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Trelay Farm, Marhamchurch

AGRICULTURAL LAND CLASSIFICATION AND SITE PHYSICAL CHARACTERISTICS

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MAFF

TRELAY FARM, MARHAMCHURCH, BUDE

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CONTENTS

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AGRICULTURAL LAND CLASSIFICATION SURVEY AND SITE PHYSICAL CHARACTERISTICS

SUMMARY

The survey was carried out by ADAS on behalf of MAFF as part of its statutory role in response to an ad hoc planning application made to Cornwall County Council. The fieldwork at Trelay Farm, Marhamchurch, Bude was completed in September 1994 at a scale of 1:10,000. Data on climate, soils, geology and from previous Agricultural Land Classification (ALC) Surveys was used and is presented in the report. The distribution of grades is shown on the accompanying ALC map and summarised below. Information is correct at this scale but could be misleading if enlarged.

Distribution of ALC grades: Trelay Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	8.1	90	91	
4	0.8	9	9	
Agricultural Buildings	0.1	1	0	
TOTAL	9.0	100	100	(8.9 ha)

The soils found in the survey area are poorly drained and of variable stoniness. The southern part of the site also has steep slopes which limit the land to Subgrade 3b and Grade 4. The wetness limitation restricts the remaining land to Subgrade 3b. The soils have medium clay loam topsoils and clay subsoils which are slowly permeable.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in September 1994 at Trelay Farm, Marhamchurch, Bude, on behalf of MAFF as part of its statutory role in response to an ad hoc planning application made to Cornwall County Council. The fieldwork covering 9 ha of land was conducted by ADAS at a scale of 1:10,000 with approximately one boring per hectare of agricultural land. A total of 10 auger borings were examined and one soil profile pit used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1974) shows the grades of the site at a reconnaissance scale. The north-eastern half of the site is mapped as Grade 3 while the south-western half is Grade 4.

The recent survey supersedes this map, having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988). 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. A description of the grades used in the ALC system can be found in Appendix 2.

2. CLIMATE

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 a lower grade despite other favourable conditions.

Estimates of climatic variables were interpolated from the published agricultural climate dataset (Meteorological Office 1989). The parameters used for assessing overall climate are accumulated temperature, a measure of the relative warmth of a locality, and average annual rainfall, a measure of overall wetness. The results shown in Table 1 indicate there is an overall climatic limitation which restricts the land to Grade 2 at best. There is evidence of slight exposure at the site.

Table 1: Climatic Interpolations: Trelay Farm

Grid Reference		SS 220015
Altitude (m)		160
Accumulated Temperature (day °)		1430
Average Annual Rainfall (mm)		1055
Overall Climatic Grade		2
Field Capacity Days		206
Moisture deficit (mm):	Wheat	79
	Potatoes	65

Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat and potatoes are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections.

3. RELIEF AND LANDCOVER

The site occupies part of a small ridge with the majority of the site sloping to the south into a small valley. The gradient of these slopes is between 7° and 15°. The steepest slopes are in the east. The altitude range of the site is 120 m to 165 m AOD.

At the time of survey all of the land was in permanent grazing, with a barn adjacent to the road.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:50,000 scale solid and drift geology map, sheet 323, Institute of Geological Sciences 1974, as being mainly sandstone of the Bude Formation. In the valley to the south of the site there are some alluvium deposits.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000 which shows the whole site to consist of soils from the Hallsworth 1 Association. These soils are described as being slowly permeable, seasonally waterlogged, clayey soils.

The soils found during the recent survey were poorly drained. Evidence of wetness could be seen near to the surface. The clay subsoils are slowly permeable. The medium clay loam topsoils are slightly stony. The stone content of the subsoil is variable, but generally does not enhance the free drainage of the soils.

5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades is shown in Table 2 and on the accompanying ALC map. This information could be misleading if shown at a larger scale.

