



AGRICULTURAL LAND CLASSIFICATION COTMOOR SOLAR FARM

CLIENT: JBM SOLAR PROJECTS 6 LIMITED
PROJECT: COTMOOR SOLAR FARM
DATE: 27TH NOVEMBER 2020 – ISSUE 7
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1. EXECUTIVE SUMMARY

- 1.1 This report assesses the Agricultural Land Classification (ALC) grading of 98Ha, or thereabouts, of agricultural land at Halloughton in Nottinghamshire.
- 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 3b: 98Ha

2. INTRODUCTION

- 2.1 Amet Property Ltd have been instructed by JBM Solar Projects 6 Limited to produce an Agricultural Land Classification (ALC) report on a 98-hectare site at Halloughton in Nottinghamshire. The ALC report is being prepared to accompany planning application 20/01242/FULM submitted in July 2020 for a solar farm on the site.
- 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 23rd November 2020 during which the conditions were dry and overcast. During the inspection three trial pits were dug to a depth of 120cm (where possible) with additional shallower holes to determine the depth at which the soil structure changed. 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 (where possible). A plan of augur points can be found at **appendix 1**. The trial pits were at sample points 7, 50 and 72. The trial pit locations were selected as they were representative of the soils found on site.
- 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 principle 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 2.1 Agro-Climatic Data – Details at **appendix 2**

Grid Reference	468014 352355
Altitude (ALT)	80.46
Average Annual Rainfall (AAR)	682.77
Accumulated Temperature - Jan to June (ATO)	1353.62
Duration of Field Capacity (FCD)	140.92
Moisture Deficit Wheat	101.17
Moisture Deficit Potatoes	85.63

- 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 site is not within a flood risk area

4. SOILS

- 4.1 The soil across the site is relatively consistent with some slight changes in colour and structure but they are consistent enough to grade as one soil throughout.
- 4.2 The trial pit and augur sampling indicate the predominant soil type across the site being clay or loam topsoil over clay subsoil – detailed assessment can be found at **appendix 3**.

4.3 Soil profile description

Horizon 1: 0cm to between 25cm and 35cm Dark reddish brown, dark brown, brown, or very dark greyish brown heavy clay loam or clay (occasionally medium clay loam or sandy loam with a weak fine or medium subangular blocky structure

Horizon 2: From between 25cm and 35 cm to between 40 and 120cm reddish brown, yellowish red or occasionally brown clay with a weak medium angular blocky or massive structure with many grey, ochreous and black mottles

Horizon 3 (Not always present): From between 40cm and 75 cm to 120cm reddish brown or occasionally light brownish grey clay with a massive structure and many grey, ochreous and black mottles

In many locations, especially to the north of the site the soil stopped at between 60 and 80 cm to be replaced by a white (10YR 8-1) mudstone. Chunks of this mudstone could be found at various layers in the clay. Where the topsoil had been stripped for the archaeological survey the various colours of the subsoil could be seen very clearly changing significantly over short distances although the red clay was always dominant.

5.0 Interactive Factors

5.1 In-Field wetness class:

Site conditions: Undisturbed

Slowly permeable layer: Clay at 30-120cm depth, mottles evidencing wetness, weak medium angular blocky or massive structure (occasionally starting at 55cm)

Gleying – No evidence of gleying in most locations where subsoils were very red. Gleying evidenced by grey or pale ped faces and ochreous mottles from 30cm where subsoils were not reddish

Maff guide to ALC states 'Mineral Soil with a slowly permeable layer starting within 80cm and gleying present starting within 40cm' and 'If the soil is reddish (5YR or redder) and not gleyed within 70cm depth – if there is a slowly permeable layer that starts within 60cm depth and extends to at least 100cm' – 'use figure 7 to determine wetness class':

Using Figure 7 from the MAFF guide the Wetness Class is determined as Wetness Class IV for the majority of the site and wetness class III in a small number of locations where the slowly permeable layer started at 55cm rather than 30-35cm

