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Heneage Farm, Falfield
AGRICULTURAL LAND CLASSIFICATION
AND
SITE PHYSICAL CHARACTERISTICS

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Ministry of Agriculture, Fisheries and Food
Land Use Planning Unit



HENEAGE FARM, FALFIELD, THORNBURY

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HENEAGE FARM, FALFIELD, THORNBURY

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 a response to an ad hoc planning application made to Avon County Council under the Town and Country Planning Act 1990. The fieldwork at Heneage Farm, Falfield was completed in August 1994 at a scale of 1:10,000. Data on climate, soils, geology and previous ALC Surveys was used and is presented in the report. The distribution of grades is detailed below and illustrated on the accompanying ALC map and summarised below. Information is correct at this scale but could be misleading if enlarged.

Distribution of ALC grades: Heneage Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	2.6	20.6	21.5	
4	9.5	75.4	78.5	
Non Agricultural	0.5	4.0	0.0	
TOTAL	12.6	100.0	100.0	(12.1 ha)

Distribution of ALC grades: Proposed Landfill Area, Heneage Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	1.8	21.7	21.7	
4	6.5	78.3	78.3	
Non Agricultural	0.0	0.0	0.0	
TOTAL	8.3	100.0	100.0	(8.3 ha)

Distribution of ALC grades: Proposed Lake, Heneage Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	0.0	0.0	0.0	
4	0.7	77.8	100.0	
Non Agricultural	0.2	32.2	0.0	
TOTAL	0.9	100.0	100.0	(0.7 ha)

No best and most versatile land was identified during the survey. All of the agricultural land experiences poor drainage, caused by slowly permeable subsoils. The Subgrade 3b land has medium clay loam topsoils whilst the Grade 4 land has clay topsoils. Clay subsoils were predominant across the site.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in August 1994 at Heneage Farm, Falfield, Thornbury on behalf of MAFF as part of its statutory role in response to ad hoc planning applications made to Avon County Council under the Town and Country Planning Act 1990. The fieldwork covering 12.6 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 13 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 1970) shows the grades of the site at a reconnaissance scale. The majority is mapped as Grade 3 with a small area of Grade 2 in the north east.

Part of the area was also surveyed in 1988 at a scale of 1:25,000 which mapped Subgrades 3a and 3b.

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: Heneage Farm

Grid Reference	ST 681 943
Altitude (m)	20
Accumulated Temperature (day °)	1515
Average Annual Rainfall (mm)	811
Overall Climatic Grade	1
Field-Capacity Days	181
Moisture deficit (mm):	
Wheat	100
Potatoes	92

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 survey area is flat in the west and north at an altitude of just under 20 m AOD. The area known as The Mount rises gently to just over 20 m AOD. The survey area is used for arable production except for a small area in the north which has been developed as a conservation area.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:63,360 scale solid and drift geology map, sheet 251 (Institute of Geological Sciences 1970).

This shows most of the site is underlain by Recent River Terrace and Head drift deposits with some Wenlock Limestone in the south.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000 and in 1974 at a scale of 1:63,360.

The detailed map shows most of the site is overlain by the Speller Series, with Spetchley Series in the west. These are both surface water gleys. A small area of the Heneage Complex occurs in the south. This is a gleyed brown Earth. The 1:250,000 scale map shows the area as the Brockhurst 2 Association. These soils are described as slowly permeable, seasonally waterlogged reddish fine loamy over clayey and clayey soils.

The soils found during the recent survey were variable. The soils were poorly drained. In the southern part of the site, the soils were reddish. The slightly higher land had medium clay loam topsoils over heavier soils, whilst the lower land had clay topsoils over clays.

5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades is shown in Table 2 and on the accompanying ALC map. The information could be misleading if shown at a larger scale. The distribution of ALC grades for the proposed landfill and lake, which fall within the survey area, are given in Tables 3 and 4.

