



# OAKLANDS FARM SOLAR PARK

Applicant: Oaklands Farm Solar Ltd

**Environmental Statement** 

Appendix 15.2 – Agricultural Land Classification Survey for Park Farm

January 2024

Document Ref: EN010122/APP/6.1/Appx 15.2

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## Oaklands Farm Solar Park - Environmental Statement Volume 3

Appendix 15.2: Agricultural Land Classification (Park Farm area) (KCC)

Final report
Prepared by LUC
January 2024



LAND AT PARK FARM, WALTON ON TRENT

AGRICULTURAL LAND
CLASSIFICATION SURVEY

August 2023





#### **APPENDIX 15.2**

# LAND AT PARK FARM, WALTON ON TRENT

AGRICULTURAL LAND
CLASSIFICATION SURVEY

August 2023

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KCC3018/01A Auger Points Plan
KCC3018/02A Agricultural Land Classification

#### 1 INTRODUCTION

- 1.1 This report sets out the results of an Agricultural Land Classification (ALC) survey across a site of approximately 11.5 hectares east of Walton on Trent.
- 1.2 The site is outlined on the Google Earth image below. It is bordered by agricultural land and woodland on all sides

Insert 1: The Site



- 1.3 The ALC follows a detailed soil survey carried out in April 2021.
- 1.4 This report:
  - describes the methodology in section 2;
  - describes the factors affecting agricultural land quality in section 3;
  - and sets out the ALC grades in section 4.

#### 2 METHODOLOGY

- 2.1 The work has been carried out by a Chartered Scientist (CSci), who is a Fellow (F. I. Soil Sci) of the British Society of Soil Science (BSSS). This ALC survey has been carried out by a soil scientist who meets the requirements of the BSSS Professional Competency Standard (PSC) scheme for ALC (see BSSS PCS Document 2 'Agricultural Land Classification of England and Wales'1). The BSSS PSC scheme is endorsed, amongst others, by the Department for Environment, Food and Rural Affairs (Defra), Natural England, the Science Council, and the Institute of Environmental Assessment and Management (IEMA).
- 2.2 This assessment is based upon the findings of a study of published information on climate, geology and soil in combination with a soil investigation carried out in accordance with the Ministry of Agriculture, Fisheries and Food (MAFF) <sup>2</sup> 'Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land', October 1988 (henceforth referred to as the 'the ALC Guidelines').
- 2.3 The ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The ALC system divides agricultural land into five grades (Grade 1 'Excellent' to Grade 5 'Very Poor'), with Grade 3 subdivided into Subgrade 3a 'Good' and Subgrade 3b 'Moderate'.
- 2.4 A detailed ALC survey was carried out in April 2021. The full survey involved examination of the soil's physical properties at 49 auger-bore locations on a 100m by 100m grid, as shown on Plan KCC3018/01. One soil pit (Pit 1) was excavated with a spade to examine certain soil physical properties, such as stone content and subsoil structure, in more detail. Ten of the auger sites lie within the reduced site area.
- 2.5 The sample locations were located using a hand-held Garmin E-Trec Geographic Information System (GIS) to enable the sample locations to be relocated for verification, if necessary.

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<sup>&</sup>lt;sup>1</sup> British Society of Soil Science. Professional Competency Scheme Document 2 'Agricultural Land Classification of England and Wales'. Available online @ <a href="https://www.soils.org.uk/sites/default/files/events/flyers/ipss-competency-doc2.pdf">https://www.soils.org.uk/sites/default/files/events/flyers/ipss-competency-doc2.pdf</a> Last accessed January 2021

<sup>&</sup>lt;sup>2</sup> The Ministry of Agriculture, Fisheries and Food (MAFF) was incorporated within the Department for Environment, Food and Rural Affairs (Defra) in June 2001

2.6 The soil profile was examined at each sample location to a maximum depth of approximately 1.2 m by hand with the use of a 5 cm diameter Dutch (Edleman) soil auger. The soil profile at each sample location was described using the 'Soil Survey Field Handbook: Describing and Sampling Soil Profiles' (Ed. J.M. Hodgson, Cranfield University, 1997). Each soil profile was ascribed a grade following the ALC Guidelines.

#### 3 FACTORS AFFECTING LAND QUALITY

- 3.1 As described in the ALC Guidelines, the main physical factors influencing agricultural land quality are:
  - climate;
  - site;
  - soil; and
  - interactive limitations.
- 3.2 These factors are considered in turn below.

