SEQUENTIAL TEST ANALYSIS

SWEETBRIAR SOLAR FARM, LINCOLNSHIRE

FOR LIGHTROCK POWER

JANUARY 2022

Prepared By:

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1 INTRODUCTION

1.1 Background

Arcus Consultancy Services Limited ('Arcus') has been commissioned by Lightrock Power to undertake a Sequential Test Analysis for a potential Solar Farm Development ('the Development') on agricultural land to the east of Wootton, approximately 4.5 km south east of Barrow-upon-Humber and 5.5 km north west of Immingham, Lincolnshire ('the Development Site'). The Development would connect to the 33 kV overhead electrical line which passes through the Development Site. The connection would be undertaken by the Distribution Network Operator.

The Development Site covers an area of approximately 44.58 hectares (ha) and is currently used for a mixture of arable land and free range chicken farming.

The Sequential Test Analysis was requested by Lightrock Power in order to contribute to pre-application discussions with North Lincolnshire Council ('the Council') and to support a planning application, as the Development Site lies within Agricultural Land Classification (ALC) Grades 2, 3a and 3b.

This Report is supported by the following figures and appendices:

- Figure 1 – Constraints;
- Figure 2 - Potentially Developable Areas (PDA); and
- Appendix A: Agricultural Land Classification Survey of the Development Site.

1.2 Policy Overview

This analysis determines whether or not there is potentially lower quality land by reference to its ALC grade, on which to locate the Development when considered against the requirements of the revised National Planning Policy Framework (NPPF)[1] and Planning Practice Guidance (PPG)[2].

The NPPF, which was revised in July 2021, states the following at paragraph 174:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;"

with the following relevant definition:

"Best and most versatile agricultural land: Land in grades 1, 2 and 3a of the Agricultural Land Classification."

PPG on "Renewable and Low Carbon Energy" still, at the time of writing, reflects the 2019 version of the NPPF, which required a sequential test to address the factors a local planning authority needs to consider, including:

"- *encouraging the effective use of land by focussing large scale solar farms on previously developed and non-agricultural land, provided that it is not of high environmental value;*

[1] Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework. July 2021. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [Accessed 27/07/2021].

[2] Ministry of Housing, Communities and Local Government (2015). Guidance: Renewable and Low Carbon Energy. Paragraph: 013 Reference ID: 5-013-20150327. Available at: https://www.gov.uk/guidance/renewable-and-low-carbon-energy#active-solar-technology [Accessed 21/06/2021].

- where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays."

As such, there is no prohibition on the use of good quality agricultural land for solar outlined in the NPPF and PPG. The requirements as detailed in the Minister's statement of 2015[3], stated that it would need to be justified by '*the most compelling evidence'*.

There has been an historical absence of national policy direction for solar development in England. That changed in September 2021 with the issue of the draft revised version of the National Policy Statement (NPS) for renewable energy, EN-34. Whilst this Policy is for Nationally Significant Infrastructure Projects, it provides a useful insight into a number of considerations for solar farm development and specifically, with regards to ALC, it identifies it as relevant but it should not be *'a predominating factor in determining the suitability of the site location'* and solar is *'not prohibited on agricultural land classified 1, 2 and 3a'* (2.48.13 and 2.48.15).

1.3 Planning Background

As outlined within Section 1.4 of this report, there is a growing need to produce low carbon electricity. Solar developments can contribute to this low carbon electricity; however, there are challenges associated with locating solar farms on poorer quality ALC land in certain areas. In order to ensure that solar developments are kept viable, the distance between the development and grid connection point needs to be kept relatively short. As a result, there is a growing need for solar developments to be granted planning permission on better quality agricultural land if that is the only available land surrounding the available point of connection to the grid.

The operational Rose and Crown solar farm was refused by King's Lynn and West Norfolk Borough Council. Following an appeal decision by the Planning Inspector in 2015, planning permission was granted[5]. The Inspector recognised that there was very little low-quality land within the local area and understood that there was a "*need to limit the distance between generation capacity and the grid*".

The Inspector went on to conclude that "*this high-quality agricultural land would not be lost to agriculture ... and would be restored to arable use, most likely in a better condition than the intensive use it is currently put to*".

1.4 Need for Renewable Development

In order to meet the emission targets, set by the Paris Agreement[6] in 2015 and the EU 2020 renewable energy targets set by the Renewable Energy Directive 2009/28/EC[7], the UK has a responsibility to increase the amount of renewable energy generated power available and reduce the dependence on fossil fuels for UK energy needs.

[3] Department for Communities and Local Government, Written Statement – HCWS488 (2015). Available at https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2015-03-25/HCWS488/ [Accessed 21/06/2021].

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf [Accessed 15/11/2021].

[5] Paul Jackson (2015). Appeal Decision. [Online] Available at https://acp.planninginspectorate.gov.uk/ViewDocument.aspx?fileid=12475820. [Accessed 04/12/2019]

[6] United Nations Climate Change (2015). The Paris Agreement | UNFCCC. [online] Unfccc.int. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed 05/05/2021].

[7] European Commission (2018). EUR-Lex - 32009L0028 - EN - EUR-Lex. [online] Energy Directive. Available at: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028 [Accessed 05/05/2021].

The UK Clean Growth Strategy (2017)[8] conveys the Government's objective of achieving clean growth, whilst ensuring an affordable energy supply for businesses and consumers. The strategy is in-line with the 2015 Paris Agreement where 195 countries agreed to stretch national targets to keep the global temperature rise below 2°C. Therefore, further actions and investment will be needed to ensure the shift to clean growth in the coming years, where the clean growth plays a central role in the UK's Industrial Strategy.

To meet the fourth and fifth carbon budgets (2023-2027 and 2028-2032), and the newly emerging sixth carbon budget, there will be a need for a significant acceleration in the pace of decarbonisation, while ensuring a secure energy supply at minimum cost to both industry and domestic consumers.

On 9th December 2020, the CCC released The Sixth Carbon Budget which updates intermediary targets for the UK's progress to net zero.