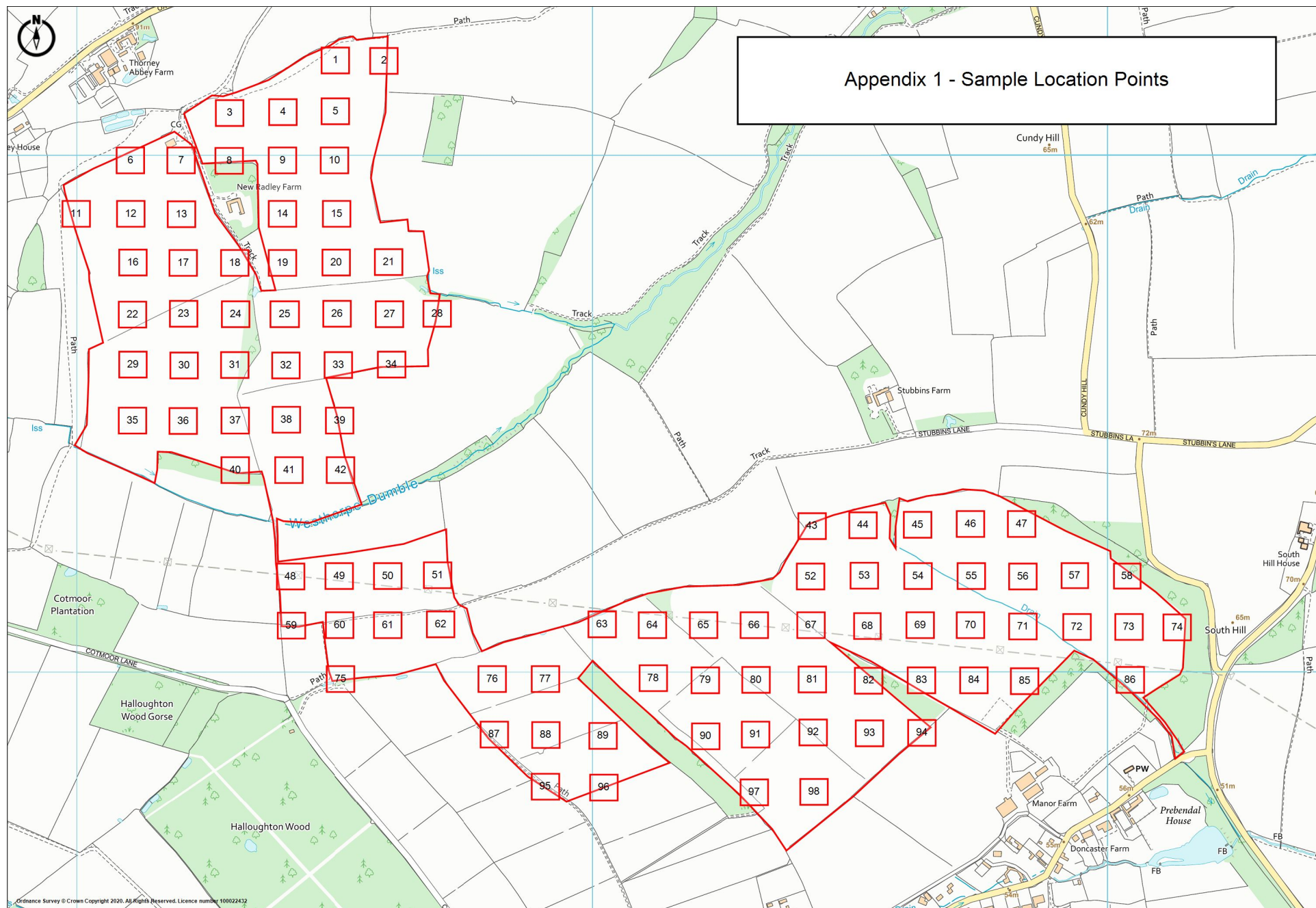
5.2 Wetness Assessment

Field Capacity Days (FCD)	140.92
Wetness Class	III/IV
Soil Texture	Clay/Heavy Clay Loam

Table 6 Grade According to soil wetness – mineral soils, describes this combination as Grade 3b. In a small number of locations, the topsoil was a far lighter texture, as light as a sandy loam in places. In these locations the grading would come out as grade 3a but because these points are individual samples in the middle of clay and heavy clay loam areas a pattern limitation is said to occur limiting the whole site to 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 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.
- 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 4**.
- 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 land to grade 3b. A plan of the land grading can be found at **appendix 5**.



APPENDIX 2 – AGRO-CLIMATIC DATA

Site Details: Cotmoor

Grid reference (centre of site): 468014 352355

Altitude: Mean 80.46

Climatic data from surrounding locations:

Grid Reference	ALT	AAR	LR_AAR	ASR	ATO	ATS	MDW	MDP	FCD
46503500	71	633	1.2	325	1366	2323	104	95	136
46503550	55	684	1.2	335	1382	2340	103	94	150
47003500	36	600	1.3	300	1405	2368	113	107	124
47003550	27	649	1.3	320	1413	2377	109	102	134