#### Climate

3.3 Interpolated climate data relevant to the determination of the ALC grade of land at the Site is given in Table 1 below.

Table 1: ALC Climate Data for Oaklands Solar Farm, Walton on Trent, Staffs

Climate Parameter	<b>Grid Ref:</b> SK237182
Average Altitude (m)	64
Average Annual Rainfall (mm)	640
Accumulated Temperature above 0°C (January – June)	1397
Moisture Deficit (mm) Wheat	105
Moisture Deficit (mm) Potatoes	96
Field Capacity Days (FCD)	139
Grade according to climate	1

- 3.4 Agricultural land quality at the Site is mainly not limited by climate with reference to Figure 1 'Grade according to climate' on page 6 of the ALC Guidelines, in which in absence of any other limiting factor the land will be determined as Grade 1.
- 3.5 Due to the average annual rainfall, agricultural land across the Site is predicted to range at field capacity (i.e., near saturation point) for approximately 139 days per year, mainly over the late autumn, winter and early spring. Moisture Deficit (MD) values range between approximately 105mm for wheat, and 96mm for potatoes.

3.6 The climate interacts with soil physical properties, i.e., soil texture and wetness class, and can limit agricultural land quality due to soil wetness, and/or soil droughtiness, as described under 'interactive limitations' below.

#### Site

- 3.7 The Site is located to the east of Walton-on-Trent, Staffordshire. The approximate centre of the study area is located at British National Grid (BNG) reference SK 23764 18281. The western boundary is formed by a tributary of the River Trent. The remainder of the Site is surrounded by agricultural land.
- 3.8 With regard to the ALC Guidelines, agricultural land quality can be limited by one or more of three main site factors as follows:
  - gradient;
  - micro-relief (i.e., complex change in slope angle over short distances); and
  - risk of flooding.
- 3.9 **Gradient and Micro-Relief**. The Site is located on a west-facing slope, with the highest elevation in the east at approximately 84 metres (m) Above Ordnance Datum (AOD) and descending to approximately 59 mAOD along the western boundary. The quality of agricultural land is limited by gradient in the north-west (Auger-bore locations 2, 4 and 5, **Plan KCC3018/01**), where the gradient exceeds 7°, but is less than 11°, i.e., the land is limited to Subgrade 3b following Table 1 of the ALC Guidelines. No part of the Site is limited by micro-relief (i.e., complex changes in slope angle and direction over short distances).
- 3.10 **Risk of Flooding**. From the Government Flood Map for Planning website<sup>3</sup>, the study area is mainly within Flood Zone 1 with regions of Flood Zone 3 in the western region of the Site bordering the River Trent. Overall, the agricultural land within the study area is not limited by flooding (re Table 2 '*Grade according to flood risk in summer*' and/or Table 3 '*Grade according to flood risk in winter*' of the ALC Guidelines).

#### Soil

3.11 Geology/Soil Parent Material. From British Geological Survey (BGS) maps at 1:50,000 scale, most of the Site is underlain by sandstone (Edwalton Member), with mudstone (Gunthorpe Member) underlying the higher ground in the east.

<sup>&</sup>lt;sup>3</sup> Government Flood Map for Planning website. Available online @ <a href="https://flood-map-for-planning.service.gov.uk/">https://flood-map-for-planning.service.gov.uk/</a> Last accessed September 2020

