacts during the construction and operational phases of the proposed development, in addition to confirming the suitability of the Site for the proposed use.

A qualitative assessment of impacts of construction activities upon air quality was undertaken following the Institute of Air Quality Management (IAQM) guidance¹². methodology. A quantitative assessment of from the impact of road traffic emissions on air quality was undertaken following IAQM dust guidance¹².

The carbon footprint of the construction phase activities, in the context of the associated traffic generation, was calculated and subtracted against the carbon savings associated with the generation of electricity via solar power. The CO₂ generated from the construction traffic was calculated using the UK Government Greenhouse Gas (GHG) conversion factors provided by Defra for company reporting¹⁷.

The carbon saving from generating electricity via solar power was further quantified based on a direct comparison against the amount of CO_2 produced where an equal amount of electricity is produced using alternative fuels operated on the National Grid. The July 2018 GHG conversion factor spread sheet includes an estimated average amount of CO_2 emitted for each kWh of electricity produced for the grid assuming a range of energy sources e.g. coal, gas and renewable electricity generation. The total annual CO_2 offset was calculated based on this factor.

The following section provides the conclusions of this assessment.

7.1 Construction Effects

The assessment of dust/PM₁₀ effects from the construction phase of the development was subject to a qualitative assessment following IAQM guidance¹². Following the construction dust assessment the development site is found, in relation to dust soiling, to be at worst low risk from earthworks, construction and trackout. In relation to human health impacts, the development Site is found to be at worst low risk for all three activities.

In regards to construction phase vehicle movements, the average number of two-way HDV movements per day is expected to be well below the 100 AADT criteria. Therefore it is not considered that there will be any potential for significant air quality effects from development related road traffic emissions during the construction phase. Such potential impacts have therefore been scoped out from requiring a detailed assessment on the basis of their low and negligible impacts.

Effective mitigation measures were not specified as there is no risk defined. Furthermore, impacts from dust emissions during the construction phase would be **not significant**, which is supported by the low levels of annual mean emissions as detailed in Section 2.4. It is considered that despite there not being a defined risk present, it is still advisable that a number of good practice measures are implemented, such as considerate traffic speed and observing minimal dust dispersion where at all possible during construction and transport activities.

7.2 Operational Effects

Maintenance vehicles are only expected to visit the site four times a year. Therefore it is unlikely that the number of vehicle movements during the operational phase will exceed those of the construction

¹⁷ https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018



phase. As a result, operational phase impacts associated with road traffic emissions are deemed to be not significant and therefore scoped out of requiring a detailed assessment.

7.3 Carbon Footprint

Based on the calculations in Section 6, it is estimated the Little Crow Solar Park will offset 34,642 tonnes of CO_2 in the first year. This value has taken into consideration the estimated amount of CO_2 generated as a result of the construction vehicles transporting materials to and from the site during the construction phase. A greater carbon saving will be experienced in the future years as all construction activities would have been completed by the end of the first year.

APPENDIX 4.6

DRAFT DEVELOPMENT CONSENT ORDER

STATUTORY INSTRUMENTS

201[] No.

INFRASTRUCTURE PLANNING

LITTLE CROW SOLAR PARK

Order 201[]

Made	-	-	-	-	***
Coming in	ıto fo	orce	-	-	***

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SCHEDULES

SCHEDULE 1 — AUTHORISED DEVELOPMENT SCHEDULE 2 — REQUIREMENTS [NOT INCLUDED IN INITIAL DRAFT]

An application has been made to the Secretary of State under section 37 114, 115 and 120 of the Planning Act 2008(**a**) ("the 2008 Act") in accordance with the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009(**b**) for an Order granting development consent.

The application was examined by a [single appointed person] (appointed by the Secretary of State) pursuant to Chapter 3 of Part 6 of the 2008 Act and carried out in accordance with Chapter 4 of Part 6 of the 2008 Act and the Infrastructure Planning (Examination Procedure) Rules 2010(c).

The single appointed person having considered the representations made and not withdrawn and the application together with the accompanying documents, in accordance with section 83(1) and (2) of the 2008 Act, has submitted a report and recommendation to the Secretary of State.

The Secretary of State, having considered the representations made and not withdrawn, and the report of the single appointed person, has decided to make an Order granting development consent for the development described in the application [with modifications which in the opinion of the Secretary of State do not make any substantial changes to the proposals comprised in the application].

The Secretary of State, in exercise of the powers conferred by sections 114, 115 and 120 of the 2008 Act, makes the following Order—

PART 1

PRELIMINARY

Citation and commencement

1. This Order may be cited as the Little Crow Solar Park Order 201[].

⁽a) 2008.c.29 Section 37 was amended by section 137(5) of, and paragraph 5 of Schedule 13(1) to, the Localism Act 2011 (c.20). Section 83(1) was amended by paragraph 35 of that Schedule. Section 114 was amended by paragraph 55 of that Schedule. Section 120 was amended by section 140 of, and paragraph 60 of Schedule 13(1) to, that Act.

⁽b) S.I. 2009/2664, as amended by the Localism Act 2011 (Infrastructure Planning) (Consequential Amendments) Regulations 2012 (S.I. 2012/635) and the Infrastructure Planning (Prescribed Consultees and Interested Parties etc) (Amendment) Regulations 2013 (S.I.2013/522). There are other amendments to the Regulations which are not relevant to this Order. [CHECK]

⁽c) S.I. 2010/103, amended by S.I. 21012/635.

Interpretation

2.—(1) In this Order except where provided otherwise—

"the 1961 Act" means the Land Compensation Act 1961(a);

"the 1965 Act" means the Compulsory Purchase Act 1965(b);

"the 1980 Act" means the Highways Act 1980(c);

"the 1990 Act" means the Town and Country Planning Act 1990(d);

"the 1991 Act" mean means the New Roads and Street Works Act 1991(e);

"the 2008 Act" means the Planning Act 2008;

"address" includes any number or address for the purposes of electronic transmission;

"apparatus" has the same meaning as in section 105(1) of the 1991 Act;

"authorised development" means the development and associated development described in Schedule 1 (authorised development) and any other development authorised by this Order, which is development within the meaning of section 32 of the 2008 Act;

"building" includes any structure or erection or any part of a building, structure or erection;

"CCTV" means a closed circuit television security system;

"commence" means beginning to carry out any material operation (as defined in section 56(4) of the 1990 Act) forming part of the authorised development other than operations consisting of archaeological investigations, investigations for the purpose of assessing ground conditions, remedial work in respect of any contamination or other adverse ground conditions, erection of any temporary means of enclosure, and the temporary display of site notices or advertisements, and "commencement" is to be construed accordingly;

"construction compound" means a compound including central offices, welfare facilities, accommodation facilities, and storage for construction of the authorised project; "decommissioning plan" means the document certified as the decommissioning plan by the Secretary of State for the purposes of this Order under article 34 (certification of plans and documents etc);

"electronic transmission" means a communication transmitted:

(a) by means of an electronic communications network; or

(b) by other means but while in electronic form;

"environmental statement" means the document(s) certified by the Secretary of State as the environmental statement for the purposes of this Order;

"highway authority" has the same meaning as in the 1980 Act;

⁽a) 1961 c. 33 Section 2(2) was amended by section 193 of, and paragraph 5 of Schedule 33 to, the Local Government, Planning and Land Act 1980 (c. 65). There are other amendments to the 1961 Act which are not relevant to this Order.

⁽b) 1965 c. 56.

⁽c) 1980 c. 66 1980 c.66. Section 1(1) was amended by section 21(2) of the New Roads and Street Works Act 1991 (c.22); sections 1(2), 1(3) and l(4) were amended by section 8 of, and paragraph (1) of Schedule 4 to, the Local Government Act 1985 (c. 51); section l(2A) was inserted, and section 1(3) was amended, by section 259 (1), (2) and (3) of the Greater London Authority Act 1999 (c. 29,. Section 36(2) was amended by section 4(1) of, and paragraphs 47(a) and (b) of Schedule 2 to, the Housing (Consequential Provisions) Act 1985 (c. 71), by S.I. 2006/1177, by section 4 of, and paragraph 45(3) of Schedule 2 to, the Planning (Consequential Provisions) Act 1990 (c. 11), by section 64(1) (2) and (3) of the Transport and Works Act (e. 42) and by section 57 of, and paragraph 5 of Part 1 of Schedule 6 to, the Countryside and Rights of Way Act 2000 (c. 37); section 36(3A) was inserted by section 64(4) of the Transport and Works Act 1992 and was amended by S.I. 2006/1177; section 36(6) was amended by section 8 of, and paragraph 7 of Schedule 7 to, the Local Government Act 1985 (c. 51); and section 329 was amended by section 112(4) of, and Schedule 18 to, the Electricity Act 1989 (c. 29) and by section 190(3) of, and Part 1 of Schedule 12 to, the Water Act 1989 (c. 15). There are other amendments to the 1980 Act which are not relevant to this Order.

⁽d) 1990 c. 8. Section 2060) was amended by section 192(8) of, and paragraphs 7 and 11 of Schedule 8 to, the Planning Act 2008 (c 29) (date in force to be appointed see section 241(3), (4)(a), (c) of the 2008 Act). There are other amendments to the 1990 Act which are not relevant to this Order.

⁽e) 1991 c. 22. Section 48(sA) was inserted by section 124 of the Local Transport Act 2008 (c. 26). Sections 78(4), 80(4), and 83(4) were amended by section 40 of, and Schedule 1 to, the Traffic Management Act 2004 (c. 18).

"INRG Solar (Little Crow) Ltd" means the company of that name, company number 11136483 whose registered office is at Account 1684601, International House, 223 Regent Street, London, England W1B 2QD;

"inverter" means electrical equipment required to convert direct current power generated by the solar panels to alternating current power;

"the land plan" means the plan certified by the Secretary of State as the land plan for the purposes of this Order;

"maintain" includes inspect, repair, adjust, alter, remove, reconstruct or replace in relation to the authorised development, provided such works do not give rise to any materially new or materially different environmental effects to those identified in the environmental statement; and any derivative of "maintain" is to be construed accordingly;

"mounting structure" means a frame or rack with twin posts designed to support the solar panels using central inverters made of galvanised steel or other material and mounted in piles driven into the ground;

"Order limits" means the limits shown on the land plan within which the authorised development may be carried out;

"relevant planning authority" means the planning authority for North Lincolnshire or such other planning authority for the area in which the authorised development is situated;

"requirement" means a requirement set out in Schedule 2 (requirements) and a reference to a numbered requirement is a reference to the requirement set out in the paragraph of that Schedule with the same number;

"rights of way plan" means the plan certified as the rights of way plan by the Secretary of State for the purposes of this Order under article 34 (certification of plans and documents etc.);

"Secretary of State" means the Secretary of State for Business, Energy and Industrial Strategy;

"solar panel" means a solar photovoltaic panel designed to convert solar irradiance to electrical energy fitted to mounting structures;

"transformer" means a structure containing electrical switch gear serving to transform electricity generated by the solar panels to a higher voltage;

"undertaker" means INRG Solar (Little Crow) Limited, company number 11136483, whose registered office is at Account 1684601, International House, 223 Regent Street, London, England W1B 2QD;

"watercourse" includes all rivers, streams, ditches, drains, canals, cuts, culverts, dykes, sluices, sewers and passages through which water flows except a public sewer or drain;

"work" means a work set out in Schedule 1; and a reference to a work designated by a number, or by a combination of letters and numbers, is a reference to the work so designated in that Schedule;

"the works plans" means the plans certified by the Secretary of State as the works plans for the purposes of this Order.