"Our recommended pathway requires a 78% reduction in UK territorial emissions between 1990 and 2035. In effect, it brings forward the UK's previous 80% target by nearly 15 years. There is no clearer indication of the increased ambition implied by the Net Zero target than this."

These recommended targets must be considered as a factor in the determination of applications for viable solar energy projects. In establishing intermediary targets towards net zero, the context exists for Local Authorities to recognise the action that must be taken sooner rather than later. As concluded in the Sixth Carbon Budget:

"The implication of this path is clear: the utmost focus is required from government over the next ten years. If policy is not scaled up across every sector; if business is not encouraged to invest; if the people of the UK are not engaged in this challenge – the UK will not deliver Net Zero by 2050."

Chapter 3, Section 4 of the report addressed electricity generation specifically. Reducing carbon emissions to net zero will require significant expansion of low carbon generation, in particular low cost renewables and decarbonised back up generation.

Under the CCC's 'balanced pathway' approach to net zero, the demand for electricity will increase substantially due to increased electrification (for example the use of electric vehicles in transport) and can be expected to increase from around 300 TWh today to 360 TWh in 2030, 460 TWh in 2035 and 610 TWh by 2050. Meeting this increased demand excludes potential generation from hydrogen.

The report sees renewables as forming the 'backbone of the electricity system', providing 80% of all generation by 2050. Wind, in particular offshore, will need to provide 265 TWh of generation by 2035 and 430 TWh by 2050. This will require 3 GW per year of new solar capacity, in addition to a similar amount of new wind capacity[9].

On 20th April 2021 the Department for Business, Energy and Industrial Strategy and Prime Minister's Office jointly announced that the Sixth Carbon Budget will limit the volume of greenhouse gasses emitted over the 5 year period from 2033 to 2037, equivalent to a 78% reduction by 2035 compared with 1990 levels. The UK Government is already working towards a reduction of 68% by 2030, and states that the goal of achieving 78% by 2035 constitutes the world's most ambitious climate change target.

For the first time, the Carbon Budget will incorporate the UK's share of international aviation and shipping emissions. The statement also notes that the UK continues to break records

[8] UK Government (2017) Government reaffirms commitment to lead the world in cost-effective clean growth [Online] Available at: https://www.gov.uk/government/news/government-reaffirms-commitment-to-lead-the-world-in-cost-effective-clean-growth (Accessed 14/05/2019)

[9] Climate Change Committee - The Sixth Carbon Budget: The UK's path to Net Zero (2020). Page 134/135 [Online] Available at https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf (Accessed 07/05/21)

in renewable energy generation, which has more than quadrupled since 2010, with low carbon electricity accounting for over 50% of total generation.

The new target was given statutory force on 24th June 2021 through The Carbon Budget Order 2021[10].

The Development will generate electricity with a very low carbon footprint and would be capable of operating without financial support from the Government or elsewhere, *i.e.*, income derived from sales of the electricity exported from the scheme, at wholesale prices.

The ability to generate low carbon, low-cost electricity is constrained by grid connection opportunities. It is known that the existing substation at Immingham has capacity to accept electrical input from the Development via the existing 33kV Immingham to Barrow overhead line. The scope of this assessment is therefore limited to consideration of alternative sites that could viably connect to Immingham substation and the Immingham-Barrow 33kV overhead line. The scope of the search includes an area where a solar farm of the scale being considered could be viably developed and it set as:

- Land within 2 km of the substation; and
- Within 1 km of the overhead line for a distance of 10 km from the substation.

1.5 Purpose of this Report

This report presents the findings of a Sequential Test Analysis which outlines the process through which the location of the Development has been determined as suitable. It seeks to demonstrate that the Site meets the requirements of both PPG and NPPF with regards to the siting of the Development on land classed as Best and Most Versatile (BMV: ALC Grade 1, Grade 2 and Grade 3a).

2 METHODOLOGY

There is no guidance relating to the preparation of a Sequential Test Analysis of potentially developable land for solar PV development. The methodology has therefore been informed by current practice for similar solar development types.

2.1 Study Area

The size of a suitable study area depends on the size of the electricity generating station. The cost of connection to the electrical grid increases substantially with distance from the connection point. Therefore, the maximum viable distance from the Site to the point of electrical connection to the grid has been determined to be no more than 2 km from the Immingham substation, or within 1 km either side of the Immingham Barrow 33kV line for a distance of up to 10 km from the substation.

The study area, as described above, is shown in Figure 1.

2.2 Constraints

Land within the search area was examined and all constrained and designated areas where large scale solar development is unlikely to be viable were excluded. These areas are shown on Figure 1[11] and include:

- Local Wildlife Sites;
- Conservation Areas;
- Special Protection Areas;

[10] The Carbon Budget Order 2021. (2021) [Online] Available at: https://www.legislation.gov.uk/uksi/2021/750/introduction/made (Accessed 07/12/2021)

[11] GIS datasets used to create Figure 1 are sourced from publicly available data on Natural England's website (http://www.gis.naturalengland.org.uk/pubs/gis/GIS_Selection.asp?Type=2) was used to aid the production of this report and associated figures. The validity of this information has not been independently verified by Arcus, unless otherwise stated.

- Ramsar Sites;
- Special Areas of Conservation;
- Sites of Special Scientific Interest;
- Areas of woodland;
- Cumulative Renewable Energy Developments;
- Land within 100 m of Listed Buildings;
- Land within 100 m of residential properties;
- Land within 500 m of settlements;
- Land within 10 m of Public Rights of Way; and
- Grade ALC 1 and Grade ALC 2 land.

The majority of the land within the study area is located in ALC Grade 2 and ALC Grade 3.

The Council's Brownfield Register was reviewed first for potentially suitable alternative sites. The remaining 'unconstrained' land was examined to identify any contiguous Potentially Developable Areas (PDAs) of a similar area to the Development Site (44.58 ha). These areas are shown on Figure 2.

3 SEQUENTIAL TEST ANALYSIS

Figure 1 shows an overview of the search area with constraints. Remaining land, after excluding the constraints, is shown on Figure 2. Within the remaining unconstrained land, PDA's with an area of approximately 44.58 ha or greater were identified based on professional experience.

