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114/94

Chambers Farm, Brookthorpe, Gloucester

AGRICULTURAL LAND CLASSIFICATION

Prepared for MAFF by
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Land Use Planning Unit

CHAMBERS FARM, BROOKTHORPE, GLOUCESTER

AGRICULTURAL LAND CLASSIFICATION

CONTENTS

CHAMBERS FARM, BROOKTHORPE, GLOUCESTER

AGRICULTURAL LAND CLASSIFICATION SURVEY

SUMMARY

The survey was carried out by ADAS on behalf of MAFF in connection with an ad-hoc planning application. The fieldwork at Chambers Farm, Brookthorpe was completed in October 1994 at a scale of 1:10,000. Data on climate, soils, geology and previous Agricultural Land Classification (ALC) Surveys was used and is presented in the report. The distribution of grades is detailed below and illustrated on the accompanying ALC map. Information is correct at this scale but could be misleading if enlarged.

Distribution of ALC grades: Chambers Farm, Brookthorpe

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (15.9 ha)
3b	15.9	100	100
TOTAL	15.9		

The soils were found to have a heavy clay loam topsoil overlying a gleyed, slowly permeable clay subsoil. The entire site was graded as 3b due to wetness.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in October 1994 at Chambers Farm, Brookthorpe, Gloucester on behalf of MAFF in connection with an ad-hoc planning application for a motorway service area. The fieldwork covering 15.9 ha of land was conducted by ADAS at a scale of 1:10,000 (approximately one boring per hectare of agricultural land). A total of 15 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 1972) shows the grade of the site at a reconnaissance scale to be Grade 3.

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 no overall climatic limitation.

Table 1: Climatic Interpolations: Chambers Farm, Brookthorpe

Grid Reference		SO 823120
Altitude (m)		35
Accumulated Temperature (day °)		1487
Average Annual Rainfall (mm)		709
Overall Climatic Grade		1
Field Capacity Days		155
Moisture deficit (mm):	Wheat	106
	Potatoes	99

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 area south of the motorway slopes gently north. To the north of the motorway the western half of the site is artificially banked, having been used as a landfill site during the motorway construction. The entire site was under permanent grass at the time of the survey.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:50,000 scale solid and drift geology map, sheet 234, Institute of Geological Sciences 1972, as being all clays of the lower Jurassic era.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000 which showed the whole site to consist of soils from the Evesham 2 Association. These are described as being slowly permeable calcareous clay soils, with some

slowly permeable seasonally waterlogged non-calcareous clayey and fine loamy or fine silty over clayey soils.

The soils found during the recent survey were found to be non-calcareous with a heavy clay loam topsoil overlying clay. A gleyed slowly permeable layer occurred, usually at above 40 cm depth.

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: Chambers Farm, Brookthorpe

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (15.9 ha)
3b	15.9	100	100
TOTAL	15.9		

The entire site was graded as Subgrade 3b.

The topsoil is generally heavy clay loam to a depth of 25 cm, overlying a gleyed clay slowly permeable layer. With 155 Field Capacity Days this leads to a Wetness Class IV, and a grade of 3b. Five borings had a lighter (medium clay loam topsoil) but this still led to a grade of 3b. An area of disturbed land occurs north of the motorway consisting of landfill with a thin medium clay loam topsoil over clay. This area is also graded as 3b.

Resource Planning Team
Taunton Statutory Unit
October 1994

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1972) Solid and Drift Edition, Sheet 234, 1:50,000 scale.

MAFF (1972) Agricultural Land Classification Map, Sheet 143, 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
Chambers Farm	1P	2°N	Permanent Grass	Av Rainfall: 709 mm ATO: 1487 day °C	Lower Jurassic Clays
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 155 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES
114/94	21/10/94	SO825118	P R Woode		

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	14	HCL	10YR4/3	None	None	None	-	Friable	Moderate	Many	Many Fine	No	Smooth Abrupt
2	34	C	2.5Y5/2	None	10YR5/6 Common	None	Moderate Coarse Sub-angular Blocky	Firm	Poor	Common	Common Fine	No	Smooth Clear
3	85+	C	2.5Y6/4	None	10YR5/6 Common	None	Moderate Coarse Angular Blocky, tending to weak coarse prismatic	Firm	Poor	<0.5% biopores	Few Fine	No	-

Profile Gleyed From: 14 cm

Depth to Slowly Permeable Horizon: 34 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water	Wheat:	100 mm
	Potatoes:	98 mm
Moisture Deficit	Wheat:	106 mm
	Potatoes:	99 mm
Moisture Balance	Wheat:	-6 mm
	Potatoes:	-1 mm
Droughtiness Grade:		3a (Calculated to 90 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
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1	14	HCL	10YR4/3	None	None	None	-	Friable	Moderate	Many	Many Fine	No	Smooth Abrupt
2	34	C	2.5Y5/2	None	10YR5/6 Common	None	Moderate Coarse Sub-angular Blocky	Firm	Poor	Common	Common Fine	No	Smooth Clear
3	85+	C	2.5Y6/4	None	10YR5/6 Common	None	Moderate Coarse Angular Blocky, tending to weak coarse prismatic	Firm	Poor	<0.5% biopores	Few Fine	No	-

Profile Gleyed From: 14 cm

Depth to Slowly Permeable Horizon: 34 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 100 mm

Potatoes: 98 mm

Moisture Deficit Wheat: 106 mm

Potatoes: 99 mm

Moisture Balance Wheat: -6 mm

Potatoes: -1 mm

Droughtiness Grade: 3a (Calculated to 90 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks:

SOIL PLASTICITY RECORDING SHEET

ANNEX 2

SITE DATA

Grid Ref	SO825118		Site Name	Chambers Farm, Brookthorpe, Glos		LPA	Gloucester		
AAR	709 mm	ATO	1487 day °C	FCD	155	MD (wheat)	106 mm	MD (potatoes)	99 mm

SOIL PIT DATA

	PIT ONE SOIL SERIES Evesham 2 Association			PIT TWO SOIL SERIES			PIT THREE SOIL SERIES		
DEPTH	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS
10 cm	HCL	N							
20 cm	C	N							
30 cm	C	Y							
40 cm	C	Y							
50 cm	C	Y							
60 cm	C	Y							

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