Table 2: Distribution of ALC grades: Heneage Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	2.6	20.6	21.5	
4	9.5	75.4	78.5	
Non Agricultural	0.5	4.0	0.0	
TOTAL	12.6	100.0	100.0	(12.1 ha)

Table 3: Distribution of ALC grades: Proposed Landfill Area, Heneage Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	1.8	21.7	21.7	
4	6.5	78.3	78.3	
Non Agricultural	0.0	0.0	0.0	
TOTAL	8.3	100.0	100.0	(8.3 ha)

Table 4: Distribution of ALC grades: Proposed Lake, Heneage Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	0.0	0.0	0.0	
4	0.7	77.8	100.0	
Non Agricultural	0.2	32.2	0.0	
TOTAL	0.9	100.0	100.0	(0.7 ha)

Subgrade 3b

These soils are found on the slightly higher land around The Mount. The medium clay loam topsoils lie over heavy clay loam upper subsoils and slowly permeable clay lower subsoils. These soils are reddish in colour, and do not display characteristics of gleying. There are, however, common manganese concretions indicating poor drainage. The slowly permeable lower subsoils are present from 45 cm and extend to depth. These soils are Wetness Class IV (see Appendix 3).

Grade 4

The remaining areas have been mapped as Grade 4. All experience severe wetness limitations. The top 25 cm of the profile is a heavy clay. The subsoil clay is slowly permeable. The northern soils exhibit clear gleying whilst the red soils in the south are similar to the Subgrade 3b, except having clay topsoils. These soils are Wetness Class IV and III but, having a heavier topsoil, are less versatile.

Non Agricultural Land

A small area of land in the north is not in agricultural use and has been developed as a conservation area.

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. Two distinct topsoils exist at the site. These are medium clay loams on the higher land and clays on the lower land. These two topsoils are different in terms of workability and should be handled separately. The medium clay loam reddish topsoil is typically 25 cm in depth and has a weakly developed coarse sub-angular blocky structure. The greyish clay topsoil is much shallower and averages 15 cm depth. These topsoils also have weakly developed coarse sub-angular blocky structures.

A total topsoil resource of 20750 m³ is available as shown in Table 5.

Table 5: Topsoil Resources: Heneage Farm

Map Unit	Depth (cm)	Area (ha)	Soils	Volume (m ³)
A	25	2.6	MCL	6500
B	15	9.5	C	<u>14250</u>
				20750

"Subsoil" is defined as the less organic rich lower horizons. Two subsoils exist over part of the site, whilst a single subsoil is found across the majority. Beneath the medium clay loam topsoil a shallow upper subsoil is found. This reddish heavy clay loam horizon is on average 20 cm thick and has a moderately developed coarse sub-angular blocky structure. It is friable and has a moderate structural condition. The porosity is low. Beneath this horizon reddish clay horizons are found which have low porosity and moderate structural conditions. Beneath the clay topsoil, clay subsoils are found. In the south these are reddish and have low porosity and moderate structural conditions similar to the lower horizons beneath the medium clay loam topsoils. In the north the greyish and pale clay subsoils generally have poor structural conditions and low porosity.

A maximum subsoil resource of 124450 m³ is available distributed as shown in Table 6.

Table 6: Subsoil Resources

Map Unit	Depth (cm)	Area (ha)	Soils	Volume (m ³)
A	25-45	2.6	HCL	5200
A	45-120	2.6	C	19500
B	15-120	9.5	C	<u>99750</u>
				124450

Resource Planning Team
Taunton Statutory Unit
August 1994

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1970) Solid and Drift Edition, Sheet 251, Malmesbury 1:63,360

MAFF (1970) Agricultural Land Classification Map, Sheet 156, 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.

SOIL SURVEY OF ENGLAND AND WALES (1974), Malmesbury and Bath 1:63,360

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).