(2) Reference in this Order to rights over land include references to rights to do or to place and maintain, anything in, on or under land or in the airspace above its surface.

(3) All distances, directions and lengths referred to in this Order are approximate and distances between points on a work are taken lo be measured along that work.

(4) In this Order "includes" must be construed without limitation.

(5) References in this Order to any statutory body include that body's successor bodies as from time to lime have jurisdiction in relation to the authorised development.

PART 2

PRINCIPAL POWERS

Development consent etc. granted by the Order

3.—(1) Subject to the provisions of this Order including the requirements in Schedule 2 the undertaker is granted development consent for the authorised development to be carried out within the Order limits.

(2) In constructing or maintaining a work the undertaker may deviate laterally from the lines or situations of the authorised development within the limits of deviation relating to that work shown on the works plans.

Maintenance of authorised development

4.—(1) The undertaker may at any time maintain the authorised development, except to the extent that this Order, or an agreement made under this Order, provides otherwise.

(2) This article only authorises the carrying out of maintenance works within the Order limits.

Operation of generating station

5.—(1) The undertaker is authorised to operate and use the generating station for which development consent is granted by this Order.

(2) Paragraph (1) does not relieve the undertaker of any requirement to obtain a permit or licence under any legislation that may be required from time to time to authorise the operation of a generating station.

Benefit of Order

6. Subject to article 7 (consent to transfer benefit of order), the provisions of this Order conferring powers on the undertaker have effect solely for the benefit of the undertaker.

Consent to transfer benefit of Order

7.—(1) The undertaker may—

- (a) transfer to another person ("the transferee") any or all of the benefit of the provisions of the provisions of this Order and such related statutory rights as may be agreed between the undertaker and the transferee; or
- (b) grant to another person ("the lessee") for a period agreed between the undertaker and the lessee any or all of the benefit of the provisions of this Order and such related statutory rights as may be so agreed.

(2) Where an agreement has been made in accordance with paragraph (1) references in this Order to the undertaker, except in paragraph (3), include references to the transferee or the lessee.

(3) The exercise by a person of any benefits or rights conferred in accordance with any transfer or grant under paragraph (1) is subject to the same restrictions, liabilities and obligations as would apply under this Order if those benefits or rights were exercised by the undertaker.

(4) The consent of the Secretary of State is required for a transfer or grant under this article, except where the transfer or grant is made to [INSERT GROUP COMPANY?] or to a licence holder within the meaning of section 64(1) of the Electricity Act 1 989(**a**).

⁽a) 1989 c. 29. Section 6 was amended by section 30 of the Utilities Act 2000 (c. 27), and section 6(10) amended by section 89(3) of the Energy Act 2004 (c. 20). There are other amendments to the section that are not relevant to this Order.

Defence to proceedings in respect of statutory nuisance

8.—(1) Where proceedings are brought under section 82(1) (summary proceedings by person aggrieved by statutory nuisances) of the Environmental Protection Act $1990(\mathbf{a})$ in relation to a nuisance falling within paragraph (a), (c), (d), (fb), or (g) of section 79(1) (statutory nuisances and inspections therefor) of that Act no order is to be made, and no fine may be imposed, under section 82(2) of that Act if the defendant shows that the nuisance—

- (a) relates to premises used by the undertaker for the purposes of or in connection with the construction or maintenance of the authorised development and is attributable to the carrying out of the authorised development in accordance with a notice served under section 60 (control of noise on construction sites), or a consent given under section 61 (prior consent for work on construction sites), of the Control of Pollution Act 1974(b);
- (b) is a consequence of the construction or maintenance of the authorised development and cannot reasonably be avoided; or
- (c) is a consequence of the use of the authorised development and cannot reasonably be avoided.

(2) Section 61(9) (consent for work on construction site to include statement that it does not of itself constitute a defence to proceedings under section 82 of the Environmental Protection Act 1990) of the Control of Pollution Act I 974 does not apply where the consent relates to the use of premises by the undertaker for the purposes of or in connection with the construction or maintenance of the authorised development.

Public rights of way diversions

9.—(1) The authorised development shall not commence until a public rights of way management plan for any sections of public rights of way shown to be temporarily closed on the rights of way plans has been submitted to and, after consultation with the highway authority, approved by the relevant planning authority.

(2) The plan must include details of—

- (a) measures to minimise the length of any sections of public rights of way to be temporarily closed; and
- (b) advance publicity and signage in respect of any sections of public rights of way to be temporarily closed.

(3) The plan must be implemented as approved unless otherwise agreed with the relevant planning authority in consultation with the highway authority.

PART 3

SUPPLEMENTAL POWERS

Discharge of water

10.—(1) The undertaker may use any watercourse or any public sewer or drain for the drainage of water in connection with the carrying out, maintenance or use of the authorised development and for that purpose may lay down, take up and alter pipes and may, on any land within the Order limits, make openings into, and connections with, the watercourse, public sewer or drain.

(2) Any dispute arising from the making of connections to or the use of a public sewer or drain by the undertaker under paragraph (1) is to be determined as if it were a dispute under section 106 (right to communicate with public sewers) of the Water Industry Act 199l(c).

⁽a) 1990 c. 43. Section 82(1) was amended by paragraph 6 of Schedule 17 to the Environment Act 1995 (c. 25). There are amendments to this Act which are not relevant to this Order.

⁽b) 1974 c. 40. Section 61 was amended by Schedule 7 to the Building Act 1984 (c .55), paragraph 15 of Schedule 3 to the Environmental Protection Act 1990 and Schedule 24 to the Environmental Act 1995. [CHECK]

⁽**c**) 1991 c. 56.

(3) The undertaker must not discharge any water into any watercourse, public sewer or drain except with the consent of the person to whom it belongs; and such consent may be given subject to such terms and conditions as that person may reasonably impose, but must not be unreasonably withheld.

- (4) The undertaker must not make any opening into any public sewer or drain except—
 - (a) in accordance with plans approved by the person to whom the sewer or drain belongs, but such approval must not be unreasonably withheld; and
 - (b) where that person has been given the opportunity to supervise the making of the opening.

(5) The undertaker must not, in carrying out or maintaining works pursuant to this article, damage or interfere with the bed or banks of any watercourse forming part of a main river other than in accordance with a permit granted by the Environment Agency.

(6) The undertaker must take such steps as are reasonably practicable to secure that any water discharged into a watercourse or public sewer or drain under this article is as free as may be practicable from gravel, soil or other solid substance, oil or matter in suspension.

(7) This article does not authorise a groundwater activity or a water discharge activity within the meaning of the Environmental Permitting (England and Wales) Regulations 2016(**a**).

(8) In this article—

- (a) "public sewer or drain" means a sewer or drain which belongs to the Homes and Communities Agency, the Environment Agency, a harbour authority within the meaning of section 57(I) (interpretation) of the Harbours Act 1964(b), an internal drainage board, a joint planning board, a local authority, a sewerage undertaker or an urban development corporation; and
- (b) other expressions, excluding watercourse, used both in this article and in the Water Resources Act 1991(c) have the same meaning as in that Act.

(9) If a person who receives an application for consent under paragraph (3) or approval under paragraph (4)(a) fails to notify the undertaker of a decision within 28 days of receiving an application, that person is deemed to have granted consent or given approval, as the case may be.

Authority to survey and investigate the land

11.—(1) The undertaker may for the purposes of this Order enter on any land shown within the Order limits or which may be affected by the authorised development and—

- (a) survey or investigate the land;
- (b) without prejudice to the generality of sub-paragraph (a), make trial holes in such positions on the land as the undertaker thinks fit to investigate the nature of the surface layer and subsoil and remove soil samples;
- (c) without prejudice to the generality of sub-paragraph (a), carry out ecological or archaeological investigations on such land; and
- (d) place on, leave on and remove from the land apparatus for use in connection with the survey and investigation of land and making of trial holes.

(2) No land may be entered or equipment placed or left on or removed from the land under paragraph (1) unless at least 14 days' notice has been served on every owner and occupier of the land.

- (3) Any person entering land under this article on behalf of the undertaker—
 - (a) shall, if so required entering the land, produce written evidence of their authority to do so; and

⁽a) S.I. 2016/1154 "Groundwater activity" is defined in paragraph 3 of Schedule 22. "Water discharge activity" is defined in paragraph 3 of Schedule 21.

⁽**b**) 1964 c. 40.

⁽**c**) 1991 c. 57.

(b) may take with them such vehicles and equipment as are necessary to carry out the survey or investigation or to make the trial holes.

(4) No trial holes shall be made under this article in land located within the highway boundary without the consent of the highway authority but such consent shall not be unreasonably withheld.

(5) The undertaker shall compensate the owners and occupiers of the land for any loss or damage arising by reason of the exercise of the authority conferred by this article, such compensation to be determined, in case of dispute, Part 1 (determination of questions of disputed compensation) of the 1961 Act.

Access to works

12. The undertaker may, for the purposes of the authorised development—

- (a) form and lay out means of access, or improve existing means of access, in the location specified in columns (X) of Schedule [X] (access to works); and
- (b) with the approval of the relevant planning authority after consultation with the highway authority, form and lay out such other means of access or improve existing means of access, at such locations within the Order limits as the undertaker reasonably requires for the purposes of the authorised development.

Removal of human remains

13.—(1) In this article "the specified land" means the land within Order Limits.

(2) Before the undertaker carries out any development or works which will or may disturb any human remains in the specified land it shall remove those human remains from the specified land, or cause them to be removed, in accordance with the following provisions of this article.

(3) Before any such remains are removed from the specified land the undertaker shall give notice of the intended removal, describing the specified land and stating the general effect of the following provisions of this article, by—

- (a) publishing a notice once in each of two successive weeks in a newspaper circulating in the area of the authorised development; and
- (b) displaying a notice in a conspicuous place on or near to the specified land.

(4) As soon as reasonably practicable after the first publication of a notice under paragraph (3) the undertaker shall send a copy of the notice to North Lincolnshire council.

(5) At any time within 56 days after the first publication of a notice under paragraph (3) any person who is a personal representative or relative of any deceased person whose remains are interred in the specified land may give notice in writing to the undertaker of that person's intention to undertake the removal of the remains.

(6) Where a person has given notice under paragraph (5), and the remains in question can be identified, that person may cause such remains to be—

- (a) removed and re-interred in any burial ground or cemetery in which burials may legally take place; or
- (b) removed to, and cremated in, any crematorium,

and that person shall, as soon as reasonably practicable after such re-interment or cremation, provide to the undertaker a certificate for the purpose of enabling compliance with paragraph (11).

(7) If the undertaker is not satisfied that any person giving notice under paragraph (5) is the personal representative or relative as that person claims to be, or that the remains in question can be identified, the question shall be determined on the application of either party in a summary manner by the county court, and the court may make an order specifying who shall remove the remains and as to the payment of the costs of the application.

