65/95

LECKHAMPTON, CHELTENHAM

AGRICULTURAL LAND CLASSIFICATION

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LECKHAMPTON, 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 Leckhampton 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: Leckhampton, Cheltenham

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (41.5 ha)
2	12.2	20.3	29.4
3a	3.5	5.8	8.4
3b	25.8	42.9	62.2
Urban	8.5	14.1	
Non Agricultural	2.7	4.5	
Agricultural Buildings	5.5	9.1	
Not surveyed	2.0	3.3	
TOTAL	60.2		

38% of the agricultural land surveyed was found to be best and most versatile, mainly Grade 2 with minor limitations due to wetness or droughtiness and some Subgrade 3a moderate limitations due to wetness.

The remainder of the area was found to be Subgrade 3b, with more serious moderate limitations due to wetness.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in October 1995 at Leckhampton, Cheltenham on behalf of MAFF as part of its statutory role in the preparation of the Gloucester Structure Plan. The fieldwork covering 60.2 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 53 auger borings were examined and 3 soil profile pits 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 Grade 2, with a small area of Grade 3 in the South West corner of the site.

The area was surveyed in 1984 at a scale of 1:10,000. This survey shows a considerably smaller area of Grade 2 running through the site, with 3b and some 3a on either side. The pattern of the 1984 survey is similar to the 1995 survey, although the most recent survey found less Subgrade 3a.

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: Leckhampton, Cheltenham

Grid Reference		SO 938 202	SO 942 197
Altitude (m)		70	85
Accumulated Temperature (day °)		1440	1423
Average Annual Rainfall (mm)		702	719
Overall Climatic Grade		1	1
Field Capacity Days		157	160
Moisture deficit (mm):	Wheat	105	103
	Potatoes	96	93

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 70 to 90m AOD, with mainly gentle and moderate slopes which are not limiting. At the time of survey landcover was a mixture of grass, mainly for horses, some small cereal fields, and a small area still in outdoor horticultural production. Other horticultural production is mainly protected or in beds and is shown as agricultural buildings on the ALC map.

The tenure of the land in this area is highly fragmented, with many small holdings which at one time had a more productive use in horticulture or pigs. The buildings associated with these previous uses are still found, mainly in a derelict state, and have been joined by the temporary structures associated with the present hobby farmers and allotment holders, so that the area has an untidy appearance and a limited potential for field agriculture.

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 British Geological Survey 1972 as mainly lower lias clay with some fan gravel, mainly in the east and centre of the site.

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 on solid Lias clay and those developed in the presence of alluvial fan gravel, where drainage is much improved.

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: Leckhampton, Cheltenham

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (41.5 ha)
2	12.2	20.3	29.4
3a	3.5	5.8	8.4
3b	25.8	42.9	62.2
Urban	8.5	14.1	
Non Agricultural	2.7	4.5	
Agricultural Buildings	5.5	9.1	
Not surveyed	2.0	3.3	
TOTAL	60.2		

Grade 2

The area shown as Grade 2 was found to be closely correlated with the area of alluvial fan gravel which appeared during the survey as the occurrence of medium loamy sand in the lower subsoil to 120 cm. There is also a higher sand content in the topsoil and upper subsoil, although this does not necessarily show in the recorded textures. The Grade 2 profiles are limited mainly by minor limitations of wetness and occasionally of droughtiness.

Within the mapping unit are included several Grade 1 profiles, mainly at the south end of the site and illustrated by Pit 3. These tend to have a higher sand content and therefore a sandy loam topsoil texture.

Subgrade 3a

Although more Subgrade 3a was shown in the 1984 survey a small area remains at the east side of the site where it represents a narrow inter-grade between the Grade 2 and the surrounding Subgrade 3b. The soils are found to have a slowly permeable layer at fluctuating depth, giving rise to Wetness Class II perhaps with heavy clay loam topsoil or Wetness Class III with medium clay loam topsoil (see Appendix 3).

Subgrade 3b

The majority of the site is underlain by solid Lower Lias clay which in this area consistently gives rise to Wetness Grade 3b whether Wetness Class III or Wetness Class IV. Thus a significant area of Subgrade 3a shown in the 1984 survey has become Subgrade 3b under the revised classification (MAFF 1988).

Other Land

The fragmented tenure of land in this area has been refered to earlier. Several categories of other land are well represented and are shown on the survey map.

Urban land includes many domestic properties, old and new, also an extended dairy yard and an area of un-restored tip around Leckhampton Farm.

Non agricultural land includes mainly an extensive area of allotments at the north end of the site and a small area of scrub woodland east of Leckhampton Farm.

The several areas of agricultural buildings include at least 4 current horticultural businesses with protected crops and container bed cultivation. This category also includes areas of derelict agricultural buildings.

One small area was not surveyed because the owners refused consent to access, reputedly because they anticipate a development value.

