66/95

Gloucestershire Structure Plan
Swindon Farm, Cheltenham

Agricultural Land Classification

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SWINDON FARM, CHELTENHAM

AGRICULTURAL LAND CLASSIFICATION

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SWINDON FARM, CHELTENHAM

AGRICULTURAL LAND CLASSIFICATION SURVEY

SUMMARY

The survey was carried out by ADAS on behalf of MAFF as part of its statutory role in the preparation of the Gloucester Structure Plan. The fieldwork at Swindon Farm was completed in October 1995 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: Swindon Farm, Cheltenham

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (12.3ha)
2	3.0	21.1	23.8
3b	9.6	67.6	76.2
Urban	0.6	4.2	
Non Agricultural	0.4	2.8	
Agricultural Buildings	0.6	4.2	
TOTAL	14.2		

The survey shows only 24% of the agricultural land to be best and most versatile. This is Grade 2 with minor limitations of wetness or droughtiness.

The remainder of the site is shown as Subgrade 3b, with a more serious moderate limitation due to wetness.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in October 1995 at Swindon Farm, Cheltenham on behalf of MAFF as part of its statutory role in the preparation of the Gloucester Structure Plan. The fieldwork covering 14.2 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 14 auger borings were examined and 1 soil profile pit used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1968) shows the grades of the site at a reconnaissance scale as mainly Grade1 with some Grade 3 at the north end of the site.

The area was also included on the 1981 survey of land at Cheltenham at a scale of 1:25 000. This shows Grades 2 and 3b much as in the latest survey, but also a tongue of Subgrade 3a between the two. This will be considered in Section 5 of this report.

The recent survey supersedes these previous surveys 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: Swindon Farm, Cheltenham

Grid Reference		SO 930247
Altitude (m)		40
Accumulated Temperature (day °)		1473
Average Annual Rainfall (mm)		645
Overall Climatic Grade		1
Field Capacity Days		144
Moisture deficit (mm):	Wheat	110
	Potatoes	103

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

Altitude ranges from 38 to 44 on AOD, with mainly gentle to moderate slopes which are not limiting. At the time of survey landcover was a mixture of grass for the dairy herd, winter cereals and potatoes.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:50,000 scale solid and drift geology map, sheet 216 British Geological Survey 1988 as mainly Lower Lias clay with fan gravel at the south of the site. During this survey the fan gravel was found to comprise mainly medium loamy sand in the lower subsoil

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000 as Evesham 2 Association.

The soils found during the recent survey show a clear distinction between those in the south of the site with a loamy sand lower subsoil and those developed on calcareous Lias clay in the absence of alluvium.

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: Swindon Farm, Cheltenham

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (ha)
2	3.0	21.1	23.8
3b	9.6	67.6	76.2
Urban	0.6	4.2	
Non Agricultural	0.4	2.8	
Agricultural Buildings	0.6	4.2	
TOTAL	14.2		

Grade 2

The areas shown as Grade 2 was found on a lower land with deposits of alluvial fan gravel. These were found more or less consistently at depths of around 70 cm and are believed to improve drainage of the overlying profile to the extent that Wetness Classes I and II (see Appendix 3) were found in this area despite overlying clay with clay loam topsoil.

Subgrade 3b

The area shown as Subgrade 3b is developed mainly on solid deposits of Lower Lias clay. This is calcareous, frequently with common calcareous nodules visible in the subsoil. Although most of the profiles were found to be Wetness Class IV, which with heavy clay loam topsoil gives wetness grade 3b, three of the auger profiles were found to be Wetness Class III, which with calcareous topsoil, even heavy clay loam, gives wetness grade 3a. However, these have been included in the 3b mapping unit.

The 1991 survey, completed under the previous classification guidelines, shows a significant area of Sub grade 3a overlapping the boundary between the current Grade 2 and the Subgrade 3b. This has proved unsustainable in the light of the current survey, which includes a Wetness Class IV (wetness grade 3b) pit within the area and also the auger borings record of the previous survey were inconclusive in this area.

Other land

Other land in the survey area includes the farm buildings, a farm bungalow and a small area of amenity tree planting.

APPENDIX 1

REFERENCES

ADAS Resource Planning Team. Results of survey for Cheltenham. Reference 7. 1981. Scale 1:25 000 ADAS Bristol.

BRITISH GEOLOGICAL SURVEY (1988) Solid and Drift Edition, Sheet 216, Tewkesbury, 1:50,000.

MAFF (1968) 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).

66-95 Manor Road Kingsditch, Cheltenham

	HA	ACRES	% AGRICULTURAL LAND	% TOTAL LAND
Grade 1	0.0	0.0	0.0	0.0
Grade 2	3.0	7.4	23.8	21.1
Subgrade 3a	0.0	0.0	0.0	0.0
Subgrade 3b	9.6	23.7	76.2	67.6
Grade 4	0.0	0.0	0.0	0.0
Grade 5	0.0	0.0	0.0	0.0
Total Agri. Land =	12.6	31.1	100.0	88.7
Urban	0.6	1.5	-	4.2
Non-Agricultural	0.4	1.0	-	2.8
Woodland	0.0	0.0	-	0.0
Ag-Buildings	0.6	1.5	-	4.2
Open Water	0.0	0.0	-	0.0
Land Not Surveyed	0.0	0.0	-	0.0
Total Site Area =	14.2	35.1	-	100.0

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Swindon Farm	Pit 1	2 ° S	PGR	Av Rainfall: 645 mm ATO: 1473 day °C FC Days: 144 Climatic Grade: 1 Exposure Grade: -1	Lias clay
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
66.95	10.10.95	SO92952475	PB		PB300

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	22	C	10YR42	0	0	0	-	-	-	G	MF, VF	?Y	Abrupt wavy
2	33	C	25Y53	0	CFFOM (10YR56)	0	MMPr	VFm	P	G	CVF	C nodules	Clear smooth
3	80 +	C	25Y52	0	MDMOM (10YR56)	0	MCPr	VFm	P	P	FVF	C nodules	-

Profile Gleyed From: 22cm

Depth to Slowly Permeable Horizon: 33cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 123 mm

Potatoes: 100 mm

Moisture Deficit Wheat: 110 mm

Potatoes: 103 mm

Moisture Balance Wheat: +13 mm

Potatoes: -3 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): We

Remarks: