



**AGRICULTURAL LAND CLASSIFICATION  
LEVEDALE ENERGY STORAGE PROJECT**

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## 1. EXECUTIVE SUMMARY

- 1.1 This report assesses the Agricultural Land Classification (ALC) grading of 7.5Ha of agricultural land at Levedale, Staffordshire.
- 1.2 The limiting factor is found to be variously soil wetness and soil droughtiness, a combination of the climatic regime, soil water regime and soil texture.
- 1.3 The land is graded as follows:

**Grade 3b:                    7.5 hectares**

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## 2. INTRODUCTION

- 2.1 Amet Property Ltd have been instructed by Anglo ES Levedale Ltd to produce an Agricultural Land Classification (ALC) report on a 7.5-hectare site at Levedale, Staffordshire, in support of a planning application for a battery energy storage site and substation compound with associated infrastructure, fencing, access road, drainage and landscaping.
- 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 producing agricultural land classification reports.
- 2.3 The report is based on a site visit conducted on the 25<sup>th</sup> June 2022. During the site visit conditions were dry and overcast. During the inspection 1 trial pit was dug. In addition to the trial pit an augur was used to take approximately one sample per hectare on the proposed development site to a depth of 120cm (where possible) with smaller trial pits at some of these locations to confirm soil structure and colour where it was not clear from the augur samples. A plan of augur points can be found at **appendix 1**. The trial pit locations were selected as they were representative of the soils found on site.
- 2.4 The survey area is made up of part of 2 land parcels. The land is level to gently sloping with altitudes ranging from 105m to 108m AOD.
- 2.5 The land is all in an arable rotation.
- 2.6 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.
- 2.7 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.
- 2.8 The principal factors influencing agricultural production are climate, site and soil and the interaction between them MAFF (1988) & Natural England (2012).

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. PUBLISHED INFORMATION

- 3.1 The British Geological Survey 1:50,000 scale map shows the bedrock geology of the land to be Mercia Mudstone Group – Mudstone and Halite-Stone. The superficial deposits of the north of the site are recorded as Glaciofluvial Deposits, Devensian – Sand and Gravel and to the south of the site are recorded as Till, Devensian – Diamicton.
- 3.2 The national soils map shows the site to be Clifton Association – Slowly permeable seasonally waterlogged reddish fine and course loamy soils with slight seasonal waterlogging.
- 3.3 The 1:250,000 series agricultural land classification mapping predicts the the site to be grade 3. 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.

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#### 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.

Figure 2.1 Agro-Climatic Data – Details at **appendix 2**

Grid Reference	390099 315952
Altitude (ALT)	106.43
Average Annual Rainfall (AAR)	690.78
Accumulated Temperature - Jan to June (ATO)	1357.92
Duration of Field Capacity (FCD)	165.48
Moisture Deficit Wheat	94.51
Moisture Deficit Potatoes	70.18

- 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, as a measure of the relative warmth of a locality.
- 4.4 The Average Annual Rainfall and Accumulated Temperature provide no climatic limitation to grade.
- 4.5 The site is shown to be in Flood Zone1 – land with an annual probability of flooding less than 1 in 1000. There was no evidence on site of any significant flood events and it is not considered that flood risk will be a limiting factor to land grade.

## 5. STONINESS

- 5.1 All of the sample points had 2cm-5cm rounded or subrounded hard stones in the topsoil between 5% and 10% based on an in-field assessment. The lab results only show stones 2-20mm because the larger stones were removed from the sample due to the size of the sample box. The number and size of stones do not provide a limitation but will have an impact on the droughtiness limitation.

## 6. GRADIENT

- 6.1 The site is all level to gently sloping with no area where gradient would affect land grade.

## 7. SOILS

- 7.1 The topsoil across the site was very consistent being Dark Brown (10YR 3/3) sandy clay loam with between 5% and 10% 2-5cm stones and 3% smaller stones.
- 7.2 Sample point 1 had a subsoil from 30cm to 50cm being a brown (7.5YR 5/3) heavy clay loam. The weak medium angular blocky structure and heavy clay loam texture would indicate a slowly permeable, layer while the pale colours with ochreous mottles indicate a gleyed horizon.
- 7.3 Sample points 3 and 5 had a dark brown (7.5YR 3/3) or strong brown (7.5YR 4/6) sandy loam subsoil with a stone content of around 20% which increased with depth until the level of stone was such that the soil became impenetrable to either the augur or spade.
- 7.4 A full assessment of augur sample points, trial pits and lab results can be found at **appendix 3**.

## 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 in the MAFF guidance. 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**.
- 8.2 The slowly permeable gleyed subsoil at sample point result in wetness class IV which combined with the sandy clay loam topsoil result in grading of 3b.
- 8.3 The other sample points have no slowly permeable layer or gleyed horizon result in wetness class I which combined with the topsoil texture results in no limit to land grade.

### 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:

$$MD \text{ (Wheat)} = 94.51$$

$$MD \text{ (Potatoes)} = 70.18$$

- 9.3 The shallow course soils with relatively high stone content and course moderately structured subsoils with high stone content suggest a droughtiness limitation in the soil. A full assessment can be found at **appendix 4**.



## 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 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.
- 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 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 3b. Where the topsoil is deeper or where the subsoil is finer structured resulting in a deeper or even not present slowly permeable layer the wetness limitation is less severe, and the land graded 2 or 3a.
- 10.4 The MAFF guidance sets out that 'where soil and site conditions vary significantly and repeatedly over short distances and impose a practical constraint on cropping and land management a 'pattern' limitation is said to exist. Where there are individual or a small number of sample points of a higher grade surrounded by lower grade land it has been determined that these small areas could not be farmed separately to the surrounding lower grade land.
- 10.5 Taking into account the pattern limitation the land is graded:

**Grade 3b:                    7.5 hectares**

A plan of the land grading can be found at **appendix 6**.

## APPENDIX 2 – AGRO-CLIMATIC DATA

Site Details: Penkridge

Grid reference (centre of site): 390099 315952

Altitude: Mean 106.43

Climatic data from surrounding locations:

Grid Reference	ALT	AAR	LR_AAR	ASR	ATO	ATS	MDW	MDP	FCD
3900 3150	89	682	0.3	350	1378	2304	97	86	164
3900 3200	122	730	0.2	370	1338	2260	90	76	174
3950 3150	109	712	0.5	370	1354	2280	91	79	168
3950 3200	109	734	0.3	375	1352	2278	90	77	175

Altitude Adjusted

Grid Reference	AAR	ATO	FCD	MDW	MDP	Proximity Adjustment
3900 3150	687.23	1358.13	164.76	94.85	71.01	90.07%
3900 3200	726.89	1355.75	173.55	91.82	61.75	5.79%
3950 3150	710.72	1356.93	167.81	91.35	64.62	2.90%
3950 3200	733.23	1354.93	174.89	90.32	62.55	1.24%

## 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.