(8) The undertaker shall pay the reasonable expenses of removing and re-interring or cremating the remains of any deceased person under this article.

(9) If—

- (a) within the period of 56 days referred to in paragraph (5) no notice under that paragraph has been given to the undertaker in respect of any remains in the specified land; or
- (b) such notice is given and no application is made under paragraph (7) within 56 days after the giving of the notice but the person who gave the notice fails to remove the remains within a further period of 56 days; or
- (c) within 56 days after any order is made by the county court under paragraph (7) any person, other than the undertaker, specified in the order fails to remove the remains; or
- (d) it is determined that the remains to which any such notice relates cannot be identified,

subject to paragraph (10) the undertaker shall remove the remains and cause them to be re-interred in such burial ground or cemetery in which burials may legally take place as the undertaker thinks suitable for the purpose; and, so far as possible, remains from individual graves shall be re-interred in individual containers which shall be identifiable by a record prepared with reference to the original position of burial of the remains that they contain.

(10) If the undertaker is satisfied that any person giving notice under paragraph (5) is the personal representative or relative as that person claims to be and that the remains in question can be identified, but that person does not remove the remains, the undertaker shall comply with any reasonable request that person may make in relation to the removal and re-interment or cremation of the remains.

(11) On the re-interment or cremation of any remains under this article—

- (a) a certificate of re-interment or cremation shall be sent by the undertaker to the Registrar General by the undertaker giving the date of re-interment or cremation and identifying the place from which the remains were removed and the place in which they were re-interred or cremated; and
- (b) a copy of the certificate of re-interment or cremation and the record mentioned in paragraph (9) shall be sent by the undertaker to the local authority mentioned in paragraph (4).

(12) The removal of the remains of any deceased person under this article shall be carried out in accordance with any directions which may be given by the Secretary of State.

(13) Any jurisdiction or function conferred on the county court by this article may be exercised by the district judge of the court.

(14) Section 25 of the Burial Act $1857(\mathbf{a})$ (bodies not to be removed from burial grounds, save under faculty, without licence of Secretary of State) shall not apply to a removal carried out in accordance with this article.

PART 4

MISCELLANEOUS AND GENERAL

Procedure in relation to certain approvals, etc. under requirements

14.—(1) Where an application is made to the relevant planning authority for any consent, agreement or approval required by a requirement, the following provisions, so far as they relate to a consent, agreement or approval of a relevant local planning authority, apply as if the requirement were a condition imposed on a grant of planning permission—

- (a) sections 78 and 79 of the Town and Country Planning Act 1990(**b**) (right of appeal in relation to planning decisions);
- (b) any orders, rules or regulations that make provision in relation to a consent, agreement or approval of a local planning authority required by a condition imposed on the grant of planning permission,

⁽a) 1857 c. 81. There are amendments to this Act which are not relevant to this Order.

⁽b) Section 78 was amended by paragraph 21 of Schedule 12 to the Housing and Planning Act 2016 (c. 22). Section 79 was amended by paragraph 23 of that Schedule.

insofar as those provisions are not inconsistent with the Infrastructure Planning (Environmental Impact Assessment) Regulations $2017(\mathbf{a})$ or any orders, rules or regulations made under the 2008 Act.

(2) For the purposes of paragraph (l), a provision relates to a consent, agreement or approval of a relevant planning authority required by a condition imposed on a grant of planning permission insofar as it provides in relation to—

- (a) an application for such a consent, agreement or approval;
- (b) the grant or refusal of such an application; or
- (c) a failure to give notice of a decision on such an application.

(3) For the purposes of the application of section 262 of the 1990 Act (meaning of "statutory undertaker") to appeals pursuant to this article, the undertaker is deemed to be a holder of a licence under section 6 of the Electricity Act 1989(**b**).

Operational land for the purposes of the 1990 Act

15. Development consent granted by this Order is to be treated as specific planning permission for the purposes of section 264(3)(a) (cases in which land is to be treated as not being operational land) of the 1990 Act.

Certification of plans, etc.

16.—(1) The undertaker must, as soon as practicable after the making of this Order, submit to the Secretary of State copies of—

- (a) the environmental statement (document reference [xx]);
- (b) the CEMP (environmental statement appendix [xx]);
- (c) the rights of way plan (document reference [xx]);
- (d) the land plan (document reference [xx]);
- (e) the works plans (document reference [xx], [xx]);

Drawing Nos:

] and]:

(f) any other plans or documents referred to in this Order as requiring certification, for certification that they are true copies of the documents referred to in th.is Order.

(2) A plan or document so certified is admissible in any proceedings as evidence of the contents of the document of which it is a copy.

Service of notices

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17.—(1) A notice or other document required or authorised to be served for the purposes of this Order may be served—

- (a) by post;
- (b) by delivering it to the person on whom it is to be served or to whom it is to be given or supplied; or
- (c) with the consent of the recipient and subject to paragraphs (5) to (8) by electronic transmission.

⁽a) S.I. 2017/572.

 ⁽b) Electricity Act 1989 (c. 29) Section 6 has been amended by the Utilities Act 2000 (c. 27), Energy Act 2004 (c. 20), Climate Change Act 2008 (c. 27), Energy Act 2011 (c. 16), S.I. 2011/2704 and S.I. 2012/2400.

(2) Where the person on whom a notice or other document to be served for the purposes of this Order is a body corporate, the notice or document is duly served if it is served on the secretary or clerk of that body.

(3) For the purposes of section 7 (references to service by post) of the Interpretation Act $1978(\mathbf{a})$ as it applies for the purposes of this article, the proper address of any person in relation to the service on that person of a notice or document under paragraph (1) is, if that person has given an address for service, that address, and otherwise—

- (a) in the case of the secretary or clerk of a body corporate, the registered or principal office of that body; and
- (b) in any other case, the last known address of that person at the time of service.

Rights under or over streets

18.—(1) The undertaker may enter on and appropriate so much of the subsoil of, or air-space over, any street within the Order limits as may be required for the purposes of the authorised development and may use the subsoil or air-space for those purposes or any other purpose ancillary to the authorised development.

(2) Subject to paragraph (3), the undertaker may exercise any power conferred by paragraph (1) in relation to a street without being required to acquire any part of the street or any easement or right in the street.

(3) Paragraph (2) shall not apply in relation to—

- (a) any subway or underground building; or
- (b) any cellar, vault, arch or other construction in, on or under a street which forms part of a building fronting onto the street.

(4) Subject to paragraph (5), any person who is an owner or occupier of land appropriated under paragraph (1) without the undertaker acquiring any part of that person's interest in the land, and who suffers loss as a result, shall be entitled to compensation to be determined, in case of dispute, under Part 1 of the 1961 Act.

(5) Compensation shall not be payable under paragraph (4) to any person who is an undertaker to whom section 85 of the 1991 Act (sharing cost of necessary measures) applies in respect of measures of which the allowable costs are to be borne in accordance with that section.

Temporary use of land for carrying out the authorised project

19.—(1) The undertaker may, in connection with the carrying out of the authorised development—

- (a) enter on and take temporary possession of any of the Order land in respect of which no notice of entry has been served under section 11 of the 1965 Act (other than in connection with the acquisition of rights only) and no declaration has been made under section 4 of the 1981 Act;
- (b) remove any buildings, agricultural plant and apparatus, drainage, fences, debris and vegetation from that land;
- (c) construct temporary works, haul roads, security fencing, bridges, structures and buildings on that land;
- (d) use the land for the purposes of a working site with access to the working site in connection with the authorised development;
- (e) construct any works, on that land as are mentioned in Part 1 of Schedule 1 (authorised development); and
- (f) carry out mitigation works required pursuant to the requirements in Schedule 1.

⁽**a**) 1978 c. 30.

(2) Not less than 14 days before entering on and taking temporary possession of land under this article the undertaker must serve notice of the intended entry on the owners and occupiers of the land.

(3) The undertaker must not remain in possession of any land under this article for longer than reasonably necessary and in any event must not, without the agreement of the owners of the land, remain in possession of any land under this article after the end of the period of one year beginning with the date of completion of the part of the authorised development for which temporary possession of the land was taken unless the undertaker has, before the end of that period, served a notice of entry under section 11 of the 1965 Act or made a declaration under section 4 of the 1981 Act in relation to that land.

(4) Unless the undertaker has served notice of entry under section 11 of the 1965 Act or made a declaration under section 4 of the 1981 Act or otherwise acquired the land or rights over land subject to temporary possession, the undertaker must before giving up possession of land of which temporary possession has been taken under this article, remove all temporary works and restore the land to the reasonable satisfaction of the owners of the land; but the undertaker is not required to—

- (a) replace any building, structure, drain or electric line removed under this article;
- (b) remove any drainage works installed by the undertaker under this article;
- (c) remove any new road surface or other improvements carried out under this article to any street specified in Schedule 2 (streets subject to street works); or
- (d) restore the land on which any works have been carried out under paragraph (1)(f) insofar as the works relate to mitigation works identified in the environmental statement or required pursuant to the requirements in Schedule 1.

(5) The undertaker must pay compensation to the owners and occupiers of land which temporary possession is taken under this article for any loss or damage arising from the exercise in relation to the land of the provisions of any power conferred by this article.

(6) Any dispute as to a person's entitlement to compensation under paragraph (5), or as to the amount of the compensation, must be determined under Part 1 of the 1961 Act.

(7) Nothing in this article affects any liability to pay compensation under section 152 of the 2008 Act (compensation in case where no right to claim in nuisance) or under any other enactment in respect of loss or damage arising from the carrying out of the authorised development, other than loss or damage for which compensation is payable under paragraph (5).

(8) Where the undertaker takes possession of land under this article, the undertaker is not required to acquire the land or any interest in it.

(9) Section 13 of the 1965 Act (refusal to give possession to acquiring authority) applies to the temporary use of land pursuant to this article to the same extent as it applies to the compulsory acquisition of land under this Order by virtue of section 125 of the 2008 Act (application of compulsory acquisition provisions).

Temporary use of land for maintaining authorised project

20.—(1) Subject to paragraph (2), at any time during the maintenance period relating to any part of the authorised development, the undertaker may—

- (a) enter on and take temporary possession of any land within the Order land if such possession is reasonably required for the purpose of maintaining the authorised development; and
- (b) construct such temporary works and buildings on the land as may be reasonably necessary for that purpose.

(2) Paragraph (1) does not authorise the undertaker to take temporary possession of—

- (a) any house or garden belonging to a house; or
- (b) any building (other than a house) if it is for the time being occupied.

(3) Not less than 28 days before entering on and taking temporary possession of land under this article the undertaker must serve notice of the intended entry on the owners and occupiers of the land.
(4) The undertaker may only remain in possession of land under this article for so long as may be reasonably necessary to carry out the maintenance of the part of the authorised development for which possession of the land was taken.

Felling or lopping of trees or hedgerows

21.—(1) The undertaker may fell or lop any tree, hedgerow or shrub near any part of the authorised development, or cut back its roots, if it reasonably believes it to be necessary to do so to prevent the tree or shrub—

- (a) from obstructing or interfering with the construction, maintenance or operation of the authorised development or any apparatus used in connection with the authorised development; or
- (b) from constituting a danger to passengers or other persons using the authorised development.