Altitude Adjusted

Site Average Annual Rainfall: 682.77

Site Accumulated Temperature January to June: 1353.62

Site Field Capacity Days: 140.92

Moisture Deficit Wheat: 101.17

Moisture Deficit Potatoes: 85.63

Appendix 3 - Soil Sampling Information

		Topsoil	Subsoil 1										Subsoil 2										Subsoil 3									
Sample No	Altitude	Depth	Texture	Colour	Stoniness	Mottles	Structure	Depth	Texture	Colour	Stoniness	Mottles	Structure	Depth	Texture	Colour	Stoniness	Mottles	Structure	Depth	Texture	Colour	Stoniness	Mottles	Structure							
1	81	0-30	C	5YR 3-4			WMSAB	30-80	C	5YR 4-4		G	WMAB	80	IMP - MUDSTONE																	
2	81	0-30	HCL	5YR 3-4			WMSAB	35-65	C	5YR 5-4			WMAB	65-120	C	5YR 4-4		MG	M													
3	87	0-30	HCL	5YR 3-4			WMSAB	35-55	SL	5YR 5-6		MG	MAB	55	C	5YR 5-6		GB	M													
4	84	0-30	HCL	5YR 3-4			WMSAB	35-55	SL	5YR 5-6		MG	MAB	55	IMP - MUDSTONE																	
5	85	0-30	HCL	5YR 3-4			WMSAB	35-65	C	5YR 4-4			WMAB	65-120	C	5YR 4-4		MG	M													
6	91	0-30	HCL	5YR 3-4			WMSAB	30-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
7	90	0-30	HCL	5YR 3-4			WMSAB	30-70	C	2.5YR 4-4		MG	WMAB	70	IMP - MUDSTONE																	
8	88	0-30	HCL	5YR 3-4			WMSAB	30-70	C	2.5YR 4-4		MG	WMAB	70	IMP - MUDSTONE																	
9	86	0-30	HCL	5YR 3-4			WMSAB	30-90	C	2.5YR 4-4		MG	WMAB	90	IMP - MUDSTONE																	
10	85	0-30	HCL	5YR 3-4			WMSAB	35-55	CL	5YR 4-4			MAB	55-120	C	5YR 4-4		MG	M													
11	86	0-30	HCL	5YR 3-4			WMSAB	30-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
12	93	0-35	HCL	7.5YR 4-2			WMSAB	40-50	C	2.5YR 4-4		GB	WMAB	50-60	C	2.5YR 4-4		MG	M	60	IMP - MUDSTONE											
13	90	0-35	HCL	5YR 3-4			WMSAB	35-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
14	85	0-30	HCL	5YR 3-4			WMSAB	35-65	C	5YR 4-4			WMAB	65-120	C	5YR 4-4		MG	M													
15	84	0-30	SL	5YR 3-4			WMSAB	35-65	C	5YR 4-4			WMAB	65-120	C	5YR 4-4		MG	M													
16	96	0-35	HCL	5YR 3-4			WMSAB	35-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
17	91	0-30	HCL	5YR 3-4			WMSAB	30-70	C	2.5YR 4-4		MG	WMAB	70	IMP - MUDSTONE																	
18	89	0-35	HCL	5YR 3-4			WMSAB	35-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
19	87	0-30	HCL	5YR 3-4			WMSAB	35-65	C	5YR 4-4			WMAB	65-120	C	5YR 4-4		MG	M													
20	82	0-35	HCL	5YR 3-4			WMSAB	35-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
21	82	0-30	SL	5YR 3-4			WMSAB	35-65	C	5YR 4-4			WMAB	65-120	C	5YR 4-4		MG	M													
22	94	0-35	HCL	7.5YR 4-2			WMSAB	35-50	C	2.5YR 4-4		GB	WMAB	50	IMP - MUDSTONE																	
23	89	0-35	HCL	5YR 3-4			WMSAB	35-60	C	2.5YR 4-4		MG	WMAB	60-120	C	2.5YR 4-4		MG	M													
24	90	0-35	MCL	5YR 3-3			WFSAB	35-90	SC	5YR 4-4		MOB	WMAB	90-120	C	2.5YR 4-4		MGB	M													
25	87	0-35	HCL	5YR 3-4			WMSAB	35-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
26	85	0-30	HCL	5YR 3-4			WMSAB	30-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
27	81	0-30	HCL	5YR 3-4			WMSAB	35-60	C	5YR 4-4			WMAB	60-120	C	5YR 4-4		MG	M													
28	81	0-30	HCL	5YR 3-4			WMSAB	30-70	C	5YR 4S-4		G	WMAB	70	IMP - MUDSTONE																	