No suitable non-agricultural or brownfield sites were identified within the study area, principally due to the area required (44.58 ha).

3.1 Potential Developable Areas

3.1.1 PDA 1

PDA 1 has an area of approximately 150 ha, large enough for the proposed scale of the Development.

The PDA is located on Grade 3 agricultural land and as such has similar agricultural land quality to the Development Site.

PDA 1 is flat with limited screening which may lead to long distance views of any potential development. The PDA is flanked to the south by the A180 and to the west by the A160. The settlement of South Killingholme is situated 500 m to the north east of the PDA, however, screening is already in place to shield views of the Humber Road from residential properties and views of the PDA should be minimal.

Several public rights of way run adjacent to the PDA along the southern and eastern boundaries. The visual amenity of users on these footpaths could potentially be impacted by any potential solar development during construction and operation.

The Immingham Barrow 33kV line runs through the northern parcel of the PDA. This provides a potential grid connection opportunity for any proposed solar development.

PDA 1 is located across two Council boundaries – North Lincolnshire Council to the north and North East Lincolnshire Council to the south. This increases the complexity of the planning process and potentially increases the planning risk and timescales.

PDA 1 is not more suitable for large-scale solar PV development than the Site.

3.1.2 PDA 2

PDA 2 has an area of approximately 180 ha, large enough for the proposed scale of the Development.

The PDA is located on Grade 3 agricultural land and as such has similar agricultural land quality to the Development Site.

This PDA is flat with minimal screening which may lead to long distance views of any potential development. Properties in the village of Habrough to the west and the town of Immingham to the north east will likely have extensive and significant views of any solar development located within PDA 2.

The PDA is divided into two by the A180 which runs directly through the PDA from east to west.

The Immingham Barrow 33kV line runs through the northern parcel of the PDA. This provides a potential grid connection opportunity for any proposed solar development within the north of the PDA, although a connection to the southern parcel across the A180 may prove more difficult.

PDA 2 is not more suitable for large-scale solar PV development than the Site.

3.1.3 The Development Site

Lightrock Power have land agreements in place for the Development Site and a grid connection offer from the Distribution Network Operator. The Development Site had an initial area of approximately 44.58 ha, large enough for the proposed scale of the Development. The solar farm would be connected into the Immingham Barrow 33 kV overhead line which crosses the Development Site. This connection would be undertaken by the Distribution Network Operator.

An ALC survey of the land available for the possible solar Development covered a larger area of 87 ha and was undertaken in April 2021, a copy of which can be found in Appendix A. The report confirmed that:

- 4.3% of the Site lies within Grade 2, described as "very good quality agricultural land";
- 70.5% of the Site lies within Grade 3a described as "good quality agricultural land"; and
- 23% of the Site within Grade 3b, described as "moderate quality agricultural land".

Following the development of the preliminary design, the overall Site area was reduced from 87 ha to 44.58. The ALC classification distribution across the Site is now approximately:

- 0% of the Site lies within Grade 2;
- 86.1% of the Site lies within Grade 3a; and
- 13.9% of the Site lies within Grade 3b.

The ALC survey included additional land which has since been removed from the proposal to avoid using Grade 1 ALC land. The Development is partly sited on land currently used for the rearing of free-range chickens. Furthermore, in other areas of the Site, sheep grazing would be proposed within the solar farm. As such a form of agriculture would continue alongside the Development which would also only be for a temporary period. The area of land to the south of the Development Site closer to the substation surveyed in the ALC survey was discounted as it is in arable cultivation and located closer to the settlements of Ulceby and Ulceby Skitter, therefore it is considered to be less appropriate.

The Development Site is located beyond 1.2 km from the village of Wootton. Consideration of local topography was also a factor in the location of the Development, with the land benefiting from flat land and some pre-existing screening from hedgerow and woodland areas.

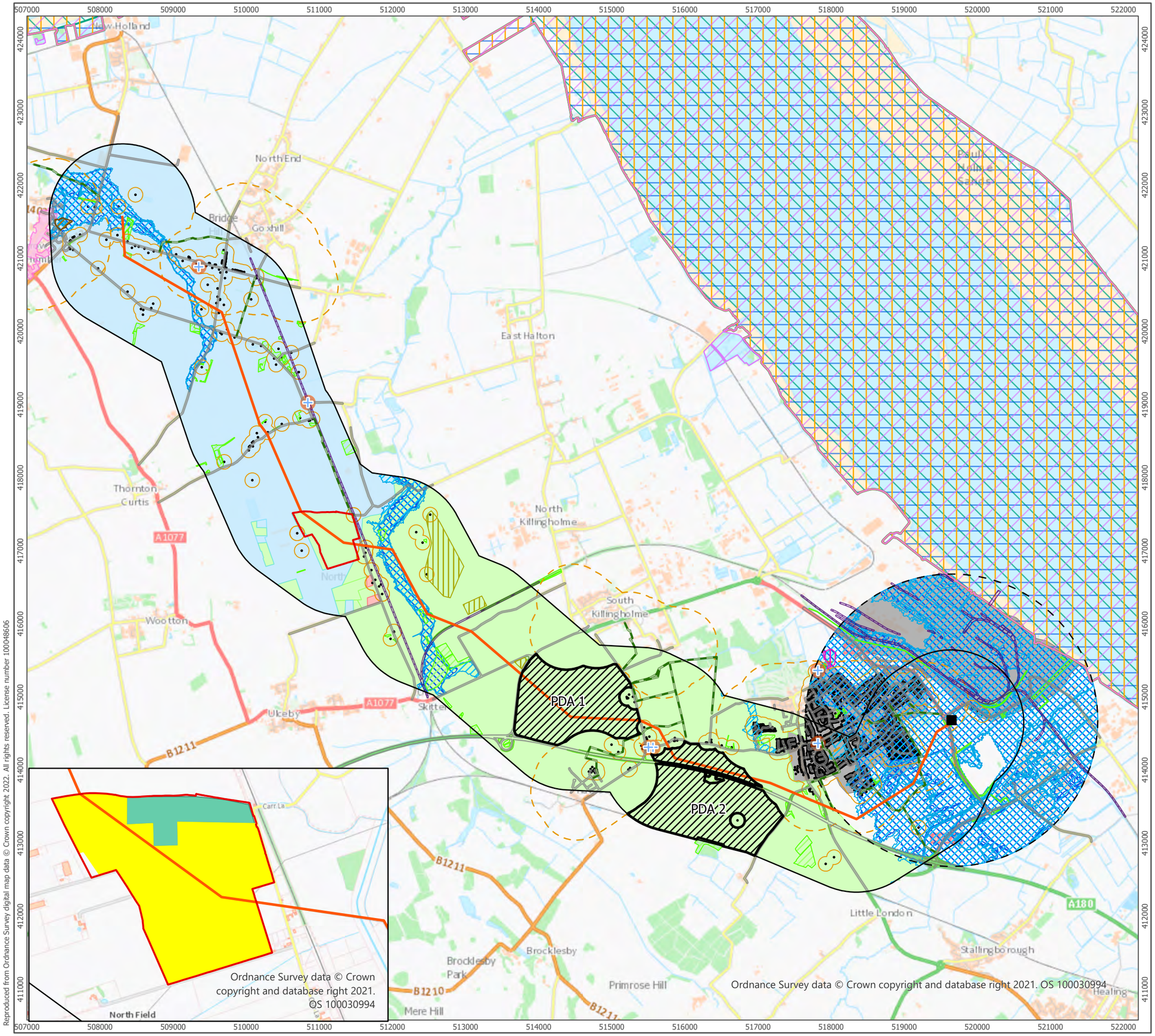
There are no public rights of way running through the Application Boundary. A section of public footpath 'NI|THOR|130', finishes adjacent to the north east of the boundary.