Resource Planning Team
Taunton Statutory Unit
October 1995

APPENDIX 1

REFERENCES

ADAS Resource Planning Team, Results of survey for Leckhampton area. Reference 24, 1984, Scale 1:10,000, ADAS Bristol.

BRITISH GEOLOGICAL SURVEY (1972) Solid and Drift Edition, Sheet 234, Gloucester 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).

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	HA	ACRES	% AGRICULTURAL LAND	% TOTAL LAND
Grade 1	0.0	0.0	0.0	0.0
Grade 2	12.2	30.1	29.4	20.3
Subgrade 3a	3.5	8.6	8.4	5.8
Subgrade 3b	25.8	63.8	62.2	42.9
Grade 4	0.0	0.0	0.0	0.0
Grade 5	0.0	0.0	0.0	0.0
Total Agri. Land =	41.5	102.5	100.0	68.9
Urban	8.5	21.0	-	14.1
Non-Agricultural	2.7	6.7	-	4.5
Woodland	0.0	0.0	-	0.0
Ag-Buildings	5.5	13.6	-	9.1
Open Water	0.0	0.0	-	0.0
Land Not Surveyed	2.0	4.9	-	3.3
Total Site Area =	60.2	148.7	-	100.0

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Leckhampton	Pit 1 (Asp 15)	0°	PGR	Av Rainfall: 702 mm ATO: 1440 day °C FC Days: 158 Climatic Grade: 1 Exposure Grade: 1	Lias clay
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
65.96	13.10.95	SO937201	PB		PB306

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	23	C	25Y42	5% HR (vis)	FDFOM (75YR58)	0	-	-	-	-	MF, VF	-	Clear smooth
2	40	C	25Y54	10% HR (vis)	FFFOM (75YR58)	0	MM, CSAB	Fm	G	G	CVF	Y	Gradual smooth
3	50	C	10YR66	20% HR (vis)	FFFOM (75YR58)	0	WCSAB	Fm	M	G	CVF	Y	Clear wavy
4	75+	C	25Y52	2%HR (vis)	MDMOM (60YR58)	0	WCPr	Fm	P	P	FVF	Y	-

Profile Gleyed From: 50 cm

Depth to Slowly Permeable Horizon: 50 cm

Wetness Class: III

Wetness Grade: 3b

Available Water Wheat: 131 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 104 mm

Potatoes: 94 mm

Moisture Balance Wheat: +27 mm

Potatoes: +14 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): We

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Leckhampton	Pit 2 (Asp 17)	0°	CER	Av Rainfall: 702 mm ATO: 1440 day °C FC Days: 158 Climatic Grade: 1 Exposure Grade: 1	Fan gravel
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
65.96	13.10.95	SO939201	PB		PB307

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	23	SCL	10YR42	0	0	0	-	-	-	G	CF, VF	-	Abrupt wavy
2	40	SCL	10YR54	0	0	0	MCSAB	Fr	M	G	CVF	-	Clear smooth
3	75	C	10YR53	0	CFFOM (10YR58)	0	WCPr	Fr	M	G	FVF	-	Gradual smooth
4	105+	LMS	10YR66	0	CFFOM (10YR58)	0	WCSAB	VFr	M	G	FVF	-	-

Profile Gleyed From: 44 cm

Depth to Slowly Permeable Horizon: -

Wetness Class: 2

Wetness Grade: 2

Available Water Wheat: 122 mm

Potatoes: 113 mm

Moisture Deficit Wheat: 104 mm

Potatoes: 94 mm

Moisture Balance Wheat: +18 mm

Potatoes: +19 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): We

Remarks:

H3 texture SC/C
H1 texture PSD MSL/SCL but firm clods persist after cultivation ∴SCL.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Leckhampton	Pit 3(Asp 49)	1°E	PGR	Av Rainfall: 719 mm ATO: 1423 day °C FC Days: 159 Climatic Grade: 1 Exposure Grade: 1	Fan gravel
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
65.95	17.10.95	SO941196	PB		PB308

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	MSL	10YR43	0	0	0	-	-	-	G	MF, VF	0	Gradual smooth
2	42	MSL	10YR54	0	0	0	WCSAB	Fr	G	G	MF, VF	0	Gradual smooth
3	63	SCL	10YR54	0	0	F	MCSAB	Fr	M	G	MVF	0	Clear wavy
4	86	SC	10YR54	1% HR(Vis)	FFFOM (75YR58)	0	MCSAB	VFm	M	G	CVF	0	Clear smooth
5	110+	LMS	10YR56	0	FDMOM (75YR58)	F	WCAB	FVr	M	G	FVF	0	

Profile Gleyed From: -

Depth to Slowly Permeable Horizon: -

Wetness Class: 1

Wetness Grade: 1

Available Water Wheat: 136 mm

Potatoes: 113 mm

Moisture Deficit Wheat: 104 mm

Potatoes: 94 mm

Moisture Balance Wheat: +32 mm

Potatoes: +19 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 1

Main Limiting Factor(s):

Remarks: H4 structure tending to MMPr.
Worm channels persist to 110+.