



AGRICULTURAL LAND CLASSIFICATION NORTH CRAY ROAD ENERGY STORAGE SYSTEM

CLIENT: DWD PROPERTY AND PLANNING
PROJECT: NORTH CRAY ROAD ENERGY STORAGE SYSTEM
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ISSUED BY: JAMES FULTON MRICS FAAV

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1. EXECUTIVE SUMMARY

- 1.1 This report assesses the Agricultural Land Classification (ALC) grading of 7Ha, of agricultural land at Sidcup.
- 1.2 The limiting factor found to be droughtiness on the site.
- 1.3 The land is graded as follows:

Grade 2: 0.8 Ha

Grade 3a: 6.2 Ha

2. INTRODUCTION

- 2.1 Amet Property Ltd have been instructed by DWD Property and Planning to produce an Agricultural Land Classification (ALC) report on a 7-hectare site on land at North Cray Road, Sidcup. The ALC report is being prepared to accompany a planning application to be submitted for the construction and operation of an Energy Storage System (ESS) of up to 200 megawatts ('MW') electrical capacity, associated site access and cable route to the point of connection, and associated work.
- 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, has a degree in agriculture which included modules on soils and over 10 years' experience in advising farmers on soil structure and cultivation methods and in producing agricultural land classification reports. Additional information on authors experience is found at **appendix 1**.
- 2.3 The report is based on a site visit conducted by two surveyors on the 21st of March 2025 during which the conditions were overcast, and the soils were dry.
- 2.4 During the inspections 1 trial pit was dug to 120cm or in this case as deep as possible before the ground became impenetrable. In addition to the trial pits an auger was used to take approximately one sample per hectare on the proposed development site to a depth of 120cm with smaller trial pits at some of these locations to confirm soil structure and colour where it was not clear from the auger samples. A plan of auger points and trial pit locations can be found at **appendix 2**. The trial pit locations were selected as they were representative of the soils found on site. Where subsoils were inspected with a spade, descriptions of structure have been recorded based on the soil survey field handbook¹; where an auger has been used the structure is described as good, moderate or poor based on figure 9,10 and 11 in the MAFF² guidance. Colours are described using Munsell Colours³.
- 2.5 The site is described in literature as likely to be calcareous and so hydrochloric acid was used to test in field for a reaction that would indicate calcareous soils.
- 2.6 The surveyed area extends to 7Ha of grassland land spread cross 2 fields. The site is located on land at North Cray Road, Sidcup.
- 2.7 Further information has been obtained from the MAGIC website, the Soil Survey of England and Wales, the British Geological Survey, the Meteorological Office and 1:250,000 series Agricultural Land Classification maps.

¹ Hodgson, JM (1997) Soil Survey Field Handbook

² MAFF (1988) - *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. MAFF Publications

³ Munsell Color (2009) Munsell Soil Color Charts

- 2.8 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.
- 2.9 The principal factors influencing agricultural production are climate, site and soil and the interaction between them MAFF (1988) & Natural England (2012)⁴.
- 2.10 The report is prepared and formatted considering the latest BSSS guidance⁵.

3. PUBLISHED INFORMATION

- 3.1 The British Geological Survey 1:50,000 scale map shows the bedrock geology to be largely Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation – Chalk. The centre of the site has a patch that runs from the west to the south of the site with superficial deposits of Head – Clay, silt, sand and gravel. In the northeast corner of the site there is a small patch which is shown to have the bedrock geology of Thanet Formation – Sand.
- 3.2 The soils on the site are identified as being 571j FRILSHAM Association, well drained mainly fine loamy soils over chalk, some calcareous.
- 3.3 The 1:250,000 series Agricultural Land Classification maps show the south of the site to be Grade 3 and small are to the north and northeast to be grade 2. These plans are of strictly limited value, using an out-of-date methodology at a very small scale (low detail) level of survey. Further information on the limits of their use can be found in TIN049.

⁴ 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

⁵ BSSS (2022) Working with Soil Guidance Note on Assessing Agricultural Land Classification Surveys in England and Wales

4. CLIMATE

- 4.1 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.
- 4.2 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.

Agro-Climatic Data – Full details can be found at **appendix 3**

Grid Reference	548843,171006
Altitude (ALT)	28
Average Annual Rainfall (AAR)	578
Accumulated Temperature - Jan to June (ATO)	1474
Duration of Field Capacity (FCD)	117
Moisture Deficit Wheat	120
Moisture Deficit Potatoes	116

- 4.3 The main parameters used in assessing the climatic limitation are average annual rainfall (AAR), as a measure of overall wetness; and accumulated temperature (ATO), as a measure of the relative warmth of a locality.
- 4.4 The AAR and ATO provide climatic limitation to grade 1.
- 4.5 The site is shown to be in flood zone 1 – areas with a less than 1 in 1000 annual chance of flooding. There was no evidence of flooding seen during the site visit and it is considered that will not result in a limitation to land grade.

5. STONINESS

- 5.1 The stones that were identified in the topsoil are not of sufficient size or quantity to limit land grade.

6. GRADIENT AND MICRORELIEF

- 6.1 The site is gently sloping with no gradient or microrelief that limits land grade.

7. SOILS

- 7.1 Full information on the sample points along with trial pit descriptions and photographs and lab test results can be found at **appendix 4**.
- 7.2 The topsoil was found to be a very dark greyish brown (10YR 3/2), medium clay loam, confirmed by a lab test to be on the verge of being sandy clay loam calcareous in some places.
- 7.3 The upper subsoils were found to have the texture of calcareous medium clay loam. The colours were found to be brown (10YR 5/3), or pale brown (10YR 6/3). The subsoil had a moderate structure and 20% stoniness in the south of the site.
- 7.4 Where a second subsoil was found the texture was found to be calcareous silty clay loam. The colours were found to be greyish brown (10YR 5/2). The subsoil had a moderate structure.
- 7.5 All survey points are shallow over soft limestone.

INTERACTIVE FACTORS

8. WETNESS

- 8.1 An assessment of the wetness class of each sample point was made based on the flow chart at Figure 6 and the graphs at figure 7 and 8 in the MAFF guidance.

Wetness class Assessment

Depth to gley	Depth to SPL	Coarse subsoil	Wetness Class
No gley	No SPL	N/A	I
40-70	No SPL	Yes	I
<40	No SPL	Yes	I
<40	No SPL	No	II
40-70	No SPL	No	I
40-70	>39	N/A	II
40-70	<39	N/A	III
<40	>59	N/A	II
<40	35-59	N/A	III
<40	<35	N/A	IV

- 8.2 The wetness class and topsoil texture were then assessed against Table 6 of the MAFF guidance to determine the ALC grade according to wetness. The wetness assessment can be found at **appendix 4**.
- 8.3 With no slowly permeable layer or gleying the assessment results in all survey points being recorded as wetness class I. With a medium clay loam topsoil this results in no limitation to land grade caused by wetness.

9. DROUGHTINESS

- 9.1 Droughtiness limits are defined in terms of moisture balance for wheat and potatoes using the formula:

$$MB \text{ (Wheat)} = AP \text{ (Wheat)} - MD \text{ (Wheat)}$$

and

$$MB \text{ (Potatoes)} = AP \text{ (Potatoes)} - MD \text{ (Potatoes)}$$

Where:

MB = Moisture Balance

AP = Crop Adjusted available water capacity

MD = Moisture deficit

- 9.2 Moisture deficit for wheat and potatoes can be found in the agro-climatic data and are as follows:

$$MD \text{ (Wheat)} = 120$$

$$MD \text{ (Potatoes)} = 116$$

- 9.3 Crop adjusted available water is calculated by reference to the total available water and easily available water which is calculated by reference to soil texture and structural condition and the stone content.
- 9.4 The moisture balance was calculated for all survey points and this assessment can be found at **appendix 4**.
- 9.5 Droughtiness is the most limiting factor across the site.

10. AGRICULTURAL LAND CLASSIFICATION

- 10.1 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 principle 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.
- 10.2 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**.
- 10.3 This assessment sets out that the site is limited by droughtiness.
- 10.4 The breakdown of land by classification is:
- | | |
|-----------|--------|
| Grade 2: | 0.8 Ha |
| Grade 3a: | 6.2 Ha |
- 10.5 A plan of the land grading can be found at **appendix 6**.