4 CONCLUSION

The Sequential Test Analysis described in this report has identified that the selection of the Development Site meets the requirements of the NPPF and PPG for the following reasons:

- There are no suitable PDAs comprising land that is of a lower agricultural quality than the Site (*i.e.,* ALC grade 3b, 4 or 5, or non-agricultural/ brownfield land). The study area comprises predominantly Grade 2 and 3 agricultural land;
- The Development is partly sited on land currently used for the rearing of free-range chickens. Furthermore, in other areas of the Site sheep grazing would be proposed within the solar farm. As such, a form of agriculture would continue alongside the Development which would also only be for a temporary period;
- The land within the Development Site benefits from being flat and has a small number of potentially sensitive receptors nearby. There is also pre-existing screening from existing hedgerow and woodland which acts to reduce the visual extent of the proposed Development; and,
- The Immingham-Barrow overhead line, which is the point of connection to the grid, runs through the Development Site.

FIGURE 1 – CONSTRAINTS



LIGHTROCKPOWER

ARCUS

- Immingham Substation
- Immingham Barrow 33kV
- 2 km Search Area from Immingham Substation
- 1 Km Search Area from Immingham Barrow 33kV
- Sweetbriar Site Boundary
- Conservation Area
- Special Protection Area
- Special Area of Conservation
- Ramsar
- Site of Special Scientific Interest
- Woodland
- Local Wildlife Site
- Urban Area
- Brownfield Register
- Undevelopable Area
- Flood Zone 2
- Flood Zone 3
- Grade 1 ALC
- Grade 2 ALC
- Grade 3 ALC
- 10 m Road Buffer
- 10 m Railway Buffer
- 100 m Buffer of Listed Building
- 100 m Buffer of Residential Dwelling
- 500 m Buffer of Settlement
- Footpath
- Grade II Listed Building
- Residential Dwelling

Site ALC Survey Results (Inset Map)

- Grade 3a
- Grade 3b

1:50,000 Scale @ A3

0 1 2 km

NORTH

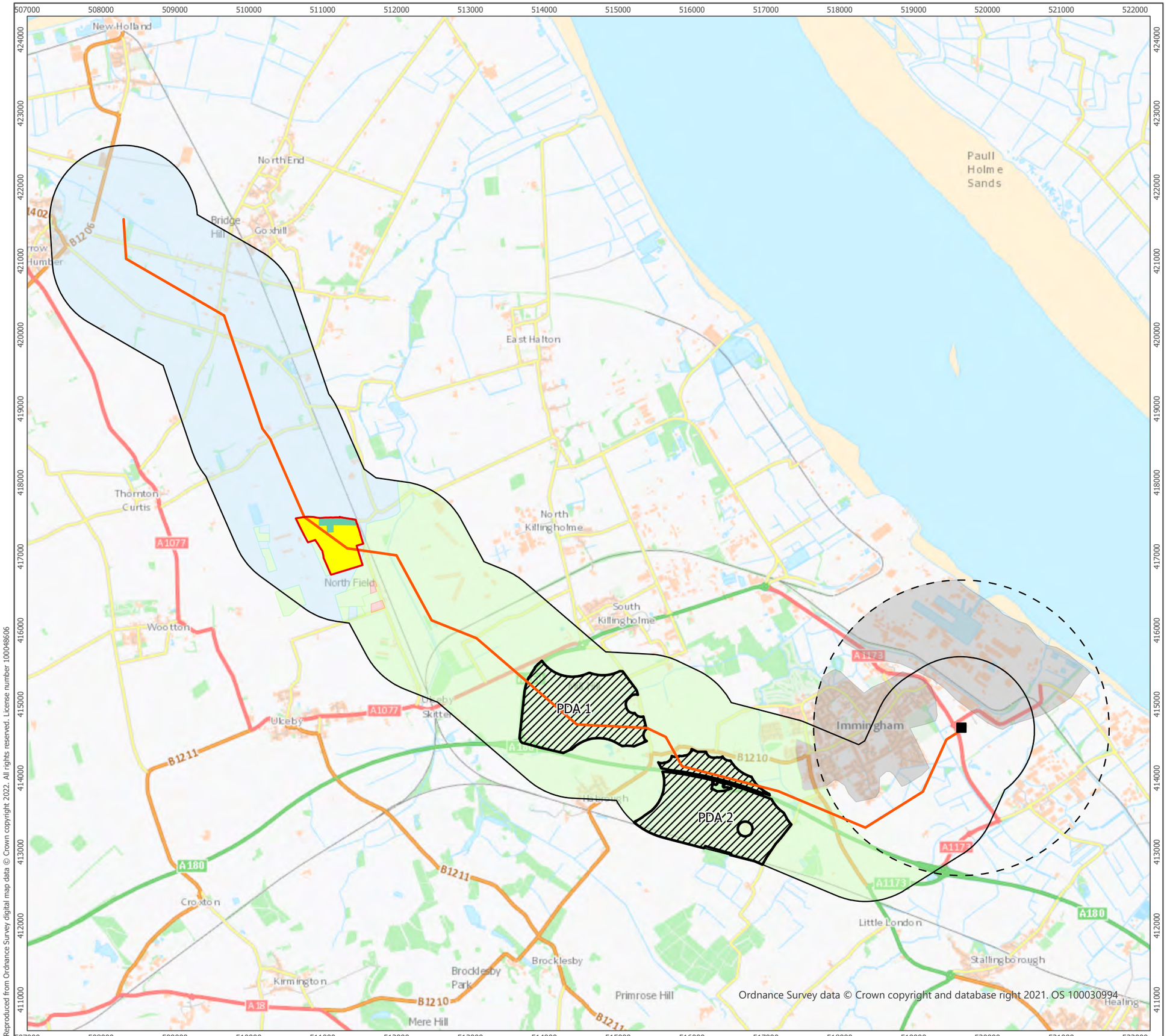
Produced By: EL	Ref: 4157-REP-007
Checked By: JM	Date: 26/01/2022

