8FCs 5075 19/93

AGRICULTURAL LAND CLASSIFICATION INCORPORATING SOIL PHYSICAL CHARACTERISTICS

ORCHARD FARM LANDFILL SITE, HOLMACOTT, NR INSTALL, DEVON

REPORT OF SURVEY

1. INTRODUCTION

1.1 The site, an area of 14 ha, is located to the north of the new A39(T) at Holmacott. The survey work was completed on behalf of MAFF as part of its statutory role in response to an ad hoc planning application to Devon County Council. The survey work was carried out in April 1993 by ADAS's Resource Planning Team (Taunton Statutory Unit) using the Agricultural Land Classification system. The field work was carried out at a scale of 1:10,000 (approximately one sample point every hectare of agricultural land). These borings were supplemented by a soil inspection pit in order to assess subsoil conditions. The information is correct at the scale shown but any enlargement would be misleading.

1.2 The published Provisional 1" to the mile ALC map of this area (MAFF 1974) shows much of the site to be Grade 4, with some Grade 3 in the southern part and non-agricultural land in the northern part. The site comprises part of an area which was surveyed in 1984 using the original guidelines. This indicates that Grade 4 land was found in the central part of the site with 3a and 3b on the land to the north and south. The current survey was undertaken to provide a more detailed representation of the agricultural land quality using the Revised Guidelines and Criteria (MAFF 1988) and this supersedes the previous surveys. These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The grading takes account of the top 120 cm of the soil profile.

1.3 The proportion of ALC grades are shown in the table below and are illustrated on the accompanying map. A description of the grades used in the ALC system can be found in the Appendix.

Table 1 Distribution of ALC grades: Orchard Farm, Holmacott

GRADE	AREA (ha)	% OF SURVEY AREA	% OF AGRICULTURAL LAND
3b	5.4	37.5%	50.0
4	5.4	37.5%	50.0
Non-agricultural	3.6	25.0	
TOTAL	14.4	(14.4 ha)	(10.8 ha)

2.0 CLIMATE

2.1 The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to lower grades despite other favourable conditions.

2.2 Climatic data for the site was interpolated from the published Agricultural Climate Dataset (Meteorological Office 1989). The parameters used for assessing climate are accumulated temperature (a measure of relative warmth of a locality) and average annual rainfall (a measure of overall wetness). The results shown in Table 2 indicate that there is no climatic limitation.

Table 2 **Climatic interpolations: Orchard Farm, Holmacott**

Grid Reference	SS 504296	SS 506299
Height (m)	90	60
Accumulated Temperature (° days)	1490	1524
Average Annual Rainfall (mm)	913	878
Overall Climatic Grade	1	1
Field Capacity (days)	190	185
Moisture Deficit - Wheat (mm)	92	98
Potatoes (mm)	81	88

2.3 No local climatic factors such as exposure were noted in the survey area. Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. This data is used in assessing the soil wetness and droughtiness limitations referred to in Section 5.

3. RELIEF

3.1 The site occupies a north easterly facing valley side which rises from 60 m AOD at the most northerly point to 90 m AOD in the south western corner. Part of the north-east facing slopes are moderately steep in places imposing a Grade 4 slope limitation.

4. GEOLOGY AND SOILS

4.1 The published 1:50,000 scale solid and drift geology map sheet 293 (Geological Survey of England and Wales, 1982) shows the majority of the site to be underlain by mainly shale (from the Crackington Formation) with a band of sandstone in the southern region of the site. A narrow strip of alluvium occupies the valley floor.

4.2 The Soil Survey of England and Wales mapped the soils of the area in 1983, at a reconnaissance scale of 1:250,000. This map shows the soils to comprise the Hallsworth 2 Association* with a small area of Denbigh 2 Association** at the southern part of the site.

* Hallsworth 2 Association: slowly permeable, seasonally waterlogged, clayey, fine loamy and fine silty soils.

** Denbigh 2 Association: well-drained fine loamy soils over slate or slate rubble. Some fine loamy soils variably affected by groundwater.

4.3 During the recent survey one soil type was found. This was a clayey profile in which the stone contents varied with location across the site. A full profile description is given in paragraph 6.

5. AGRICULTURAL LAND CLASSIFICATION

5.1 The distribution of ALC grades identified in the survey area is detailed in section 1 and shown on the accompanying ALC map. The information is correct at the scale shown but any enlargement would be misleading.

Subgrade 3b

5.2 A total of 5.4 ha has been graded 3b. The soil profiles are poorly draining clayey soils and have been assessed as wetness Class IV which when combined with medium clay loam topsoils restricts the land to subgrade 3b.

Grade 4

5.3 Half of the agricultural land (5.4 ha) has been allocated Grade 4 land quality. These soils have a wetness limitation similar to soils described in paragraph 5.2 however these profiles experience a severe workability limitation due to the heavy clay loam topsoils and relatively high Field Capacity Days experienced in this area. There is a narrow north facing slope of 12° which also imposes a grade 4 slope limitation due to the unsuitability of this land for the safe operation of the machinery used in some cultivations and crop harvests.