Table 2: Distribution of ALC grades: Trelay Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	8.1	90	91	
4	0.8	9	9	
Agricultural Buildings	0.1	1	0	
TOTAL	9.0	100	100	(8.9 ha)

Subgrade 3b

All the soils at the site have been assessed as Subgrade 3b. These soils are poorly drained. The evidence of poor drainage is seen in the form of mottles, gleying and pale colours often at the surface. This is caused by slowly permeable subsoils. The soils are Wetness Class IV (see Appendix 3). The stone content of these soils is variable, but is generally insufficient to enhance free drainage. At a soil profile pit the stone content was measured by volume to be 2% in the topsoil and 10% in the subsoil. Parts of the area mapped as Subgrade 3b are also limited by gradient. The slope gradient was measured as 8° and 9°.

Grade 4

A small area in the east has gradients of over 11°. This severely limits the versatility of the land because only a limited range of machinery can be safely used.

6. SOIL RESOURCES

The areas referred to can be found on the accompanying Soil Resources map.

"Topsoil" is defined as the organic rich surface horizon. The topsoils at the site are medium clay loams. The depth of the topsoil was fairly uniform across the site and can be averaged at 30 cm. The topsoil has a weakly developed coarse angular blocky structure with friable consistence. The topsoils are greyish or pale in colour and are well rooted with good porosity. These soils are slightly stony.

A total topsoil resource of 26,700 m^3 is available as shown in Table 3.

Table 3: Topsoil Resources

Map Unit	Depth (cm)	Area (ha)	Soils	Volume (m^3)
A	30	8.9	MCL	26700

"Subsoil" is defined as the less organic rich lower horizons. A single subsoil horizon is identified across the site. These pale coloured soils are clays with low porosity but common rooting. These soils are slightly stonier than the topsoil, but two stone types exist at random. There are some denser patches of very weathered stone. In these areas the soils have weakly developed coarse subangular blocky structures with firm consistence. Where the stone fragments are more interspersed and less weathered, the soil has a moderately developed coarse angular blocky structure with firm consistence. These soils have poor structural condition and low porosity.

A maximum subsoil resource of 80,100 m^3 is available distributed as shown in Table 4.

Table 4: Subsoil Resources

Map Unit	Depth (cm)	Area (ha)	Soils	Volume (m^3)
A	30-120	8.9	HCL, C	80100

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September 1994

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1974) Solid and Drift Edition, Sheet 323, Holsworthy, 1:50,000.

MAFF (1974) Agricultural Land Classification Map, Sheet 174, Provisional 1:63,360 scale.

MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of agricultural land), Alnwick.

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification.

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

APPENDIX 2

DESCRIPTION OF GRADES AND SUBGRADES

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 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 (eg cereals and forage crops) the yields of which are variable. In most 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.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: private park land, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Agricultural buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg polythene tunnels erected for lambing) may be ignored.

Open water

Includes lakes, ponds and rivers as map scale permits.

Land not surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above landcover types, eg buildings in large grounds, and where may be shown separately. Otherwise, the most extensive cover type will usually be shown.

Source: MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for Grading the Quality of Agricultural Land), Alnwick.

APPENDIX 3

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but not wet within 40 cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31 and 90 days in most years.

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (in preparation), Soil Survey Field Handbook (revised edition).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Trelay Farm, Marham Church	Pit 1	8° S	PGR	Av Rainfall: 1055 mm ATO: 1430 day °C	Bude Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 206	SOIL SAMPLE REFERENCES
100/94	2/9/94	ASP5 SS 219015	G M Shaw	Climatic Grade: 2 Exposure Grade: 1/2	-

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	25	MCL	10YR42	2% HR Sieved	Cdfo 10YR56	None	WCAB	Friable	-	Good	MF+VF		Clear smooth
2	120	C	2.5Y64	10% HR Visual	mdfo 10YR58	None	WCSAB where weathered stone. MCAB where clay lenses.	Firm	Poor	Low	CVF		

Profile Gleyed From: Surface

Depth to Slowly Permeable Horizon: 25 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 118 mm

Potatoes: 97 mm

Moisture Deficit Wheat: 79 mm

Potatoes: 65 mm

Moisture Balance Wheat: 39 mm

Potatoes: 32 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness/gradient

Remarks:

Pit dug to 55. Borings showed same material to depth with variable stones which are easily impenetrable to auger. Where weathered stone drainage is better, ie less mottles, but surrounding clay heavily mottled, therefore WC IV reasonable.