- 3.12 Most of the sandstone is not covered by any superficial deposits, and the soils are developed directly from the sandstone parent material. The sandstone along the western boundary, flanking the watercourse, is covered by a superficial covering of alluvium (clay, silt, sand and gravel). In the northwest, the sandstone is covered by glaciofluvial deposits of sand and gravel. The mudstone bedrock underlying the higher ground in the east is covered by glacial till (Thrussington Member).
- 3.13 **Published Information on Soil**. Soil information is available only at a small scale (1:250,000) on the National Soil Map published by the Soil Survey of England and Wales (SSEW) in 1983. This provisional soil map indicates that land at the Site is covered soils grouped in the Whimple 3 Association.
- 3.14 As described by the SSEW, the soils in the Whimple 3 Association consist of reddish fine loamy or fine silty over clayey soils, developed in thin drift over Permo-Triassic and Carboniferous mudstone or clay shal mainly on moderate slopes. These soils suffer slight seasonal waterlogging (Wetness Class III) in many districts, but in the drier parts of the region, they can have a better water regime (Wetness Class II).
- 3.15 **Soil Survey**. The detailed soil survey carried out in April 2020 determined sandy loam and sandy clay loam soils developed over sandstone on the lower ground in the central and western parts of the Site. Much of the lighter, sandier, soils are well drained (Wetness Class I) but some soils near the watercourse along the western boundary are slowly permeable and seasonally waterlogged (Wetness Class III).
- 3.16 The soils in the east, developed in glacial till over mudstone, comprise heavy clay loam soils which have slowly permeable subsoil (Wetness Class IV). The profiles are seasonally waterlogged as a result. Some of the topsoils on high ground in the east, i.e., auger-bore 34, 35, 36 40 and 41, **Plan KCC3018/01A**) are slightly to moderately stony, are and limited to Subgrade 3a by the size of stones (2-6cm), following Table 5 of the ALC Guidelines.
- 3.17 A log of all the soil profiles recorded on site is given as **Appendix KCC1**.

#### **Interactive Limitations**

3.18 From the information above, together with the findings of the detailed soil survey (see Soil Profile Logs given as **Appendix KCC1**), it has been determined that the quality of agricultural land over the Site is limited by soil droughtiness on lighter (sandier) and well drained soils during the growing season, and by soil wetness on heavier, seasonally

waterlogged soils during the wettest times of the year (i.e., autumn and winter), as described below.

- 3.19 **Soil Droughtiness**. As shown in the soil profile logs given as **Appendix KCC1**, moisture balance (MB) calculations for the ALC reference crops (winter wheat and maincrop potatoes) have determined that the soil profiles mainly have MB values of between -20 to -50mm for wheat, and/or between -30mm to -55mm for potatoes. These MB values limit the quality of agricultural land to Subgrade 3b (re Table 8 'Grade according to droughtiness' of the ALC Guidelines).
- 3.20 Soil profiles that have calculated MB values of between +5mm and -20mm for wheat, and between -10mm and -30mm for potatoes. These profiles are limited by soil droughtiness to Subgrade 3a (re Table 8 'Grade according to droughtiness' of the ALC Guidelines).
- 3.21 Occasionally, soil profiles that have calculated MB values of between +30mm and +5mm for wheat, and between +10mm and -10mm for potatoes. These profiles are limited by soil droughtiness to Grade 2 (re Table 8 'Grade according to droughtiness' of the ALC Guidelines).
- 3.22 **Soil Wetness**. From the ALC Guidelines, a soil wetness limitation exists where 'the soil water regime adversely affects plant growth or imposes restrictions on cultivations or grazing by livestock'. Agricultural land quality at the Site is limited by soil wetness as per Table 2 below (based on Table 6 'Grade According to Soil Wetness Mineral Soils' in the ALC Guidelines).

Table 2: Predicted ALC Grade According to Soil Wetness

Wetness	Texture of the Top 25 cm	126-150
Class		Field Capacity Days
1	Sandy Loam, Sandy Silt Loam	1
	Medium Clay Loam*, Sandy Clay Loam	1
	Heavy Silty Clay Loam**, Heavy Clay Loam**	2
	Clay, Silty Clay	3a
II	Sandy Loam, Sandy Silt Loam	1
	Medium Clay Loam*, Sandy Clay Loam	2
	Heavy Silty Clay Loam**, Heavy Clay Loam**	3a
	Clay, Silty Clay	3b
III	Sandy Loam, Sandy Silt Loam	2
	Medium Clay Loam*, Sandy Clay Loam	3a
	Heavy Silty Clay Loam**, Heavy Clay Loam**	3b
	Clay, Silty Clay	3b
IV	Sandy Loam, Sandy Silt Loam	3a
	Medium Clay Loam*, Sandy Clay Loam	3b
	Heavy Silty Clay Loam**, Heavy Clay Loam**	3b
	Clay, Silty Clay	3b
Key * <27% cla	ay; and ** >27% clay	

3.23 Therefore, in a climate area with 139 field capacity days (FCD), the soil profiles in Wetness Class III and IV with heavy clay loam topsoils are limited to Subgrade 3b. Whilst, the soil profiles in Wetness Class III with sandy clay loam topsoils are limited to Subgrade 3a.