29	93	0-35	MCL	5YR 3-3			WFSAB	35-90	SC	5YR 4-4		MOB	WMAB	90-120	C	2.5YR 4-4		MGB	M													
30	90	0-35	MCL	7.5YR 4-2			WFSAB	35-50	SC	5YR 5-4		MOB	WMAB	50-120	C	2.5YR 4-4		MGB	M													
31	87	0-35	HCL	2.5YR 3-3			WMSAB	35-60	C	2.5YR 4-4		MG	WMAB	60-120	C	2.5YR 4-4		MG	M													
32	86	0-30	HCL	2.5YR 3-3			WMSAB	30-60	C	2.5YR 4-4		MG	WMAB	60-120	C	2.5YR 4-4		MG	M													
33	84	0-30	SL	5YR 3-4			G	30-75	SC	5YR 5-4		MOB	WMAB	75	IMP - MUDSTONE																	
34	81	0-35	HCL	5YR 3-4			WMSAB	35-70	C	5YR 4-4		G	M	70	IMP - MUDSTONE																	
35	87	0-30	HCL	5YR 3-3			WMSAB	30-50	C	5YR 4-4		G	M	50	IMP - MUDSTONE																	
36	88	0-30	HCL	5YR 3-3			WMSAB	30-40	C	5YR 4-4		G	M	40	IMP - MUDSTONE																	
37	87	0-35	HCL	5YR 3-4			WMSAB	35-80	C	2.5YR 4-4		MG	WMAB	80	IMP - MUDSTONE																	
38	86	0-35	C	5YR 3-4			WMSAB	35-120	C	5YR 4-4		G	M																			
39	87	0-35	C	5YR 3-4			WMSAB	35-80	C	5YR 4-4		G	M	80	IMP - MUDSTONE																	
40	88	0-35	HCL	5YR 3-4			WMSAB	35-60	C	2.5YR 4-4		MG	WMAB	60-120	C	2.5YR 4-4		MG	M													
41	88	0-35	HCL	5YR 3-4			WMSAB	35-65	C	2.5YR 4-4		MG	WMAB	65	IMP - MUDSTONE																	
42	85	0-35	C	5YR 3-4			WMSAB	35-80	C	5YR 4-4		G	M	80	IMP - MUDSTONE																	
43	84	0-35	C	7.5YR 3-2			WMSAB	35-75	V	5YR 4-4		MGB	WMAB	75-120	C	5YR 4-4		GB	M													
44	80	0-35	C	7.5YR 3-4			WMSAB	35-120	C	10YR 5-3		MOB	M																			
45	72	0-35	C	7.5YR 3-2			WMSAB	35-75	V	5YR 4-4		MGB	WMAB	75-120	C	5YR 4-4		GB	M													
46	74	0-35	C	7.5YR 3-2			WMSAB	35-75	V	5YR 4-4		MGB	WMAB	75-120	C	5YR 4-4		GB	M													
47	73	0-30	C	7.5YR 3-4			WMSAB	30-40	C	5YR 4-4		G	WMAB	40	IMP - MUDSTONE																	
48	84	0-35	C	5YR 3-4			WMSAB	35-65	C	2.5YR 4-4		MG	WMAB	65-120	C	10YR 6-2		GB	M													
49	81	0-30	C	5YR 3-4			WMSAB	30-70	C	5YR 4-4		BG	WMAB	70-120	C	5YR 4-4		GB	M													
50	80	0-25	C	7.5YR 3-3			WMSAB	25-50	C	5G 5-1			M	50-120	C	2.5YR 4-4			M													
51	80	0-30	C	7.5YR 3-3			WMSAB	30-120	C	2.5YR 4-4		GB	M																			
52	77	0-30	C	7.5YR 3-4			WMSAB	30-40	C	5YR 4-4		G	WMAB	40	IMP - MUDSTONE																	
53	75	0-30	C	5YR 3-4			WMSAB	30-70	SC	5YR 4-4		BG	WMAB	70-120	C	5YR 4-4		GB	M													
54	71	0-30	C	10YR 3-2			WMSAB	30-120	C	5YR 4-4		MGB	M																			
55	70	0-35	C	7.5YR 3-4			WMSAB	35-120	C	10YR 5-3		MOB	M																			
56	69	0-30	C	7.5YR 3-4			WMSAB	30-75	C	5YR 4-4		G	WMAB	75-120	C	5YR 4-4		GB	M													
57	68	0-30	C	7.5YR 3-4			WMSAB	30-75	C	5YR 4-4		G	WMAB	75-120	C	5YR 4-4		GB	M													
58	70	0-30	C	7.5YR 3-4			WMSAB	30-75	C	5YR 4-4		G	WMAB	75	IMP - MUDSTONE																	
59	87	0-30	C	5YR 3-4			WMSAB	30-70	C	5YR 4-4		BG	WMAB	70-120	C	5YR 4-4		GB	M													
60	88	0-35	HCL	7.5YR 3-2			WMSAB	35-120	C	2.5YR 4-4		BG	M																			
61	88	0-35	HCL	7.5YR 3-2			WMSAB	35-60	SC	5YR 5-4		GO	WMAB	60-120	SC	2.5YR 4-4		BG	M													
62	87	0-35	C	5YR 3-3			WMSAB	35-120	C	2.5YR 4-4		GB	M																			
63	84	0-30	C	5YR 3-3			WMSAB	30-120	C	2.5YR 4-4		GB	M																			

APPENDIX 4 - 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.