(2) In carrying out any activity authorised by paragraph (1), the undertaker shall do no unnecessary damage to any tree or shrub and shall pay compensation to any person for any loss or damage arising from such activity.

(3) Any dispute as to a person's entitlement to compensation under paragraph (2), or as to the amount of compensation, shall be determined under Part 1 of the 1961 Act.

SCHEDULES

SCHEDULE 1

Articles 2, 3 and 4

AUTHORISED DEVELOPMENT

In the administrative area of North Lincolnshire

The construction, operation, maintenance and decommissioning of a nationally significant infrastructure project as defined in sections 14(1)(a) and 15 of the 2008 Act, comprising—

Work No. 1A - A generating station comprising: arrays of ground-based photovoltaic solar panels with a gross electrical output of up to 150 megawatts comprising—

- (a) solar panels;
- (b) the mounting structure;
- (c) inverters;
- (d) transformers;
- (e) cable circuits; and
- (f) earthing circuits.

Work No. 1B - A battery storage facility with a gross electrical output capacity of up to 90 megawatts comprising—

- (a) battery containers;
- (b) inverters;
- (c) transformers;
- (d) cable circuits;
- (e) air-conditioning units; and
- (f) earthing circuits.

In connection with and in addition to Work No. 1A-

- (a) equipment facilitating connection to National Grid infrastructure;
- (b) switchgear cabinet;
- (c) access tracks; and
- (d) substation building and compound.

In connection with and in addition to Work No. 1B-

- (a) equipment facilitating connection to National Grid infrastructure;
- (b) switchroom;
- (c) access tracks; and
- (d) substation building and compound;

In connection with and in addition to Works Nos. 1A and 1B-

- (a) works to lay cables connecting Works No 1A and 1B and the substation;
- (b) equipment facilitating connection to National Grid infrastructure;
- (c) security fencing, boundary treatment and other means of enclosure;

- (d) CCTV and mount;
- (e) switchgear cabinet;
- (f) access tracks;
- (g) construction compound;
- (h) substation building and compound;
- (i) habitat enhancement works;
- (j) fencing around the archaeological exclusion zone;
- (k) ramps and footpaths;
- (1) [jointing bays, cable ducts, cable protection, joint protection, manholes, kiosks, marker, posts, underground cable marker, tiles and tape, and lighting and other works associated with cable laying;]
- (m) landscaping and other works to mitigate any adverse effects of the construction, maintenance or operation of the authorised project;
- (n) works for the benefit or protection of land affected by the authorised development;
- (o) works to alter the position of apparatus below ground level including mains, sewers, drains and cables and also including below ground structures associated with that apparatus.

In connection with the construction of any of those works, further development within the Order limits consisting of—

- (a) foundations, retaining walls, barriers, parapets, drainage, fencing, culverts and lighting;
- (b) altering the course of or otherwise constructing over or under non-navigable watercourses;
- (c) site preparation works, site clearance (including fencing); earthworks (including soil stripping and storage, site levelling); remediation of contamination;
- (d) construction compounds and working sites, storage areas, temporary vehicle parking, ramps and other means of access, internal roads and tracks, construction fencing, perimeter enclosure, security fencing, construction-related buildings, welfare facilities, construction lighting, haulage roads and other buildings, machinery, apparatus, works and conveniences;
- (e) such other works, working sites, storage areas and works of demolition, as may be necessary or expedient for the purposes of, or for purposes ancillary to, the construction of the authorised development; and
- (f) to the extent that it does not form part of such works, further associated development comprising such other works (i) as may be necessary or expedient for the purposes of or in connection with the relevant part of the authorised development and (ii) which fall within the scope of the works assessed in the environmental statement.

SCHEDULE 2 REQUIREMENTS

Article 3

EXPLANATORY NOTE

(This note is not part of the Order)

This Order authorises INRG Solar (Little Crow) Limited to construct a new solar power generating station and battery storage facility on land in Scunthorpe to the east of the British Steel plant and to carry out all associated works.

The Order also makes provision for the operation, maintenance and decommissioning of the authorised development.

A copy of the plans, environmental statement and other documents mentioned in this Order and certified in accordance with article [XX] of this Order (certification of plans, etc.) may be inspected free of charge during working hours at [].

Technical Appendix 6.1

ASSESSMENT CRITERIA

Appendix 6.1 Landscape and Visual Assessment Criteria

Introduction

This appendix presents the assessment criteria adopted for the assessment of landscape and visual effects arising from the proposed development.

The primary source of best practice for LVIA in the UK is *The Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (GLVIA3) (Landscape Institute and the Institute for Environmental Management and Assessment, 2013). The assessment criteria adopted to inform the assessment of effects has been developed in accordance with the principles established in this best practice document. It should however be acknowledged that GLVIA3 establishes guidelines not a specific methodology. The preface to GLVIA3 states:

'This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand.'

The criteria set out below have therefore been developed specifically for this assessment to ensure that the methodology is appropriate and fit for purpose.

The purpose of an LVIA when undertaken in the context of an Environmental Impact Assessment (EIA) is to identify and describe any likely significant landscape and visual effects arising as a result of the proposals.

An LVIA must consider both:

- effects on the landscape as a resource in its own right (the landscape effects); and
- effects on specific views and visual amenity more generally (the visual effects).

Therefore, separate criteria are set out below for the assessment of landscape and visual effects.

Nature (sensitivity) of landscape features

The nature or sensitivity of an individual landscape feature or element reflects its susceptibility to change and the value associated with it. Sensitivity is therefore a function of factors such as the feature's quality, rarity, contribution to landscape character, degree to which the particular element can be replaced and cultural associations or designations that apply. A particular feature may be more 'sensitive' in one location than in another often as a result of local value associated with the feature. Therefore, it is not possible to

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simply place different types of landscape feature into sensitivity bands. Where individual landscape features are affected, professional judgement is used as far as possible to give an objective evaluation of its sensitivity. Justification is given for this evaluation where necessary.

The nature or sensitivity of individual landscape features has been described as **very high**, **high**, **medium**, **low** or **very low**.

Nature (sensitivity) of landscape character

The nature or sensitivity of landscape character reflects its susceptibility to change and the value associated with it. It is essentially an expression of a landscape's ability to accommodate a particular type of change. It varies depending on the physical and perceptual attributes of the landscape including but not necessarily limited to: scale; degree of openness; landform; existing land cover; landscape pattern and complexity; the extent of human influence in the landscape; the degree of remoteness/wildness; perception of change in the landscape; the importance of landmarks or skylines in the landscape; inter-visibility with and influence on surrounding areas; condition; rarity and scenic quality of the landscape, and the value placed on the landscape including any designations that may apply.

In this assessment, the nature or sensitivity of landscape character is considered with reference to a number of local character areas as defined in this LVIA for the purposes of this study. Information regarding the key characteristics of these character areas has been extrapolated from relevant published studies where possible but also informed by project specific field assessment. An assessment of landscape sensitivity to the development proposed has been undertaken employing professional judgement for relevant local landscape character areas.

The nature or sensitivity of landscape character has been described as **very high**, **high**, **medium**, **low** or **very low**.

Nature (sensitivity) of visual receptors

The nature or sensitivity of visual receptor groups reflects their susceptibility to change and the value associated with the specific view in question. Sensitivity varies depending on a number of factors such as the occupation of the viewer, their viewing expectations, duration of view and the angle or direction in which they would see the site. Whilst most views are valued by someone, certain viewpoints are particularly highly valued for either their cultural or historical associations and this can increase the sensitivity of the view. The following criteria are provided for guidance only and are not exclusive:

- Very Low Sensitivity People engaged in industrial and commercial activities or military activities.
- Low Sensitivity People at their place of work (e.g. offices); shoppers; users of trunk/major roads and passengers on commercial railway lines (except where these form part of a recognised and promoted scenic route).
- Medium Sensitivity Users of public rights of way and minor roads which do not appear to be used primarily for recreational activities or the specific enjoyment of the landscape; recreational activities not specifically focused on the landscape (e.g. football); motel users.
- High Sensitivity Residents at home; users of long distance or recreational trails and other sign posted walks; users of public rights of way and minor roads which appear to be used for recreational activities or the specific enjoyment of the landscape; users of caravan parks, campsites and 'destination' hotels; tourist attractions with opportunities for views of the landscape (but not specifically focused on a particular vista); slow paced recreational activities which derive part of their pleasure from an appreciation of setting (e.g. bowling, golf); allotments.
- Very High Sensitivity People at recognised vantage points (often with interpretation boards), people at tourist attractions with a focus on a specific view, visitors to historic features/estates where the setting is important to an appreciation and understanding of cultural value.

It is important to appreciate that it is the visual receptor (i.e. the person) that has a sensitivity and not a property, public right of way or road. Also, the sensitivity of a receptor group is not influenced by the number of receptors. As an example, although many people may use a motorway, this does not increase the sensitivity of each receptor using it. Likewise, a residential property may only have one person living in it but this does not reduce the sensitivity of that one receptor. Whilst the number of receptors affected at any given location may be a planning consideration, for the purposes of this assessment it does not alter the sensitivity of the receptor group.

Where judgements are made about the sensitivity of assessment viewpoints, the sensitivity rating provided is an evaluation of the sensitivity of the receptor group represented by the viewpoint and not a reflection of the number of people who may experience the view.

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For some developments (e.g. wind energy developments) it important not to confuse the concept of visual sensitivity with the perception of the development. For example, it is recognised that some people consider wind turbines to be unattractive, but others enjoy the sight of them.

Nature (magnitude) of effects - General note

The following discussion sets out the approach adopted in this LVIA in relation to a specific issue arising in GLVIA3 which requires a brief explanation.

Prior to the publication of GLVIA3, LVIA practice had evolved over time in tandem with most other environmental disciplines to consider the level of effect (relative significance) principally as a function of two factors, namely: sensitivity of the receptor and magnitude of the effect (the term 'magnitude' being a word most commonly used in LVIA and most other environmental disciplines to describe the size or scale of an effect).

Box 3.1 on page 37 of GLVIA3 references a 2011 publication by IEMA entitled 'The State of EIA Practice in the UK' which reiterates the importance of considering not just the scale or size of effect but other factors which combine to define the 'nature of the effect' including factors such as the probability of an effect occurring and the duration, reversibility and spatial extent of the effect.

The flow diagram on page 39 of GLVIA3 suggests that the magnitude of effect is a function of three factors (the size/scale of the effect, the duration of the effect and the reversibility of the effect).

For certain types of development (e.g. residential) the proposed development is permanent and non-reversible. For other types of development (e.g. wind and solar energy) the proposed development is for a time-limited period and would be largely reversible at the end of the scheme's operational period. Reversibility of a proposed development is a material consideration in the planning balance but does not reduce the scale of the effect (i.e. the 'magnitude' in the traditional and commonly understood sense of the word) during the period in which the scheme is operational. In this regard, it would be incorrect to report a lesser magnitude of change to a landscape or view as a result of a time-limited effect or the relative reversibility of the effect.

For clarification, the approach taken in this LVIA has been to consider magnitude of effect solely as the scale or size of the effect in the traditional sense of the term 'magnitude'. Having identified the magnitude of effect as defined above, the LVIA also describes the duration and reversibility of the identified effect, taking these factors into account as appropriate in the consideration of the level (relative significance) of the effect.