Constraints Plan
Figure 1

Sweetbriar Solar Farm
Sequential Test

N:\GIS\Environment\4157 Sweet Briar Farm, Lincolnshire\4157 Sweet Briar Farm, Lincolnshire.aprx\4157-REP-007 Fig01 Constraints Plan

FIGURE 2 – POTENTIALLY DEVELOPABLE AREAS



LIGHTROCKPOWER

ARCUS

- Immingham Substation
- Immingham Barrow 33kV
- 2 km Search Area from Immingham Substation
- 1 Km Search Area from Immingham Barrow 33kV
- Sweetbriar Site Boundary
- PDA
- Grade 1 ALC
- Grade 2 ALC
- Grade 3 ALC
- Urban Area

Site ALC Survey Results (Inset Map)

- Grade 3a
- Grade 3b

1:50,000 Scale @ A3

0 1 2 km

NORTH

Produced By: EL	Ref: 4157-REP-008
Checked By: JM	Date: 26/01/2022

Potentially Developable Areas
Figure 2

Sweetbriar Solar Farm
Sequential Test

N:\GIS\Environment\4157 Sweet Briar Farm, Lincolnshire\4157 Sweet Briar Farm, Lincolnshire.aprx\4157-REP-008 Fig02 Potentially Developable Areas

Appendix A Agricultural Land Classification Survey

AGRICULTURAL LAND CLASSIFICATION
SWEET BRIAR SOLAR FARM

CLIENT: SWEET BRIAR SOLAR FARM LIMITED
PROJECT: SWEET BRIAR SOLAR FARM
DATE: 14TH APRIL 2021 – ISSUE 1
ISSUED BY: JAMES FULTON MRICS FAAV

CONTENTS

1. EXECUTIVE SUMMARY

1.1 This report assesses the Agricultural Land Classification (ALC) grading of 87Ha, or thereabouts, of agricultural land at Sweet Briar Farm.

1.2 The limiting factor is found to be soil wetness, a combination of the climatic regime, soil water regime and texture of the top 25cm of the soil.

1.3 The land is graded as follows:

Grade 1:	3Ha
Grade 2:	4Ha
Grade 3a:	55Ha
Grade 3b:	25Ha

2. INTRODUCTION

2.1 Amet Property Ltd have been instructed by Sweet Briar Solar Farm Limited to produce an Agricultural Land Classification (ALC) report on an 87 hectare site at Sweet Briar Farm, Ulceby in north Lincolnshire. The ALC report is being prepared to accompany a planning application to be submitted for a solar farm.

2.2 The report's author is James Fulton BSc (Hons) MRICS FAAV who has worked as a chartered surveyor, agricultural valuer, and agricultural consultant since 2004.

2.3 The report is based on a site visit conducted on the 10th April 2021 during which the conditions were dry and sunny. During the inspection three trial pits were dug to a depth of 120cm with additional shallower holes to determine the depth at which the soil structure changed or to determine colour where they were unclear from augur samples. In addition to the trial pits an augur was used to take one sample per hectare on the proposed development site to a depth of 1.2m. A plan of augur points can be found at ***appendix 1***. The trial pits were at sample points 21, 64 and 85.

2.4 Further information has been obtained from the MAGIC website, the Soil Survey of England and Wales and the Meteorological Office.

2.5 The collected information has been judged against the Ministry of Agriculture Fisheries and Food Agricultural Land Classification of England and Wales revised guidelines and criteria for grading the quality of agricultural land.

2.6 The principal factors influencing agricultural production are climate, site and soil and the interaction between them MAFF (1988) & Natural England (2012). Where factors are used for ALC grading but do not give any limitation to this site, they are not discussed.

MAFF (1988) - *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. MAFF Publications

Natural England (2012) - *Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land*, Second Edition

3. CLIMATE

3.1 Climate has a major, and in places overriding, influence on land quality affecting both the range of potential agricultural uses and the cost and level of production.

3.2 There is published agro-climatic data for England and Wales provided by the Meteorological Office, such data for the subject site is listed in the table below.