#### **Predicted ALC**

3.24 MAFF Provisional ALC information (1:250,000) indicates that agricultural land around Walton-on-Trent is Grade 2 and Grade 3 (not differentiated between Subgrade 3a and Subgrade 3b). There is no detailed (post-1988) ALC survey information covering the study area. However, there is a large proportion of Subgrade 3b to the south and east of the Site, with smaller regions of Grade 1, Grade 2 and Subgrade 3a.

#### 4 AGRICULTURAL LAND CLASSIFICATION GRADING AT THE SITE

4.1 The agricultural land within the study area has been classified mainly as Subgrade 3b with a smaller area of Grade 2. The area and proportion of agricultural land in each ALC grade has been measured from an ALC map given as **Plan KCC3018/02A**. The findings are reported in Table 3 below.

Table 3: Agricultural Land Classification – Oakland Solar Farm, Walton on Trent

ALC Grade	Area (Ha)	Area (% of Total Site)
Grade 1 (Excellent)		
Grade 2 (Very Good)	0.5	6
Subgrade 3a (Good)		
Subgrade 3b (Moderate)	8.0	94
Grade 4 (Poor)	0	0
Grade 5 (Very Poor)	0	0
Non-agricultural / Other land	0	0
Not surveyed		
Total	8.5	100

Appendix KCC1
Soil Profile Logs

oject Number	Project Name	Parrel
/83	IKCC3018 Oakland Farm Walton on Trent Derbychine	
	medical carrier and the second of the second	

Project Number	Project Name			Parcel
C783	KCC3018 Oakland Far	KCC3018 Oakland Farm, Walton on Trent, Derbyshire		
Date of Survey	Survey Type	Surveyor(s)	Company	
14/04/2021	Detailed ALC	AR	Askew Land and Soil	l and Soil
Weather		Relief	Land use and vegetation	nc
Mild, sunny, slight breeze.	eeze.	West to southwest facing slope	LEY (Ley Grass)	

Grid Reference	Postcode	Altitude	Area
SK237182	DE15 9UF	64	50

11111					
MAFF prov		MAFF detailed		Flooding	
Grade 2		No post 1988 ALC		Flood Zopne 1, with FZ3 to the west	Z3 to the west
AAK	ATO	MDw	MDp	FCD	Climate grade
0.0					055.0
164()	11307		707		

100	AIO	MUM	MUP	55	Climate grade
640	1397		105	96	1
-					
Bedrock			Superficial deposits		
١					
Edwalton Sandstone	Sandstone; Gunthorpe Mudstone in east		Alluvium along west boundary: till in east	oundary: till in east	

Soil association(s) 1:250,000	Detailed soil information
Whimple 3	No detailed SSEW soil surveys
-	
Kovicion Milmbar	

Date Revised	30/04/2021
Revision Number	2

C783/KCC3018 Oakland Farm, Walton on Trent, Derbyshire Revision 2 Revision Date 30/04/2021

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Mottle form	Ped. Shape	Ped. Size
FF - Few Faint	SG - Single grain	VF - Very Fine
FD - Few Distinct	GRA - Granular	F - Fine
FP - Few Prominent	SAB - Subangular Blocky	M - Medium
CF - Common Faint	AB - Angular Blocky	C - Coarse
CD - Common Distinct	PRIS - Prismatic	VC - Very Coarse
CP - Common Prominent	PLAT - Platy	NA - N/A
MF - Many Faint	MASS - Massive	
MD - Many Distinct	NA - N/A	Degree of Ped. De
MP - Many Prominent		W - Weak
VF - Very many Faint	Subsoil Structure Condition	M - Moderate
VD - Very many Distinct	Not Applicable	S - Strong
VP - Very many Prominent	Good	NA - Not applicable
	Moderate	
Texture	Poor	Wetness Cl
C - Clay		WCI
CHK - Chalk	Soil or Ped. Strength	WCII
CS - Coarse Sand	Loose	WCIII
CSL - Coarse sandy loam	Very friable	WCIV
CSZL - Coarse sandy silt loam	Friable	WC V
FP - Fibrous and semifibrous peats	Firm	WCVI
FS - Fine Sand	Very firm	
FSL - Fine sandy loam	Extremely firm	ALC Grad
FSZL - Fine sandy silt loam	Extremely hard	1
HCL - Clay loam (heavy)	N/A	2
HP - Humified peats		3a
HZCL - Silty clay loam (heavy)	Calcareousness	36
IMP - Impenetrable to roots	NON - Non-calcareous (<0.5% CaCO3)	4
LCS - Loamy Coarse Sand	VSC - Very slightly calcareous (0.5 - 1% CaCO3)	2
LFS - Loamy fine sand	SC - Slightly calcareous (1 - 5% CaCO3)	Non-Ag
LMS - Loamy medium sand	MC - Moderately calcareous (5 - 10% CaCO3)	
LP - Loamy peats	VC - Very calcareous (>10% CaCO3)	Gley