In the context of the above discussion the following criteria have been adopted to describe the magnitude of effects.

Nature (magnitude) of effects on landscape features

Professional judgement has been used as appropriate to determine the magnitude of direct physical effects on individual existing landscape features using the following criteria as guidance only:

- Very Low Magnitude of Change Negligible loss or alteration to existing landscape features;
- Low Magnitude of Change Minor loss or alteration to part of an existing landscape feature;
- Medium Magnitude of Change Some loss or alteration to part of an existing landscape feature; and
- **High Magnitude of Change** Major loss or major alteration to an existing landscape feature.
- Very High Magnitude of Change Total loss or alteration to an existing landscape feature.

Nature (magnitude) of effects on landscape character

The magnitude of effect on landscape character is influenced by a number of factors including: the extent to which existing landscape features are lost or altered, the introduction of new features and the resulting alteration to the physical and perceptual characteristics of the landscape. Professional judgement has been used as appropriate to determine the magnitude using the following criteria as guidance only. In doing so, it is recognised that usually the landscape components in the immediate surroundings have a much stronger influence on the sense of landscape character than distant features whilst acknowledging the fact that more distant features can have an influence on landscape character as well.

- Very Low Magnitude of Change Negligible loss or alteration to existing landscape features; no notable introduction of new features into the landscape; and negligible change to the key physical and/or perceptual attributes of the landscape.
- Low Magnitude of Change Minor loss or alteration to existing landscape features; introduction of minor new features into the landscape; or minor alteration to the key physical and/or perceptual attributes of the landscape.

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- Medium Magnitude of Change Some notable loss or alteration to existing landscape features; introduction of some notable new features into the landscape; or some notable change to the key physical and/or perceptual attributes of the landscape.
- **High Magnitude of Change** A major loss or alteration to existing landscape features; introduction of major new features into the landscape; or a major change to the key physical and/or perceptual attributes of the landscape.
- Very High Magnitude of Change Total loss or alteration to existing landscape features; introduction of dominant new features into the landscape; a very major change to the key physical and/or perceptual attributes of the landscape.

Nature (magnitude) of effects on views and visual amenity

Visual effects are caused by the introduction of new elements into the views of a landscape or the removal of elements from the existing view.

Professional judgement has been used to determine the magnitude of impacts using the following criteria as guidance only:

- Very Low Magnitude of Change Negligible change in views;
- Low Magnitude of Change Some change in the view that is not prominent but visible to some visual receptors;
- Medium Magnitude of Change Some change in the view that is clearly notable in the view and forms an easily identifiable component in the view;
- **High Magnitude of Change** A major change in the view that is highly prominent and has a strong influence on the overall view.
- Very High Magnitude of Change A change in the view that has a dominating or overbearing influence on the overall view.

Using this set of criteria, determining levels of magnitude is primarily dependent on how prominent the development would be in the landscape, and what may be judged to flow from that prominence or otherwise.

For clarification, the use of the term 'prominent' relates to how noticeable the features of the development would be. This is affected by how close the viewpoint is to the development but not entirely dependent on this factor. Other modifying factors include: the focus of the view, visual screening and the nature and scale of other landscape features within the view. Rather than specifying general bands of distance at which the proposed development would be dominant, prominent or incidental to the view etc. the prominence

of the proposed development in each view is described in detail for each viewpoint taking all the relevant variables into consideration.

Type of effect

The assessment identifies effects which may be **beneficial**, **adverse** or **neutral**. Where effects are described as neutral this is where the beneficial effects are deemed to balance the adverse effects.

For some developments (e.g. wind energy developments) it is recognised that some people consider the development to be unattractive but others enjoy the sight of it. A landscape and visual assessment for these developments therefore assumes that all identified landscape and visual effects are 'adverse' unless stated otherwise. This allows decision makers to assess a worst-case scenario.

Duration of effect

For the purposes of this assessment, the temporal nature of each effect is described as follows:

- Long Term over 5 years
- Medium Term between 1 and 5 years
- Short Term under 1 year

Reversibility of effect

The LVIA also describes the reversibility of each identified effect using the following terms:

- **Permanent** effect is non reversible
- Non permanent effect is reversible

Level of effect and identification of significant effects

The purpose of an LVIA when produced in the context of an EIA is to identify and describe any significant effects on landscape and visual amenity arising from the proposed development.

Neither EC Directive 2011/12/EU nor the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 define a threshold at which an effect may be determined to be significant. In certain other environmental disciplines there are regulatory thresholds

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or quantitative standards which help to determine the threshold of what constitutes a significant effect. However in LVIA, any judgement about what constitutes a significant effect is ostensibly a subjective opinion expressed as in this case by a competent and appropriately qualified professional assessor.

The level (relative significance) of landscape and visual effects is determined by combining judgements regarding the sensitivity of the landscape or view, magnitude of change, duration of effect and the reversibility of the effect. In determining the level of residual effects, all mitigation measures are taken into account.

The relative level of effect is described as **major**, **major/moderate**, **moderate**, **moderate/minor**, **minor** or **minor/no effect**. **No effect** may also be recorded as appropriate where the effect is so negligible it is not even noteworthy.

Those effects described as major, major/moderate and in some cases moderate may be regarded as **significant** effects as required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Technical Appendix 6.2

ASSESSMENT VIEWPOINT PHOTOGRAPHS



Viewpoint photograph location 1a Footpath 214, near Little Crow Covert - looking south east



Viewpoint photograph location 1b Footpath 214, near Little Crow Covert - Looking south west

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	Drawn by: KG	Approved by: KC	Sh
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Track north to Santon

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ittle Crow Solar Park lient: INRG Solar Ltd.



Viewpoint photograph location 2a Footpath 214, south eastern boundary of the site - looking north west



Viewpoint photograph location 2b Footpath 214, south eastern boundary of the site - looking north east

Proposed panels offset from woodland

Drawn by: KG

Approved by: KC

Note: Photographic material was not taken and is not presented to any specific standard. Photographs are for illustrative purposes only to support the assessments made in the LVIA.

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Appendix 6.2 - Photographic Becord Group Record Sheet No: 2 of 7



Little Crow Solar Park Client: INRG Solar Ltd.



Viewpoint photograph location 3a Footpath 212, near Raventhorpe Farm - looking north west



L Viewpoint photograph location 3b Footpath 212, near Raventhorpe Farm - looking north east

Drawn by: KG Approved by: KC Note: Photographic material was not taken and is not presented to any specific standard. Photographs are for illustrative purposes only to	DRWG No. P17-0718	Date: 25/07/2018
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pendix 6.2 - Photographic Pegasus Record : No: 3 of 7



Crow Solar Park Client: INRG Solar Ltd.



Viewpoint photograph location 4 Risby Road, near High Risby



Viewpoint photograph location 5 A1029, Winterton Road, Scunthorpe

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pendix 6.2 - Photographic **Pegasus** Record



No: 4 of 7

e Crow Solar Park t: INRG Solar Ltd.



Viewpoint photograph location 6 Lakeside Parkway, Scunthorpe



Viewpoint photograph location 7 Holme Lane, Overbridge of M180 motorway

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	Drawn by: KG	Approved by: KC	She
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Appendix 6.2 - Photographic Pegasus Record eet No: 5 of 7



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Viewpoint photograph location 8 Central Park, Scunthorpe



Viewpoint photograph location 9 Carr Lane, near Worlaby Carrs Farm

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pendix 6.2 - Photographic Pegasus Record



t No: 6 of 7

e Crow Solar Park nt: INRG Solar Ltd.



Viewpoint photograph location 10 Holme Lane, Messingham



Viewpoint photograph location 11 B1207, south of Appleby

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Technical Appendix 6.3

VIEWPOINT ASSESSMENT

APPENDIX 6.3 VIEWPOINT ASSESSMENT

INTRODUCTION

This Appendix provides an assessment of the visual effects of the Proposed Development from a selection of 11 viewpoints during the operational phase. For each of the assessment viewpoints a short description is given of the baseline view followed by a description of the features of the Proposed Development which would be visible from that viewpoint. For each viewpoint the commentary includes details of any vegetation, buildings or topography would affect the visibility of the Proposed Development. A comment on the sensitivity of the viewpoint, the magnitude of change experienced and the significance of visual impacts is given for each viewpoint. All effects during the operational phase of the Proposed Development are long term and permanent.

During the construction phase of the Proposed Development there would be additional visual effects in relation to construction activities including the movement of plant on site. The construction activity on site would be visible for a brief period, and as such these effects would all be short term and non-permanent. At all of the viewpoints listed below there would be no greater than a minor additional effect, tending towards no additional effect during the construction phase.

Viewpoint 1: Footpath 214, near Little Crow Covert

This viewpoint is taken from the western portion of an unsurfaced farm track that provides access for farm machinery through the site area. It leads from the B1207 to the east of the site, past the chicken farm complex on the eastern boundary of the site through to the western edge of the site. Footpath 214 runs in part along the track which falls from the higher ground to the west via two turns in the track to an area of lower ground from where this photograph is taken. The footpath originally crossed the arable field to the south but has been previously diverted onto the track. From beyond the large copse of trees in photograph 1b the footpath turns north to Santon. A further farm track north to Santon is also available from behind the viewpoint location.

Views are currently gained over the arable fields, which are largely open of field boundaries. The Scunthorpe Steelworks dominate the skyline including the rolling mills, chimneys and cooling towers. Views of the industrial form are broken in part by scrub vegetation on the periphery of the site, some remnant hedgerows and areas of copse. Overhead powerlines provide a visual connection within the areas of farmland back to the industrial complex to the west and south west.

In the assessment criteria as set out in Appendix 6.1, users of public rights of way are considered to have high sensitivity to a change in their view. The proposed solar farm would occupy all of the foreground views in this location beyond the access track, replacing the views of arable fields with solar panels. Behind the viewer at this location and to the east beyond the overhead power lines, the site would be free of solar panels to provide a zone for winter birds. The security fencing around the site and adjacent to the track would be softened by new native hedgerow planting and the intervening verges seeded with wild flower mixes. The magnitude of change to the view from the addition of the new solar panels would be high from this position, resulting in a major visual effect on users of the footpath which would be significant.

Viewpoint 2: Footpath 214, south eastern boundary of the site

This viewpoint is taken from the eastern end of the public right of way, Footpath 214 as it emerges from the dense, enclosed woodland of West Wood into the site area. To the west, the footpath continues along the woodland edge as marked in the viewpoint photograph. To the south east, the footpath continues through the woodland to the village of Broughton. There is also an extensive network of permissive footpaths within the woodland forming a series of circular routes as well as this public right of way which cuts diagonally through the wood. Emerging from the cover of the trees the pedestrian gains contrasting open views over the intervening arable fields. Longer distance views are contained by further woodland at Santon Wood wrapping around the site to the north. To the east is a large chicken farm. To the west the taller elements of the steelworks complex can be seen, a series of powerlines extend across the site connecting the urban landscape to the wider area.