Non-agricultural Land

5.4 A total of 3.6 ha of non-agricultural land was found in the survey area. This comprises land which is at present used for landfill, and 2 small areas, one of woodland and the other a pond.

6. SOIL RESOURCES

TOPSOIL

6.1 "Topsoil" is defined as the organic rich surface horizon. Two topsoils have been identified across the site. The western half of the site has non-calcareous medium clay loams and the east and southern areas has heavy clay loams. The topsoil depth varies slightly between 25 and 35 cms; 30 cm being the average across the site. Topsoils are relatively stone free except in the southern field where a visual estimate indicated there is between 10-15% hard rock. The material on the surface in this field indicates that this field is possibly disturbed.

A total topsoil resource of 32,400 cubic metres is available as shown in Table 3.

Table 3 Topsoil Resources: Orchard Farm, Holmacott, Devon

MAP UNIT	DEPTH	AREA	SOILS	VOLUMES (m^3)
I	0-30 cm	5.9 ha	MCL	17,700
II	0-30 cm	4.9 ha	HCL	14,700

6.2 The topsoil structure in unit I is weakly developed coarse and very coarse sub-angular blocky with a friable consistence. Most of the topsoil in unit II has recently been cultivated and therefore has a disturbed topsoil structure. The topsoils are well rooted and of good porosity.

SUBSOIL

6.3 "Subsoil" is defined as the less organic rich lower horizons. The subsoils across this site can be handled as 2 units. The upper subsoils of the 3b land (unit III) comprises heavy clay loam, to a depth 70-75 cm. These soils have moderately developed coarse and very coarse sub-angular blocky structures turning to a coarse prismatic structure below about 50 cm. These soils have moderate substructural conditions and friable consistency. They are well rooted and porosity decreases with depth.

6.4 The lower subsoil of map unit III and the upper and lower subsoils of map unit IV can be treated as one unit. These soils are very slightly stony clays which are weakly developed adherent very coarse sub-angular blocky structures having a poor structural condition and a firm consistence. The lower subsoils are poorly rooted and observations indicate a low porosity.

6.5 A total subsoil resource of 97,200 cubic metres is available, the distribution of which is shown in Table 4.

Table 4 Subsoil Resources: Orchard Farm, Holmacott

MAP UNIT	DEPTH	AREA	SOILS	VOLUME
III	30-75cm	2.5	C	11,250
III	75-120cm	2.5	C	11,250
IV	30-120cm	8.3	C	74,700

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1982) Solid and Drift edition. Sheet 293 1:50,000 scale

MAFF (1974) Agricultural Land Classification Map Sheet 163 Provisional 1:63,360 scale

MAFF (1988) Agricultural Land Classification of England and Wales (revised guidelines and criteria for grading the quality of land) Alnwick

METEOROLOGICAL OFFICE (1989) Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5 Soils of South West England 1:250,000 scale

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APPENDIX

DESCRIPTION OF THE GRADES AND SUB-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 include 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 an 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 (eg 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.

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 913-878	PARENT MATERIAL
Holmacott (Orchard Farm)Devon	Pit 1	0	Permanent Grass	ATO :- 1490-1524 FC Days :- 185-190	Mainly shale with small band of mainly sandstone in south of site
JOB NO 19/93	DATE 28/4/93	GRID REFERENCE SS 5040 2970	DESCRIBED BY N Done G Clark	Climatic grade :- 1	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	30	25Y42	MCL	Negligible Visual	25YR46 Common, fine, distinct, ochreous	Weakly developed coarse and very coarse sub-angular blocky	>0.5%	-	Friable	Abundant fine, very fine	-	-	Gradusl smooth
2	50	25Y64 42	HCL	- Visual	75YR68 Abundant, distinct, ochreous	Moderately developed coarse and very coarse sub-angular blocky	>0.5%	Moderate	Friable	Many, fine very fine	-	-	Clear, smooth
3	70	25Y64	HCL	- Visual	10YR68 Many, distinct, ochreous	Moderately developed, coarse prismatic	0.4%	Moderate	Friable	Few, fine, very fine	-	-	Clear, smooth
4	110+	5Y62	C	7% soft, fine, sandstone Visual	10YR58 Many, distinct, ochreous	Weakly developed adherent. Very coarse sub-angular blocky	<0.5%	Poor	Firm	Few, fine, very fine	-	-	-

Profile Gleyed From:- Surface

Depth to Slowly Permeable Horizon:- 50cm

Wetness Class :- IV

Wetness Grade :- 3B

Available Water Wheat :- 140mm

Potatoes :- 118mm

Moisture Deficit Wheat :- 95mm

Potatoes :- 85mm

Moisture Balance Wheat :- +45mm

Potatoes :- +33mm

Droughtiness Grade :- 1

Final ALC Grade :- 3B

Main Limiting Factor(s) :- Wetness

Remarks :-

Very moist horizon at 70cm, water oozing out of pit side.