Figure 3.1 Agro-Climatic Data – Details at ***appendix 2***

Grid Reference	510810 417011
Altitude (ALT)	18.93
Average Annual Rainfall (AAR)	622.20
Accumulated Temperature - Jan to June (ATO)	1385.22
Duration of Field Capacity (FCD)	135.12
Moisture Deficit Wheat	106.90
Moisture Deficit Potatoes	98.58

3.3 The main parameters used in assessing the climatic limitation are average annual rainfall (AAR), as a measure of overall wetness; and accumulated temperature, as a measure of the relative warmth of a locality.

3.4 The Average Annual Rainfall and Accumulated Temperature provide no climatic limitation to grade.

3.5 The whole site is shown to be flood zone 1 with little or no risk of flooding.

4. SOILS

4.1 The site is generally consistent being a loam or clay loam topsoil over a slowly permeable clay subsoil. Three sample points to the south east were completely different to the rest of the site and were demonstrably a different soil type.

4.2 Detailed assessment of each trial pit and augur sample can be found at ***appendix 3*** with a plan at ***appendix 4*** showing the two separate soil areas.

4.3 Soil profile description

Area 1

Horizon 1: 0cm to between 30cm and 40cm Dark greyish brown or very dark greyish brown heavy clay loam, medium clay loam, sandy clay loam or sandy loam with a weak fine subangular blocky or weak medium subangular blocky structure.

Horizon 2: From between 30cm and 40 cm to between 50cm and 70cm Dark greyish brown, greyish brown, brown or grey clay with a weak course platy or course angular blocky structure with many ochreous and black mottles.

Horizon 3: From between 50cm and 70cm cm to 120cm Grey or greyish brown clay with a massive structure and many ochreous and black mottles

Area 2

Horizon 1: 0cm to between 35cm Dark greyish brown sandy loam with a weak fine subangular blocky structure.

Horizon 2: from 35cm to 120cm yellowish brown sandy clay loam with a medium angular blocky structure

5.0 Interactive Factors

Area 1

5.1 In-Field wetness class:

Site conditions: Undisturbed
Slowly permeable layer: Clay at 35-120cm depth, mottles evidencing wetness, weak course platy,course angular blocky or massive structure
Gleying – Evidenced by grey or pale ped faces and ochreous mottles from 35cm.

Maff guide to ALC states 'Mineral Soil with a slowly permeable layer starting within 80cm and gleying present starting within 40cm – use figure 7 to determine wetness class':

Using Figure 7 from the MAFF guide the Wetness Class is determined as Wetness Class III

5.2 Wetness Assessment

Field Capacity Days (FCD)	135.12
Wetness Class	III
Soil Texture	Sandy Loam, Sandy Clay Loam, Medium Clay Loam, Heavy Clay Loam

Table 6 Grade According to soil wetness – mineral soils, describes this combination as:

Sandy Loam:	Grade 2
Sandy Clay Loam/Medium Clay Loam:	Grade 3a
Heavy Clay Loam	Grade 3b

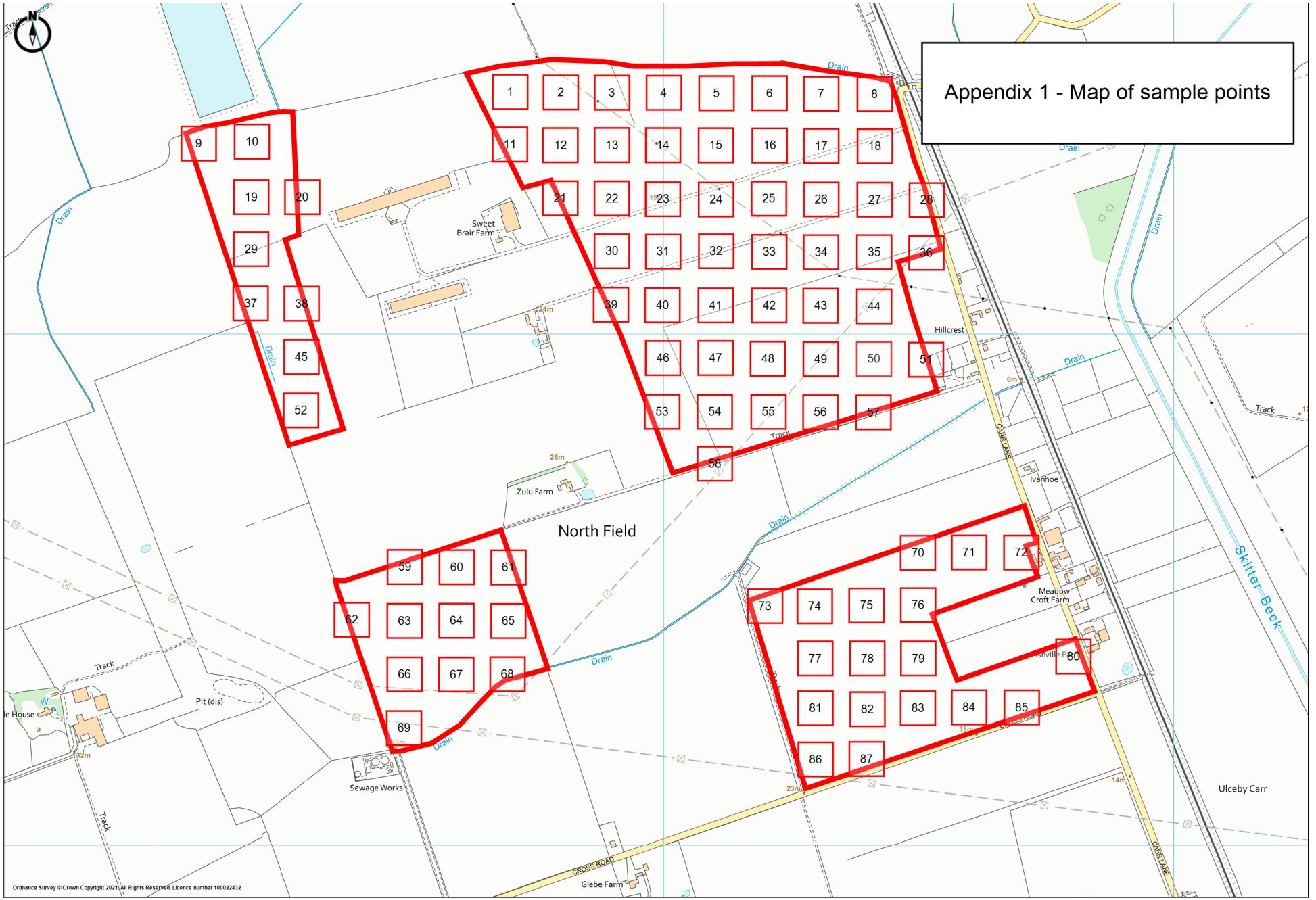
6.0 AGRICULTURAL LAND CLASSIFICATION

6.1 The Agricultural Land Classification provides a framework for classifying land according to which its physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can operate in one or more of four principal ways: they may affect the range of crops that can be grown, the level of yield, the consistency of yield and the cost of obtaining it.