The proposed solar panels would be located in the foreground, beyond an offset at this position from the adjacent woodland. Views of the adjacent security fencing would be softened by proposed native hedgerows. The margin between the boundary and the footpath would be sown with a native wildflower mix. In the assessment criteria as set out in Appendix 6.1, users of public rights of way are considered to have high sensitivity to a change in their view. The magnitude of change to the view from the addition of the new solar panels would be high from this position, resulting in a major visual effect on users of the footpath which would be significant.

Viewpoint 3: Footpath 212, near Raventhorpe Farm

This public right of way, Footpath 212 runs to the south of the site area from the duelled A18 to the south west. It runs along the southern edge of the woodland to the south of the site, through Mamby Wood to the east, exiting in the settlement Broughton.

Existing views from this point on the footpath, (approximately 500m south of the site) as it crosses under the overhead powerline running above the arable field, are dominated by the extensive complex of the Scunthorpe Steel Works to the east. Views towards the site are largely screened by the band of woodland to the south of the site. The overhead powerlines cut a channel through the woodland, creating a small potential view corridor when the viewer is aligned with the route of the poles and cables. As well as the steelworks complex renewable energy infrastructure can been seen from this position in the form of the existing Raventhorpe Solar Farm in the adjacent field to the east and the Bagthorpe Solar Farm beyond the Steel works to the northwest.

In the assessment criteria as set out in Appendix 6.1, users of public rights of way are considered to have high sensitivity to a change in their view. The potential view corridor towards the site is so limited the potential magnitude of change is judged to be very low. Some viewers may catch a glimpsed view of the security fencing and the southernmost panels on the southern edge of the proposed site but this potential is limited by the power lines slightly changing course as they pass through the woodland. This would result in a moderate minor visual effect on users of the footpath at this position which would not be significant.

Viewpoint 4: Risby Road, near High Risby

This viewpoint is located approximately 4.5km north east of the site, within an area the Screened ZTV indicates potential views of the site area may be available. The viewpoint is located on a minor road which runs to the settlement of Appleby from Winterton Road to the north of Scunthorpe. There are two farmsteads located along the road at High and Low Risby. Further to the east along the road, extensive views over the Humber Estuary are gained to the north east.

The field boundary adjacent to the road is sparse, allowing views over the adjacent arable field. Further to the south lies Risby Warren an area of rough grassland containing some areas of scrub. To the north of the site area is Santon Wood a deep area of woodland. An extensive network of pylons punctuate the skyline.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity. The intervening mature woodland vegetation, particularly at Santon Wood, which extends north from the northern boundary screens out all potential views of the site from this position. Therefore, there would be no visual effect on users of this minor road from this position which would not be significant.

Viewpoint 5: A1029, Winterton Road, Scunthorpe

This viewpoint is located approximately 4km north west of the site area. Winterton Road at this point, runs through an industrial area to the north of Scunthorpe. On the western side of the road are a series of industrial units and on the eastern side a waste recycling facility. Between this viewpoint position and the site lies the extensive Steelworks complex which contains an eclectic collection of chimneys, storage tanks and cooling towers. Also, amongst the built form are derelict areas colonised by developing scrub. A remnant hedgerow adjacent to the road, in part limits views over the intervening area. Santon Wood to the north of the site area also wraps around the north eastern corner of the site.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity. People engaged in industrial and commercial activities are considered to be of very low sensitivity. The intervening industrial landscape and mature woodland vegetation on the horizon screens out all potential views of the site from this position, therefore there would be no visual effect on users of this section of the road, which would not be significant.

Viewpoint 6: Lakeside Parkway, Scunthorpe

This viewpoint is taken from approximately 2.3km to the south west of the site area to the south of a new area of housing and commercial units including the Lakeside Retail Park. Views towards the site include the large buildings on the southern side of the steel works. To the north east, the existing Ravensthorpe Solar Farm can be seen on the crest of the higher ground of the ridge. Views towards the site area are limited by a combination of the steel works complex and the woodland wrapping around the south of the site.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity. The intervening industrial form of the steel works and mature woodland vegetation screens out all potential views of the site from this position. Therefore, there would be no visual effect on users of this section of the road, which would not be significant.

Viewpoint 7: Holme Lane, Overbridge of M180 motorway

The M180 motorway is located to the south of the site. This viewpoint is taken from an overbridge, (approximately 3.2km south west of the site) providing access to the settlement of Messingham to the south west from Holme Lane, a minor road which runs from the southern portion of Scunthorpe to Twigmoor Woods to the east.

Views towards the site, from the elevated overbridge, are limited by vegetation growing on the adjacent embankment. Behind the close range vegetation lies the Steelworks complex. To the north east the existing Raventhorpe Solar Farm is visible in the open ground between the intervening areas of woodland. The woodland to the south of the site area is visible from this position with the existing Solar Farm extending in front of it.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity. The intervening industrial form of the steel works and mature woodland vegetation screens out all potential views of the site from this position, therefore there would be no visual effect on users of this section of the road, which would not be significant.

Viewpoint 8: Central Park, Scunthorpe

This viewpoint is from within Scunthorpe Central Park located approximately 4.3km east of the site area. The park is furnished with numerous mature trees, providing containment to a network of pathways. The viewpoint photograph is taken from the central portion of the park near to the fountain. To the north and west of the formal park area and gardens are extensive playing fields, a leisure centre, water park and play area. Also located within the park area are the North Lincolnshire Council offices. To the east between Central Park and the site area is an extensive area of housing beyond which lies the Steelworks.

People undertaking slow paced recreational activities which derive pleasure from an appreciation of the setting such as walking and sitting in a park are considered in the assessment criteria at Appendix 6.1 to be of high sensitivity. The strong tree cover within the park and the intervening housing and industrial form of the steel works within the wider landscape to the east screens out all potential views of the site from this position. Therefore, there would be no visual effect on users of this portion of the park (which is representative of the park area), which would not be significant.

Viewpoint 9: Carr Lane, near Worlaby Carrs Farm

This viewpoint is located within open farmland approximately 4km to the east of the site area in a portion of the landscape indicated by the screened ZTV to have the potential to gain views of the site area and the proposed solar panels. The viewpoint is located just south of the railway line between Scunthorpe and Barnetby le Wold. The surrounding farmland is located over low-lying ground surrounding the canalised River Ancholme to the south west of the viewpoint. The photograph location was accessed via a farm track called Carr Lane, providing access to the river form the spring line village of Worlaby at the base of the Wolds to the east. The farmland surrounding the viewpoint location is sparsely furnished with trees beyond a scattering of shelter belts and copses.

The ground on which the site area is located rises to the west over the limestone plateaux forming a scarp slope within the site area to the west. Containment of this higher ground is provided by the extensive woodland surrounding the site area to the east. Steam and smoke indicating the location of the Steelworks complex can be seen to the north west above the intervening woodland.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity. The mature woodland vegetation to the east of the site screens out all potential views of the site from this position, therefore there would be no visual effect on users of this section of the track, which would not be significant.

Viewpoint 10: Holme Lane, Messingham

The settlement of Messingham is located approximately 5.3 km to the south west of the site. Holme Lane runs adjacent to the northern extents of the village. An area of playing fields are located to the north east of the viewpoint position on the edge of the village. Extensive views of the southern edge of the steelworks complex are gained from this position. Also visible is the existing Ravenscar Solar Farm on the ridge to the east. The site area is screened from this position by the intervening woodland wrapping around the southern portion of the site and by the large built form of the steelworks.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity, people engaged in recreational activities not specifically focused on the landscape (e.g. football) are also considered to be of medium sensitivity. The mature woodland vegetation to the south of the site and the large built form of the steelworks to the west screens out potential views of the site from this position. Therefore, there would be no visual effect on users of this section of the road nor the users of the playing fields, which would not be significant.

Viewpoint 11: B1207, south of Appleby

This viewpoint is located to the south west of the settlement of Appleby approximately 3.6km north of the site. The B1207, Ermine Street is lined with an intermittent hedgerow and occasional hedgerow trees. This road follows the line of a Roman Road, (linking York, Lincoln and London) to the settlement of Broughton to the south. This viewpoint photograph is taken form a field entrance which allows views over a large arable field in the foreground. To the north, elements of the Steelworks complex can be clearly seen as can the network of pylons and wires to the north of the site area. The woodland wrapping around the northern portion of the site can also be seen beyond an intervening shelter belt of trees.

Users of minor roads which do not appear to be used primarily for recreational activities or for the specific enjoyment of the landscape are considered in the assessment criteria at Appendix 6.1 to be of medium sensitivity. The mature woodland vegetation to the north of the site screens out potential views of the site from this position. Therefore, there would be no visual effect on users of this section of the road which would not be significant.

Technical Appendix 7.1

EXTENDED PHASE 1 SURVEY, ARABLE PLANTS, GREAT CRESTED NEWTS & WATER VOLE SURVEY REPORT



National significant infrastructure project in the Energy Sector Little Crow Solar Park, Scunthorpe

BASELINE CONDITIONS REPORT:

EXTENDED PHASE 1, ARABLE PLANTS, GREAT CRESTED NEWTS & WATER VOLE

On behalf of INRG Solar (Little Crow) Ltd

November 2018

BASELINE CONDITIONS REPORT:

EXTENDED PHASE 1, ARABLE PLANTS, GREAT CRESTED NEWTS &

WATER VOLE

LITTLE CROW SOLAR, SANTON, LINCOLNSHIRE

carried out by



commissioned by

INRG Solar (Little Crow) Ltd

NOVEMBER 2018



BASELINE CONDITIONS REPORT:

EXTENDED PHASE 1, ARABLE PLANTS, GREAT CRESTED NEWTS &

WATER VOLE

LITTLE CROW SOLAR, SANTON, LINCOLNSHIRE

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	The Chin-		Mag		
V2.0 red line boundary			Peter Timms	16/11/18	
upaated			Mag		

The information, data and advice which has been prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions. This report and its contents remain the property of Clarkson and Woods Ltd. until payment has been made in full.



1 INTRODUCTION

- 1.1.1 Clarkson and Woods Ltd. was commissioned by INRG Solar (Little Crow) Ltd to carry out an ecological survey of land of land proposed to accommodate Little Crow Solar Farm near Santon in Lincolnshire.
- 1.1.2 This report presents the findings of the extended phase 1 habitat survey, a rare arable plants survey, a great crested newt survey and a water vole survey.
- 1.1.3 The Phase 1 Habitat survey was carried out over several dates on 26th & 27th July, 2nd August and 15th September 2017. The results of the survey have been augmented from additional site visits undertaken during 2017-2018 associated with detailed surveys for a number of target ecological features.
- 1.1.4 The arable plants survey was conducted on the 12th and 13th of June 2018.
- 1.1.5 The great crested newt surveys were conducted on 24th April and 19th June 2018.
- 1.1.6 The water vole surveys were conducted on 14th and 15th September 2017, and 23rd April 2018.
- 1.1.7 Unless the client indicates to the contrary, information on the presence of species will be passed to the county biological records centre in order to augment their records for the area.
- 1.2 Site Description Summary
- 1.2.1 The site is located to the east of the town of Scunthorpe and consists of 17 (predominantly arable) fields bordered by a network of hedgerows and extensive woodland plantations. The land gradually slopes down to the west of the site, where a number of ditches and ponds are present. Grassland, scrub and ruderal habitat are also present in discrete areas around the site.
- 1.2.2 The wider landscape is characterised by the industrial steel workings to the west of the site, and further arable farmland and plantation woodland to the north and east. Beyond the woodland to the south lies a recently constructed solar array. The town of Broughton is located approximately 0.9km to the east of the site.
- 1.2.3 The development site is approximately 220 hectares (ha) in size, and the approximate centre of the site was at OS Grid Ref. SE 941 099. The location of the site is shown in Figures 1 and 2.