None Gley N/A

C783/KCC3018 Oakland Farm, Walton on Trent, Derbyshire Revision 2 Revision Date 30/04/2021

GS - Gravel with porous stones (mainly soft stone types listed above) HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger nail)

CH - Chalk or chalk stones FSST - Soft fine grained sandstones GH - Gravel with non-porous (hard) stones

SI - Soft 'weathered' igneous or metamorphic rocks or stones SLST - Soft colitic or dolomitic limestones ZR - Soft, argillaceous or silty rocks or stones MSST - Soft, medium or coarse grained sandstones

MZ- Marine Light Silts
MZCL - Silty clay loam (medium)
OC - Organic clays
OL - Organic loams
OS - Organic sands
PL - Peatly clams
PS - Peatly sands

SC - Sandy clay SCL - Sandy clay loam SP - Sandy peats

ZC - Silty clay ZL - Silt loam

MS - Medium Sand MSL - Medium sandy Ioam MSZL - Medium sandy silt Ioam

IMP - Impenetrable to roots
LCS - Loamy Coarse Sand
LFS - Loamy fine sand
LMS - Loamy medium sand
LP - Loamy peats
MCL - Clay loam (medium)

### Plan KCC3018/01A Auger Point Plan

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K	ΕY

Auger sample location

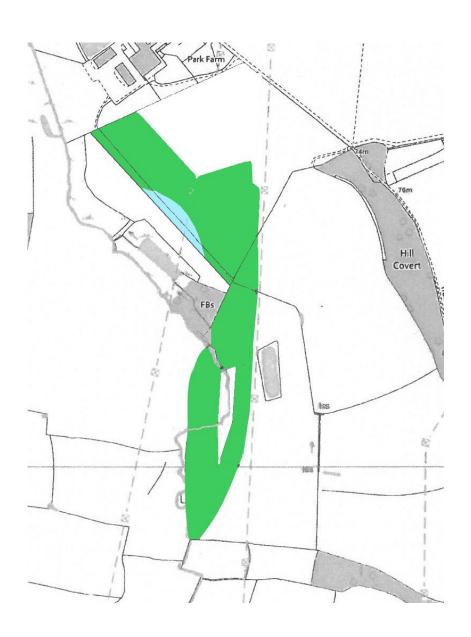
PLAN	KCC3018/01A Auger Points Plan										
TITLE											
SITE	Oaklands Solar Farm (Park Farm)										
CLIENT	BayWa.r.e. UK Limited										
NUMBER	KCC3018/01A 08/	23hr									
DATE	August 2023	SCALE NTS									
	KERNON COUNTRYSIDE CONSULTANTS LTD										

KERNON COUNTRYSIDE CONSULTANTS LTD GREENACRES BARN, PURTON STOKE, SWINDON, WILTSHIRE SN5 4LL

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### Plan KCC3018/02A Agricultural Land Classification Plan





KEY		На	%	PLAN	KCC3018/02A						
	Grade 1			TITLE	Agricultural Land Classification						
	Grade 2	0.5	6	SITE	Oakland Solar Farm (Park Farm)						
	Grade 3a			CLIENT	BayWa.r.e. UK Limited						
	Grade 3b	8.0	94	NUMBER	KCC3018/02A 08/23hr						
	Grade 4			DATE	August 2023 SCALE NTS						
	Grade 5			KER	RNON COUNTRYSIDE CONSULTANTS LTD						
	Non-agricultural			GREEN	NACRES BARN, PURTON STOKE, SWINDON, WILTSHIRE, SN5 4LL						
	Urban			Tel 01793 771 333 Email: info@kernon.co.uk This plan is reproduced from the Ordnance Survey under copyright license 100015226							
	Not surveyed										