6.2 The principle physical factors influencing agricultural production are climate, site and soil and the interactions between them which together form the basis for classifying land into one of 5 grades: grade 1 being of excellent quality and grade 5 being land of very poor quality. Grade 3 land, which constitutes approximately half of all agricultural land in the United Kingdom is divided into 2 subgrades – 3a and 3b. A full definition of all of the grades can be found at ***appendix 5.***

6.3 The MAFF 1:250,000 map indicates the site to be Grade 3 land.

6.4 This assessment sets out that while no one factor limits the grade of the land, the interaction between climate and soil result in a wetness assessment that limits the majority of the land to grade 2, 3a or 3b. The small area of different soil type has no limiting factor and is classified as grade 1. A plan of the land grading can be found at ***appendix 6***.



APPENDIX 2 – AGRO-CLIMATIC DATA

Site Details: Sweet Briar

Grid reference (centre of site): 510810 417011

Altitude: Mean 18.93

Climatic data from surrounding locations:

Grid Reference	ALT	AAR	LR_AAR	ASR	ATO	ATS	MDW	MDP	FCD
51004150	34	630	0.4	320	1369	2345	107	98	136
51004200	13	620	0.5	310	1391	2369	111	104	135
51504150	13	618	0.6	315	1392	2372	110	103	135
51504200	8	599	0.9	300	1395	2376	114	107	132

Altitude Adjusted

Grid Reference	AAR	ATO	FCD	MDW	MDP	Proximity Adjustment
51004150	623.97	1386.18	135.13	108.97	96.01	52.28%
51004200	622.97	1384.24	135.43	110.18	101.21	28.83%
51504150	621.56	1385.24	135.51	109.14	100.17	10.82%
51504200	608.84	1382.54	133.42	112.19	103.65	8.07%