Figure 1: Ordnance Survey Map Showing Location of Site (OS Licence 100050456)



Figure 2: Aerial photograph of Site boundary (©2018 Microsoft)



2 Survey and Assessment Methodology

- 2.1 Data Search
- 2.1.1 Statutory designated sites within proximity of the Site were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).
- 2.1.2 Ordnance Survey maps (1:25,000) and aerial images of the Site were examined online (bing.com/maps and maps.google.co.uk).
- 2.1.3 The Lincolnshire Environmental Records Centre (LERC) was consulted for records of protected and notable species within 2km of the site. The records centre was also asked to provide details of designated sites within 1km of the site.
- 2.2 Field Survey

Personnel

- 2.2.1 The extended Phase 1 Survey was undertaken by Peter Timms ACIEEM. Peter has 6 years' experience undertaking ecological surveys and has a BSc and MSc in relevant subjects. Peter holds a Natural England class licence (Level 1) for the survey of great crested newts (Registration Number: 2015-19739-CLS-CLS).
- 2.2.2 A survey for arable plant species was undertaken by Mark Baker MCIEEM. Mark has over 12 years' experience undertaking botanical and ecological surveys and has a BSc in a relevant subject.
- 2.2.3 The following staff members also assisted with the water vole surveys and the collection of water samples for eDNA analysis:
 - Phil Bowater BSc Grad CIEEM
 - Patrick Ellison BSc Grad CIEEM
 - Chris Poole BSc Grad CIEEM
- 2.2.4 All above staff have been assessed under the Clarkson and Woods QA processes as competent to complete the survey.

Habitats

- 2.2.5 A habitat survey was carried out based on standard field methodology set out in the Handbook for Phase 1 Habitat Survey (2003 edition)¹.
- 2.2.6 Botanical names follow Stace (1997)² for higher plants and Edwards (1999)³ for bryophytes.
- 2.2.7 Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (Table 3) are used to describe habitats not readily conforming to recognised types and evidence of or suitability for protected species and species of conservation concern.

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¹ Nature Conservancy Council. (1990 - 2003 edition). Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit, Joint Nature Conservation Committee

² Stace, C. (1997). New Flora of the British Isles Second Edition. Cambridge University Press

³ Edwards, S.R. (1999). English Names for British Bryophytes. BBS, Cardiff



Arable Plants

- 2.2.8 A targeted survey for arable plant species (sometimes called arable weed species) was undertaken during the 12th and 13th June 2018. The margins of all arable fields were initially walked over by an experienced ecologist in order to rapidly assess the distribution of arable plants across the site. Areas noted to be of interest in terms of abundance and diversity of arable plants were then subject to more detailed survey. The location of these arable plant survey target zones are provided in Figure 5.
- 2.2.9 The survey used a modified version of the Plantlife Arable Plants Survey Form and adopted a methodology whereby areas noted to be of interest in the rapid assessment were then subject to a detailed inspection with all arable plant species being recorded. Each area was subjected to an extended and detailed search with all species within the area (other than crops) being recorded. Where threatened species were recorded these were ascribed a score according to the Plantlife Important Arable Plant Areas Methodology⁴
- 2.2.10 Arable plant species encountered and their relative abundance within each target survey zone were recorded and described using the DAFOR scale shown below:
 - D Dominant
 - A Abundant
 - F Frequent
 - O Occasional
 - R Rare
- 2.2.11 The quality of each arable area was assessed against the three criteria identified by Plantlife in identifying important arable plant areas⁴.
- 2.3 Protected and Notable Species
- 2.3.1 Details of the legislative protection afforded to those protected species which have been identified as occurring or potentially occurring on the site are detailed in Appendix A.

Badgers

- 2.3.2 A search was made for badger *Meles meles* setts, and sett entrances were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying. Main setts are typically large structures which constitute the principal shelter and breeding location for a single social group. Subsidiary setts are significant setts which receive regular or sporadic usage but are not the focal sett for a social group. Annexe setts are smaller structures closely associated with Main setts but are not connected by underground tunnels. Outlying setts are located away from other setts and usually comprise no more than two, infrequently used sett entrances.
- 2.3.3 Sett entrances were counted and mapped to record tunnel direction and their relative level of usage.
- 2.3.4 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped.

⁴ Byfield,A.J. & Wilson, P. J. (2005). Important Arable Plant Areas: identifying priority sites for arable plant conservation in the United Kingdom. Plantlife International, Salisbury, UK


Bats

- 2.3.5 The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust⁵.
- 2.3.6 Trees: an inspection of trees on site was carried out from the ground, using binoculars, to record any signs of use of the tree by bat species. A ladder, powerful torch and a video fibrescope were available. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were inspected and recorded. Any signs of staining (from urine or fur rubbing) and scratch marks below potential access points were noted, and a search was made for droppings underneath these features.
- 2.3.7 *Habitat:* the habitats within the site were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.
- 2.3.8 Detailed bat activity surveys have been conducted at the site. The details of outlined in a separate Appendix (7.4)

Otter

2.3.9 A search was made along the banks of water courses and water bodies and their adjacent habitats for otter *Lutra lutra* signs including spraints, tracks, castling, and rolling. The banks of any water courses were searched for the presence or potential for holts or other sheltering areas.

Water Vole

- 2.3.10 A water vole survey was carried out following guidance in the Water Vole Conservation Handbook 3rd Edition⁶ and the Mammal Society's Water Vole Mitigation Handbook⁷.
- 2.3.11 Given that habitat suitability for water voles can change significantly throughout the course of the breeding season, the Mitigation Handbook recommends that two survey visits for the species are necessary to confirm presence or likely absence in most cases. One of these surveys should be completed in the first half of the water vole breeding season (mid-April to the end of June) and the other in the second half of the season (July to September inclusive) and the surveys should be two months apart.
- 2.3.12 The first water vole survey was undertaken on the 14th and 15th September 2017 by Peter Timms, with a second survey undertaken on 23rd April 2018 by Peter Timms, Patrick Ellison and Phil Bowater.
- 2.3.13 The surveys were carried out along the length of the ditch network at the site, which is primarily within the western part of the site. Both banks of the river were surveyed where possible and safe to do so. Where access was permitted, the survey area extend 100m up and downstream of the ditch network

⁵ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.

⁶ Rob Strachan, Tom Moorhouse and Merryl Gelling (2011), Water Vole Conservation Handbook (3rd ed.), Wildlife Conservation Research Unit (WildCRU)

⁷ Dean, M., Strachan, R., Gow, D. & Andrews, R. (2016). The Water Vole Mitigation Handbook (Mammal Society Mitigation Guidance Series). Eds Fiona Matthews & Paul Chanin. Mammal Society, London.



off-site. Where the ditch network extended into the steelworkings off-site to the west of the site, no permissible access was available to extend the survey into this area. It is nevertheless considered that adequate survey effort has been made so that water voles would have been detected if they had been present within the development site. The area covered by the surveys is shown in Figure 6.

2.3.14 The ditch banks within the survey area were systematically searched, extending to at least 1m from the water's edge, for signs of water vole including: latrines (showing discrete piles of droppings); feeding remains with characteristically cut vegetation; burrow entrances above and below the water line; runways and footprints; sightings and sounds, particularly listening for the characteristic 'plop' of a water vole entering the water as a result of having been disturbed

Amphibians

- 2.3.15 All waterbodies within 500m of the Site were identified using Ordnance Survey maps and aerial imagery.Waterbodies within the site ownership and on publically accessible land were assessed during the field survey for their suitability to support amphibian species.
- 2.3.16 Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the methodology described by Oldham et al⁸. HSI scores give a relative indication of the likelihood that a water body would support breeding great crested newts. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.
- 2.3.17 Terrestrial habitats were also assessed for their suitability for foraging and sheltering amphibians. Amphibians require habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

eDNA Survey

- 2.3.18 Five ponds pond within the site were subject to eDNA survey on 24th April 2018. This was carried out within the optimal survey window (15th April and 30th June) to determine presence/likely absence. Surveys were carried out following best practice as outlined in the Defra Project WC1067⁹.
- 2.3.19 The surveyed ponds contained >10cm water with full surveyor access to collect samples around the pond perimeter where possible. Care was taken to ensure that the water was not contaminated from other sources and that any sediment present was not stirred up to contaminate the samples. There were no constraints to sampling of the pond that may have resulted in provision of false positive or negative results.
- 2.3.20 The eDNA kit was provided and water samples analysed by ADAS UK.
- 2.3.21 Two of the ponds, which initially returned indeterminate results, were subsequently resampled on 19th June 2018. On this occasion, the eDNA kits were provided and water samples analysed by SureScreen Scientifics.

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⁸ Oldham. R.S., Keeble L., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.

⁹ Biggs J, Ewald N, Valentini Ä, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.



Reptiles

2.3.22 Features on site were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

Birds

2.3.23 Breeding and wintering bird surveys have been conducted at the site, the details of which are outlined in Appendix 7.2 and 7.3

Invasive Species

2.3.24 Invasive species, such as Japanese knotweed Fallopia japonica and Himalayan Balsam Impatiens glandulifera were searched for and recorded.

Other Notable Species and Species of Conservation Concern

- 2.3.25 Field signs indicating the presence of other species of conservation concern, such as hares *Lepus* europaeus, harvest mice *Micromys minutus* and hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act (2006)) were recorded. Habitats were also assessed for their potential to support such species.
- 2.4 Quality Assurance
- 2.4.1 All ecologists employed by Clarkson and Woods are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct¹⁰ when undertaking ecological work.
- 2.4.2 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS)¹¹.
- 2.4.3 This report has been prepared in accordance with the relevant British Standard: BS42020: 2013 Biodiversity: Code of Practice for Planning and Development¹².

¹⁰ CIEEM (2013). Code of Professional Conduct. <u>www.cieem.net/professional-conduct</u>.

¹¹ CIEEM (2013). Competencies for Species Survey (CSS). <u>www.cieem.net/competencies-for-species-survey-css-</u>

¹² The British Standards Institution (2013). BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development. BSI Standards Ltd.



3 SURVEY LIMITATIONS

3.1 Desk Study

- 3.1.1 The data presented within the report should not be seen as exhaustive. Data obtained from within the search area is highly unlikely to constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed development site that have not been identified within the desk study.
- 3.1.2 The data presented within the desk study section of this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods Ltd. should be contacted.