Appendix 1 – Details of the Authors Experience

James Fulton

Professional Education and Qualifications

BSc (Hons) Agriculture, University of Nottingham (2004)

Member of the Royal Institution of Chartered Surveyors (MRICS) (2008)

Fellow of the Central Association of Agricultural Valuers (FAAV) (2009)

Relevant Work Experience

While working for a regional firm from 2004 until 2016 as part of my work I provided advice to farmers on soils, cultivation techniques and cropping and was involved in field trials which assessed cropping and cultivation techniques and how they impacted soil structure. At the same time I worked alongside an experienced surveyor who produced Agricultural Land Classification reports and I received training in field survey techniques and the ALC process to the point where I was able to produce ALC reports.

In 2016 I left my employer and formed Amet Property Ltd providing development consultancy and other rural practice surveying services. Of all of the services that we provide Agricultural Land Classification reports is the single largest area of work accounting for approximately 70% of all of my working time.

While I am not a member of the BSSS I meet the minimum competencies set out by the BSSS in Document 1 *Foundation skills in field soil investigation, description and interpretation* and Document 2 *Agricultural Land Classification (England and Wales)*

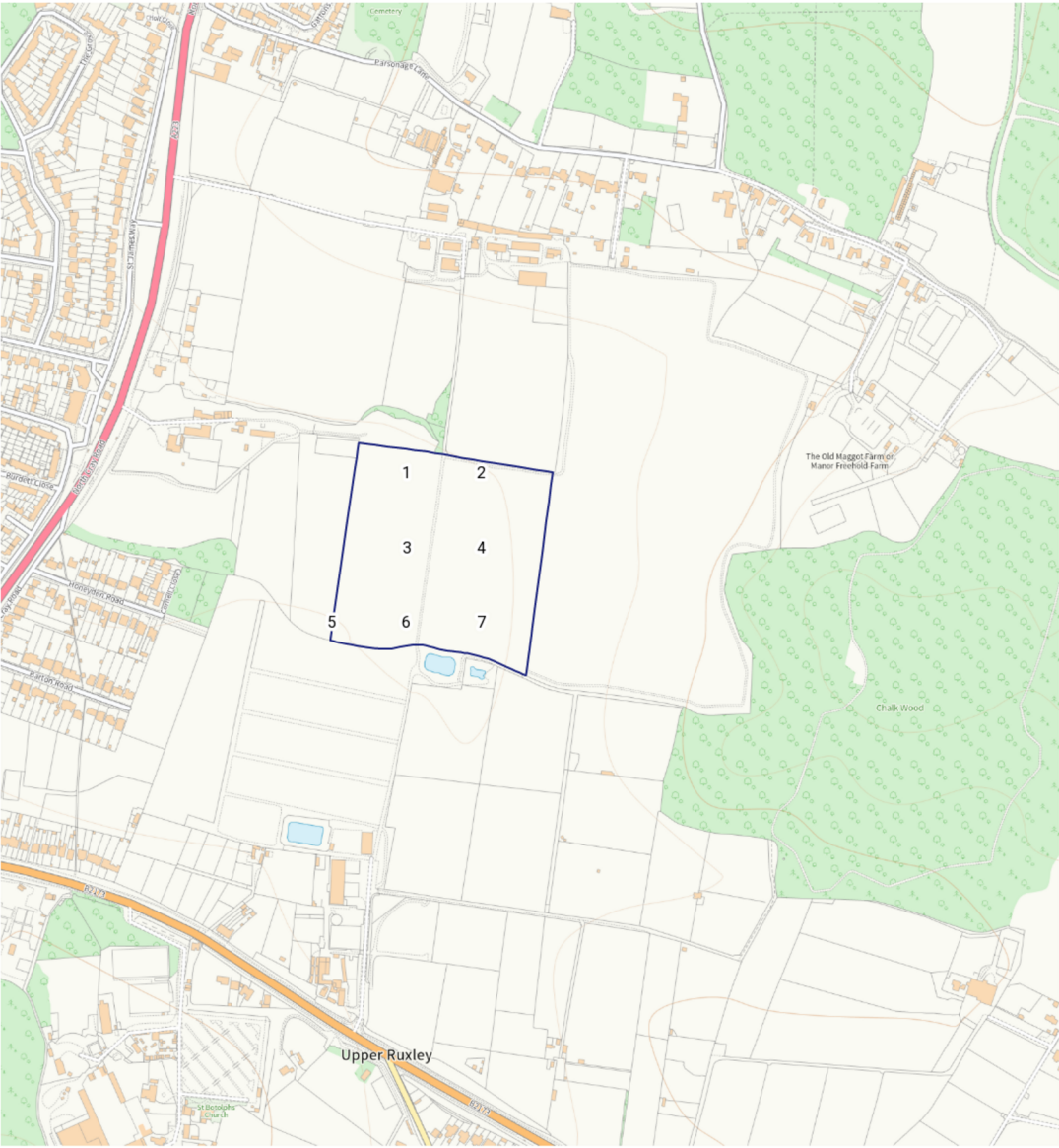
Professional Standards

As a member of the Royal Institution of Chartered Surveyors and Fellow of the Central Association of Agricultural Valuers I am bound by their professional standards and am only able to carry out work where I am suitably qualified and experienced to do so. Due to the formal and practical training that I have received I am able to competently produce Agricultural Land Classification reports.

Assistant Surveyors

All assistant surveyors have completed the BSSS working with soil course and have been trained to meet the requirements of BSSS Document 1 *Foundation skills in field soil investigation, description, and interpretation*.