Site Average Annual Rainfall: 622.20

Site Accumulated Temperature January to June: 1385.22

Site Field Capacity Days: 135.12

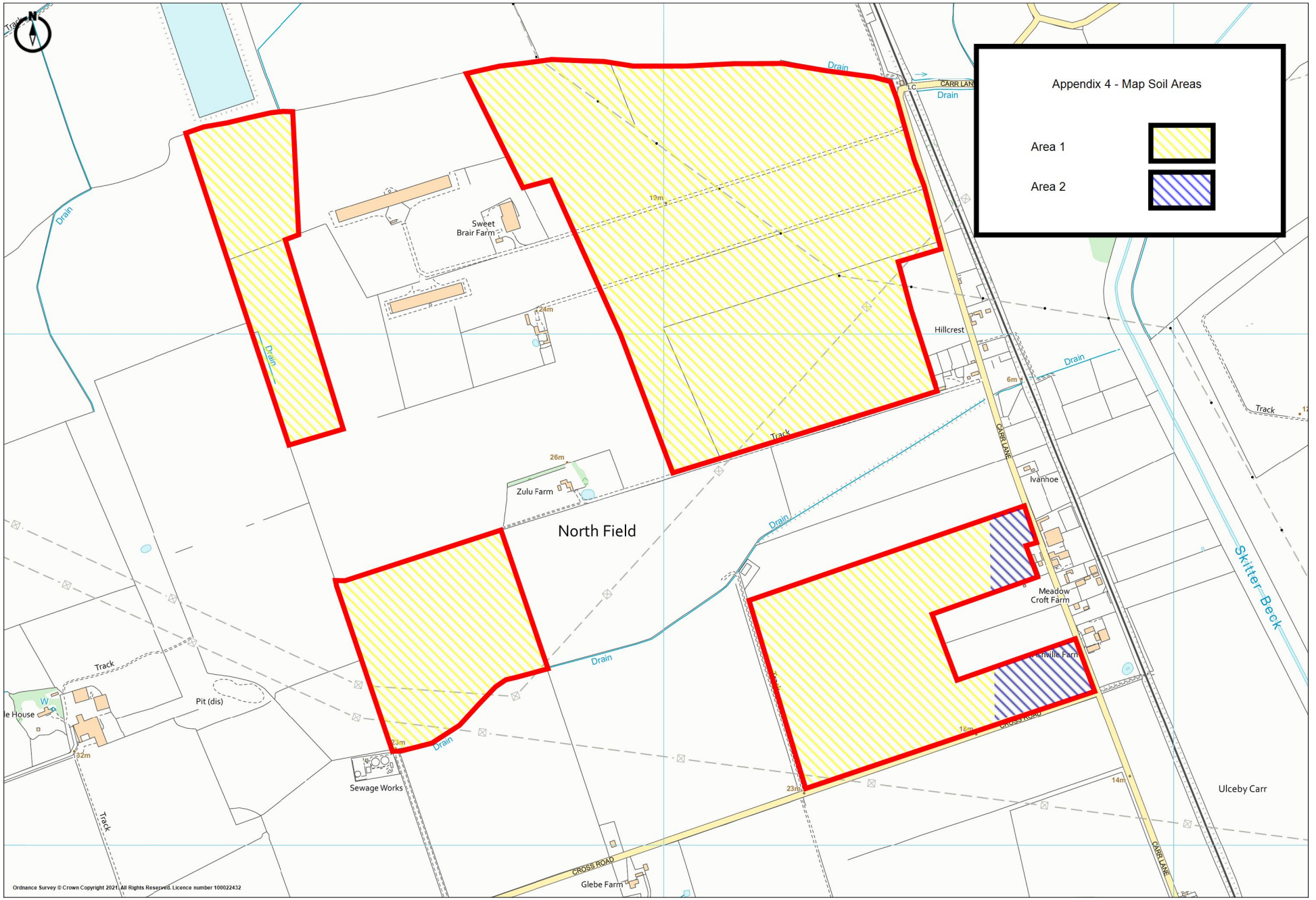
Moisture Deficit Wheat: 109.60

Moisture Deficit Potatoes: 98.58

Appendix 3 - Soil Sampling Information

		Topsoil						Subsoil 1						Subsoil 2					
Sample No	Altitude	Depth	Texture	Colour	Stoniness	Mottles	Structure	Depth	Texture	Colour	Stoniness	Mottles	Structure	Depth	Texture	Colour	Stoniness	Mottles	Structure
1	22	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
2	21	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
3	20	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
4	19	0-30	HCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
5	18	0-30	HCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
6	16	0-30	HCL	10YR 4-2			WMSAB	30-50	C	10YR 5-3		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
7	14	0-30	HCL	10YR 4-2			WMSAB	30-50	C	10YR 5-3		MOB	WCPlaty	50-120	C	10YR 5-3		OB	M
8	13	0-30	HCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
9	25	0-35	SCL	10YR 4-2			WFSAB	35-70	C	10YR 4-2		MO	CAB	70-120	C	10YR 5-2		MOB	M
10	23	0-30	SL	10YR 4-2			WFSAB	30-45	C	10YR 5-2		MOB	WCPlaty	45-120	C	10YR 5-2		MOB	M
11	21	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
12	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
13	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
14	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
15	16	0-30	HCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
16	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
17	14	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
18	12	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
19	24	0-30	HCL	10YR 3-2			WMSAB	30-120	C	10YR 4-1		MO	M						
20	23	0-40	MCL	10YR 4-2			WFSAB	40-60	C	10YR 4-2		MOB	CAB	60-120	C	10YR 5-1		MO	M
21	20	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		MOB	M
22	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
23	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
24	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
25	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
26	14	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
27	11	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
28	9	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
29	24	0-40	SL	10YR 4-2			WFSAB	40-70	C	10YR 5-2		MOB	WCPlaty	70-120	C	10YR 5-1		MO	M
30	21	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
31	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
32	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
33	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
34	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
35	16	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
36	14	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
37	25	0-40	SCL	10YR 4-2			WFSAB	40-70	CL	10YR 5-3		MO	CAB	70-120	C	10YR 5-1		MO	M
38	27	0-40	SCL	10YR 4-2			WFSAB	40-60	CL	10YR 4-2		MO	WMAB	60-120	C	10YR 5-1		MO	M
39	20	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
40	19	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
41	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
42	17	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
43	16	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
44	15	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
45	26	0-30	HCL	10YR 3-2			WMSAB	30-50	C	10YR 4-1		MO	CAB	50-120	C	10YR 5-1		MO	M
46	22	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
47	20	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
48	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
49	18	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-2		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M
50	15	0-30	MCL	10YR 4-2			WMSAB	30-50	C	10YR 5-3		MOB	WCPlaty	50-120	C	10YR 5-2		OB	M

51	12	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
52	27	0-35	SCL	10YR 4-2	<5%	WMSAB	35-80	SC	10YR 5-3	MO	CAB	80-120	C	10YR 5-2	MO	M
53	21	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
54	19	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
55	17	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
56	16	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
57	15	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
58	11	0-30	MCL	10YR 4-2		WMSAB	30-50	C	10YR 5-2	MOB	WCPlaty	50-120	C	10YR 5-2	OB	M
59	25	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
60	28	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
61	25	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-1	MO	M
62	25	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
63	25	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
64	22	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
65	21	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
66	23	0-30	MCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
67	22	0-30	MCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
68	19	0-30	HCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
69	23	0-30	MCL	10YR 3-2		WMSAB	30-50	C	10YR 4-2	MO	CAB	50-120	C	10YR 5-2	MO	M
70	16	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
71	15	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	O	M
72	12	0-35	SL	10YR 4-2		WFSAB	35-120	SCL	10YR 5-6		MAB					
73	17	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
74	15	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
75	18	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
76	18	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
77	19	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
78	18	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
79	19	0-35	HCL	10YR 3-2		WMSAB	35-50	C	10YR 5-2	MO	CAB	50-120	C	10YR 5-2	MO	M
80	12	0-35	SL	10YR 4-2		WFSAB	35-120	SCL	10YR 5-6		MAB					
81	23	0-35	MCL	10YR 3-2		WMSAB	35-70	C	10YR 5-2	MO	CAB	70-120	C	10YR 5-2	MO	M
82	22	0-35	SL	10YR 4-2		WFSAB	35-70	C	10YR 5-2	MO	CAB	70-120	C	10YR 5-2	MO	M
83	20	0-35	SCL	10YR 3-2		WMSAB	35-70	C	10YR 5-2	MO	CAB	70-120	C	10YR 5-2	MO	M
84	18	0-35	SCL	10YR 3-2		WMSAB	35-70	C	10YR 5-3	MO	CAB	70-120	C	10YR 5-2	MO	M
85	15	0-35	SL	10YR 4-2		WFSAB	35-120	SCL	10YR 5-6		MAB					
86	23	0-35	SCL	10YR 3-2		WMSAB	35-70	C	10YR 5-3	MO	CAB	70-120	C	10YR 5-2	MO	M
87	21	0-35	SL	10YR 4-2		WFSAB	35-70	C	10YR 5-2	MO	CAB	70-120	C	10YR 5-2	MO	M
	18.93															



APPENDIX 5 - DESCRIPTION OF ALC GRADES

Grade 1 - excellent quality agricultural land Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a - good quality agricultural land Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b - moderate quality agricultural land Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor-quality agricultural land Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.