3.2 Arable Plants

- 3.2.1 The majority of arable plant species are annuals and require suitable conditions in order to perform their life cycle in a given year. As such there may be arable plant species present in the seed bank that were not recorded during the surveys but that may appear in another year.
- 3.2.2 The arable plant survey was generally focused on the field margins at the site and it was not possible to survey the entire ground within the circa 209ha of arable land. Arable plants growing amongst crops are likely to have been missed if present with the centre of fields. However, arable plants do not generally flourish within the centre of conventionally managed arable crop fields, due to herbicide use and being outcompeted by crops, and it is therefore unlikely that or highly-diverse areas or abundant weed growth would have been missed. The survey approach taken is therefore considered likely to have identified the key areas of arable plants present at the site.
- 3.3 Water Voles and Otters
- 3.3.1 Otters have no defined breeding season and the breeding holt is kept deliberately obscure by the female so locating one can be difficult and time consuming.
- 3.3.2 Where water voles live at low densities or a site is at the edge of their range, field signs can be very limited.
- 3.4 Badgers
- 3.4.1 Areas with dense ground cover (hedges, scrub, woodland etc. were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.
- 3.5 General
- 3.5.1 This survey offers only a series of 'snapshots' of the site and takes no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.



3.5.2 If no action or development of this land takes place within twelve months of the date of this report, then the findings of this survey should be reviewed and may need to be updated. After three years the findings will be out of date and the full survey should be repeated.



4 DESK STUDY

- 4.1 Data Search Designated SitesInternational Designations within 10km of the Site
- 4.1.1 The Humber Estuary is designated a Special Protection Area (SPA), Special Conservation Area (SAC) and Ramsar site. The area encompassing the SPA is situated approximately 11km north of the site at the closest point, whilst the SAC and Ramsar site is located 9km west at the closest point. It primarily receives its designation for its estuarine habitats, which support a range of associated species including internationally important assemblages of wintering and migratory birds.

National Designations within 5km of the Site

4.1.2 Five Sites of Special Scientific Interest (SSSIs) are located within 5km of the application site, and are described below:

Broughton Far Wood SSSI

- 4.1.3 This is an extensive block of commercial woodland located approximately 820m east of the proposed solar array, although is 350m from the site access (which will utilise an existing farm track). This is designated for its rich woodland canopy and ground flora, as well as its areas of herb-rich limestone grassland in the north east corner.
- 4.1.4 The SSSI is separated from the application site by further woodland plantation, arable fields and the B1207 road.

Broughton Alder Wood SSSI

4.1.5 Situated approximately 1km east of the main development site, and is designated for its wet, alder *Alnus* glutinosa woodland and associated fen and spring habitats and flora. It is separated from the development site by extensive plantation woodland, the B1207 road, and a poultry farm.

Risby Warren SSSI

4.1.6 This is a remnant area of heathland which supports a variety of associated plant communities, include dune, heathland, acid and calcareous grassland which are affected by airborne pollution from the nearby industrial sites. Tree cover on the SSSI comprises coniferous shelter belt planting and as well as scattered birch *Betula sp.* and gorse *Ulex europaeus*. This is located approximately 2.65km north west of the site and is separated from the application site by plantation woodland, agricultural farmland, heavy industry and quarry workings.

Manton and Twigmoor SSSI

4.1.7 This comprises a complex of three separate sites, which are located approximately 3.1km south of the site at the closest point. Important habitats supported by the SSSI include heathland, acid grassland and wetland features, with wet woodland also present. Together the site components support a diverse range of associated floral species. The intervening landscape comprises woodland plantations, an existing solar array, a golf course and the busy A18 and M180 roads.

Castlethorpe Tufas SSSI

4.1.8 This is situated approximately 3.4km and is designated for its' geological interest.



Local Designations within 1km of the Site

4.1.9 Eleven locally designated sites for nature conservation are located within 1km of the application, which are described in Table 1. Of these, eight are Local Wildlife Sites (LWSs) selected by the Greater Lincolnshire Nature Partnership due to their importance for wildlife at a local level. Three sites are Sites of Nature Conservation Interest (SNCIs), the status of which has been superseded by the LWSs, but these sites retain SNCI status until they have been assessed against the LWS criteria.

Site	Designation	Description	Size (ha)	Distance and bearing from site
Manby Wood	LWS	Botanically diverse wooded area, primarily consisting of broadleaved plantation with small areas of young coniferous plantation. Supports a variety of associated ground flora.	80.1	Adjacent to south-eastern boundary of site
Heron Holt	LWS	Woodland with parts containing diverse range of deciduous species and structural variety, with other parts consisting of dense pine and sycamore plantation. Supports a variety of woodland ground flora.	33.3	Adjacent to eastern boundary of site
Broughton West Wood	LWS	Mostly mature deciduous plantation, representative of re-planted ancient woodland, with substantial areas of younger growth and some coniferous elements. Very rich in woodland botany.	83.8	Adjacent to eastern boundary of site
Santon Wood East	LWS	A strip of field edge woodland connecting two planted woodland blocks of varying age and structure, which contains some ancient woodland indicator species.	6,77ha	Adjacent to north eastern boundary of site
Broughton Far Wood	LWS	Botanically diverse plantation woodland containing mature or maturing broadleaved trees with some pine in places.	50.8	440m east
Gadbury and Lundimore Woods	LWS	Mixed plantation woodland considered to represent re-planted ancient woodland, supporting diverse ground flora. Known to support common pipistrelle Pipistrellus pipistrellus bat roosts.	81.5	450m south
Rowland Planation	LWS	Dominated by botanically-poor woodland plantation, although supports some areas with richer ground flora, and also contains diverse grassland rides and a small area of wetland	121	560m east
Far Wood Farm Meadow	LWS	An area of marsh, drier grassland and coarse vegetation formally cropped for hay. Supports diverse range of flush and grassland botany.	1.9	800m east
Broughton West Wood	SNCI	Two strips of woodland shelter belts, predominantly consisting of deciduous plantation woodland with a small element of coniferous growth. Occasionally diverse woodland ground flora found in some areas. Support a wide range of typical woodland bird species.	6	Adjacent to south eastern boundary of site
Santon Wood	SNCI	Deciduous plantation woodland managed for forestry. Contains some good woodland ground flora.	101	Adjacent to north western boundary, contains part of the application site
Spring Wood Boughton	SNCI	Dense coniferous plantation woodland with very little ground flora	9.2	230m north of site access

Table 1: Non-statutorily designated sites within 1km of the application site

4.1.10 Parts of Manby Wood LWS and Broughton West Wood are considered to represent Plantations on Ancient Woodland Sites (PAWS) due to notable presence of mature ancient woodland indicator species.



4.2 Data Search – Protected and Notable Species

Data obtained from Lincolnshire Environmental Records Centre

4.2.1 Data was obtained from Lincolnshire Environmental Records Centre (LERC) on all notable species within 2km of the site boundary.

Badger

4.2.2 Eight records (post-2000) of badgers were returned from the data search, the closest being a road casualty approximately 110m north east of the site. Five records of setts from woodland approximately 1km west of the site were also returned.

Bats

- 4.2.3 A number of existing records of at least six species of bats were obtained from the records centre, the closest of which were field recordings of unidentified bat species within woodland adjacent to the south east of the site.
- 4.2.4 A number of field records of common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* exist from areas of woodland approximately 1km east of the site. Field records of this species, as well as Daubenton's bat Myotis daubentonii exist from Ashbyville Lake, approximately 1.3km south west of the site. Single records of Nathusius' pipistrelle *Pipistrellus nathusii* and Whiskered bat Myotis mystacinus occur within Scunthorpe and approximately 1.5km west of the site.
- 4.2.5 Unspecified common pipistrelle and brown long-eared *Plecotus auritus* roosts are also known to be present within the town of Broughton, approximately 1km east of the site.

Otter and Water Vole

- 4.2.6 A record of an otter spraint from 1996 exists, located approximately 200m north of the site.
- 4.2.7 Water voles have been recorded on Bottesford Beck, approximately 1.95km south west of the site, most recently in 2013.

Amphibians

4.2.8 Great crested newt *Triturus cristatus* records exist from 2006. The exact location these records were taken from is unclear but is believed to be from close to the south west boundary of the site. A small number of records of common toad *Bufo bufo* are also present within the search area.

Reptiles

4.2.9 Records of reptiles from within the search area are limited to a record of grass snake from 1977, from an unspecified location.

Birds

4.2.10 A number of records of notable bird species were obtained from the records centre. These are documented within the wintering bird survey and breeding bird survey report in separate Appendices (7.2 & 7.3).



Invertebrates

- 4.2.11 Several moth and butterfly species which are listed as Species of Principal Importance¹³ have been recorded within 2km of the site since 2000. These include grey dagger Acronicta psi, mouse moth Amphipyra tragopoginis, dusky brocade Apamea remissa, garden tiger Arctia caja, sprawler Asteroscopus sphinx, mottled rustic Caradrina morpheus, latticed heath Chiasmia clathrata, sallow Cirrhia icteritia, small heath Coenonympha pamphilus, small square-spot Diarsia rubi, small phoenix Ecliptopera silaceata, august thorn Ennomos quercinaria, autumnal rustic Eugnorisma glareosa, white-line dart Euxoa tritici, ghost moth Hepialus humuli, grayling Hipparchia semele, rustic Hoplodrina blanda, wall Lasiommata megera, shoulder-striped wainscot Leucania comma, rosy minor Litoligia literosa, lackey Malacosoma neustria, dot moth Melanchra persicariae, pretty chalk carpet Melanthia procellata, dark spinach Pelurga comitata, large wainscot Rhizedra lutosa, white-letter hairstreak Satyrium w-album, shaded broad-bar Scotopteryx chenopodiata, white ermine Spilosoma lubricipeda, buff ermine Spilosoma lutea, hedge rustic Tholera cespitis, feathered gothic Tholera decimalis, blood-vein Timandra comae, cinnabar Tyria jacobaeae and dark-barred twin-sport carpet Xanthorhoe ferrugata.
- 4.2.12 The majority of small heath, grayling, and wall records were from Yarborough Quarry, approximately 350m north west of the site. The records of all other species were primarily located at either Ashbyville Lake (1.5km south west of the site) or at woodland areas approximately 1km east.

Plants

4.2.13 A number of records of notable plant species have been recorded within 2km of the site. These include two Species of Principal Importance; Purple milk vetch, of which records exist from on the site, and yellow bird's nest, which has been recorded approximately 950m north of the site

MAGIC search for EPS Licences

4.2.14 Records of previously issued European Protected Species Licences from within 5km of the site were obtained using the MAGIC website. Details of these licences are provided in Table 2 below.

Licence Ref No.	Species Covered	Dates of Licence	Distance and bearing from Site of Licence Record
2015-7054-EPS-MIT	Bats – Common pipistrelle	2015-2025	1.37km Southeast
EPSM2009-1229	Bats – Soprano pipistrelle	2009-2010	2.35km Northeast
EPSM2010-2663	Bats – Common pipistrelle	2011	4km Northwest
2015-16065-EPS-MIT	Bats – Common pipistrelle	2015-2020	5km Northwest
2015-16065-EPS-MIT-1	Bats – Common pipistrelle	2016-2020	5km Northwest
2015-16065-EPS-MIT-2	Bats – Common pipistrelle	2016-2020	5km Northwest

Table 2: MAGIC records of EPS mitigation licences issued within a 2km radius of the site

Little Crow Solar, Santon, Lincolnshire

¹³ Species of Principal Importance (SPI) are listed in Schedule 41 of the Natural Environment and Rural Communities (NERC) Act as requiring action under the UK Biodiversity Action Plan