Appendix 2 - Map of
Survey Points



Appendix 3 – Climatic Data

Site Details: North Cray Road Energy Storage System

Grid reference (centre of site): 548843,171006

Altitude: Mean 28 AOD

Climatic data from surrounding locations:

Grid Reference	ALT	AAR	LR_AAR	ASR	ATO	ATS	MDW	MDP	FCD
54501700	87	658	0.7	335	1408	2403	108	101	132
54501750	57	620	0.6	320	1440	2438	114	109	121
55001700	66	600	0.7	315	1431	2430	115	109	121
55001750	44	564	0.7	305	1454	2456	119	115	107



Altitude Adjusted

Grid Reference	AAR	ATO	FCD	MDW	MDP	Proximity Adjustment
54501700	616.70	1475.26	126.03	116.94	112.79	10.94%
54501750	602.60	1473.06	118.48	118.19	114.53	5.62%
55001700	573.40	1474.32	117.15	120.76	116.59	73.45%
55001750	552.80	1472.24	105.38	121.43	118.20	9.99%

Appendix 4a - Sample Point Assessment

Sample No	Topsoil			Calc	Colour	Stoniness			Mottles	Upper Subsoil				Stoniness	Mottles	Lower Subsoil				Stoniness	Mottles	Structure	Wetness Assessment				Grade limit by	Droughtiness Assessment		Grade limit by
	Altitude	Depth	Texture			<2cm	2-6cm	>6cm		Depth	Texture	Calc	Colour			Structure	Depth	Texture	Calc	Colour			Depth to SPL	Gley	Wetness Class	Wetness		Wheat MB	Potato MB	
1	26	0 - 40	MCL	Y	10YR 3 / 2					40 - 75	MCL	Y	10YR 5 / 3			Moderate	75 - 85	MCL	Y	10YR 5 / 2			Moderate		I	1		2.73	3.78	3a
2	29	0 - 40	MCL	N	10YR 3 / 2					40 - 90	MCL	Y	10YR 5 / 3			Moderate	90 - 120	Stone					Moderate		I	1		16.73	3.78	2
3	27	0 - 35	MCL	Y	10YR 3 / 2					35 - 50	MCL	Y	10YR 5 / 3	20%		Moderate	50 - 120	Stone					Moderate		I	1		-16.77	-25.72	3a
4	28	0 - 35	MCL	N	10YR 3 / 2					35 - 60	MCL	Y	10YR 6 / 3	20%		Moderate	60 - 120	Stone					Moderate		I	1		-11.67	-16.72	3a
5	30	0 - 35	MCL	N	10YR 3 / 2					35 - 50	MCL	Y	10YR 6 / 3	20%		Moderate	50 - 120	Stone					Moderate		I	1		-16.77	-25.72	3a
6	28	0 - 35	MCL	N	10YR 3 / 2					35 - 55	MCL	Y	10YR 6 / 3	20%		Moderate	55 - 120	Stone					Moderate		I	1		-14.22	-21.22	3a
7	28	0 - 35	MCL	N	10YR 3 / 2					35 - 75	MCL	Y	10YR 6 / 3	20%		Moderate	75 - 120	Stone					Moderate		I	1		-4.02	-7.72	3a

Appendix 4b – Trial Pit Descriptions

Sample Point No. 1	
Horizon 1	0-40cm Very dark greyish brown (10YR 3/2) calcareous medium clay loam.
Horizon 2	40-75cm Brown (10YR 5/3) medium clay loam with a coarse subangular blocky structure and firm consistence.
Horizon 3	75-85cm Dark greyish brown (10YR 4/2) medium clay loam with a coarse angular blocky structure.
Horizon 4	Becomes impenetrable due to soft limestone (stone that can be scratched with a finger but is not soft enough to be described as chalk)
Pictures	
Horizon 1 	Horizon 2 
Slowly permeable layer	Not Present
Gleying	Not Present
Wetness Class	I
Wetness limitation	1
MB Wheat	2.73
MB potatoes	3.78
Droughtiness Limitation	3a

ANALYTICAL REPORT

Report Number	86774-25	W250	AMET PROPERTY
Date Received	28-MAR-2025		HENWICK BARN
Date Reported	09-APR-2025		BULWICK
Project	SOIL		CORBY
Reference	SIDCUP		NORTHANTS
Order Number			NN17 3DU

Laboratory Reference		SOIL744417	SOIL744418								
Sample Reference		SIDCUP 1 TOPSOIL	SIDCUP 1 SUBSOIL								
Determinand	Unit	SOIL	SOIL								
Coarse Sand 2.00-0.63mm	% w/w	2	2								
Medium Sand 0.63-0.212mm	% w/w	11	9								
Fine Sand 0.212-0.063mm	% w/w	37	38								
Silt 0.063-0.002mm	% w/w	28	29								
Clay <0.002mm	% w/w	22	22								
Textural Class **		SCL/MCL	MCL								

Notes

Analysis Notes	The sample submitted was of adequate size to complete all analysis requested. The results as reported relate only to the item(s) submitted for testing. The results are presented on a dry matter basis unless otherwise stipulated.
Document Control	This test report shall not be reproduced, except in full, without the written approval of the laboratory.

Reported by	<p>** Please see the attached document for the definition of textural classes.</p> <p>Gabrielle Parkes</p> <p>Natural Resource Management, a trading division of Cawood Scientific Ltd. Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS Tel: 01344 886338 Fax: 01344 890972 email: enquiries@nrm.uk.com</p>
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ADAS (UK) Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

Class	Code
Sand	S
Loamy sand	LS
Sandy loam	SL
Sandy Silt loam	SZL
Silt loam	ZL
Sandy clay loam	SCL
Clay loam	CL
Silt clay loam	ZCL
Clay	C
Silty clay	ZC
Sandy clay	SC

For the *sand*, *loamy sand*, *sandy loam* and *sandy silt loam* classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

vf	Very Fine (more than 2/3's of sand less than 0.106 mm)
f	Fine (more than 2/3's of sand less than 0.212 mm)
c	Coarse (more than 1/3 of sand greater than 0.6 mm)
m	Medium (less than 2/3's fine sand and less than 1/3 coarse sand).

The subdivisions of *clay loam* and *silty clay loam* classes according to clay content are indicated as follows:

M	medium (less than 27% clay)
H	heavy (27-35% clay)

Organic soils i.e. those with an organic matter greater than 10% will be preceded with a letter O.

Peaty soils i.e. those with an organic matter greater than 20% will be preceded with a letter P.

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.

Appendix 6 - Map of ALC
Grade