APPENDIX 4

SOIL RESOURCES: SOIL UNITS

TEXTURE	DEPTH (cm)	AREA (Ha)	Volume (m ³)
Unit A			
MCL	0-25	2.6	6500
HCL	25-45	2.6	5200
C	45-120	2.6	19500
Unit B			
C	0-15	9.5	14250
C	15-120	9.5	99750

Abbreviations

MCL Medium Clay Loam
HCL Heavy Clay Loam
C Clay

SITE NAME Heneage Farm, Falfield		PROFILE NO. Pit 3	SLOPE AND ASPECT 0°	LAND USE Cereal Stubble	Av Rainfall: 811 mm ATO: 1515 day °C	PARENT MATERIAL River Terrace
JOB NO. 99/94		DATE 23/8/94	GRID REFERENCE ASP 4 ST 680 944	DESCRIBED BY GMS	FC Days: 181 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES -

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	12	HCL	10YR42	0% Visual	none	none	WCSAB	Friable	-	Good	CVF		Abrupt smooth
2	35	C	7.5YR62	0% Visual	MDFO 7.5YR58	none	MCAB tending to Prismatic	Firm	Poor	Low	CVF		Clear smooth
3	100	C	10YR61	0% Visual	MDFO 10YR58	none	WMAB	Firm	Poor	Low	FVF		Clear smooth
4	120	SC	5YR44	0% Visual	none	none			Assume Mod				

Profile Gleyed From: 12 cm

Depth to Slowly Permeable Horizon: 12 cm

Wetness Class: IV

Wetness Grade: 4

NL336j

Available Water Wheat: 126 mm

Potatoes: 97 mm

Moisture Deficit Wheat: 100 mm

Potatoes: 92 mm

Moisture Balance Wheat: 26 mm

Potatoes: 5 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks:

Pit dug to 100 cm, augered to 120 cm.

SITE NAME Hencage Farm, Falfield		PROFILE NO. Pit 1	SLOPE AND ASPECT 0°	LAND USE Cereal Stubble	Av Rainfall: 811 mm ATO: 1515 day °C	PARENT MATERIAL River Terrace	
JOB NO. 99/94		DATE 23/8/94	GRID REFERENCE ASP 2 ST 682 945	DESCRIBED BY GMS	FC Days: 181 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES RPT/GMS 435	

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	12	C	10YR42	0% Visual	none	none	WCSAB	Firm	-	Good	MVF		Abrupt smooth
2	38	C	10YR52	0% Visual	MDFO 10YR58	none	SVCAB	V Firm	Poor	Low	CVFON ped faces		Clear smooth
3	70	C	7.5YR53	5% HR (sandstone) Visual	MDFO 7.5YR56	Common	MCSAB	V Firm	Mod	Low	CVF		Clear smooth
4	120	C	2.5YR44 (05YR53)	0% Visual	none	Common	WCSAB	V Firm	Poor	Low	FVF		

Profile Gleyed From: 12 cm

Depth to Slowly Permeable Horizon: 70 cm

Wetness Class: III

Wetness Grade: 4

NL336j

Available Water Wheat: 123 mm

Potatoes: 103 mm

Moisture Deficit Wheat: 100 mm

Potatoes: 92 mm

Moisture Balance Wheat: 23 mm

Potatoes: 11mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks:

Farmer only ploughs to 4 inches. Pit dug to 80 cm, augered to 120 cm. Horizon 3 has clear ped faces. Horizon 2 is SPL but does'nt extend to 50 cm.

SITE NAME Henceage Farm, Falfield		PROFILE NO. Pit 2	SLOPE AND ASPECT 3° E	LAND USE Ploughed	Av Rainfall: 811 mm ATO: 1515 day °C	PARENT MATERIAL River Terrace	
JOB NO. 99/94		DATE 23/8/94	GRID REFERENCE ASP 10 ST 682 943	DESCRIBED BY GMS	FC Days: 181 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES RPT/GMS 436	

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	MCL	5YR43	0% Visual	none	none	WCSAB	Friable	-	Good	FF		Abrupt smooth
2	45	HCL	5YR56	0% Visual	CFFO 5YR58	Common	MCSAB	Friable	Mod	Low	FVF		Clear smooth
3	100	C	2.5YR44	0% Visual	none	Common	MCAB	Firm	Mod	Low	CVF		Clear smooth
4	120	C	2.5YR48	0% Visual	none	none	WCSAB	Friable	Mod	Low	None		

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: 45 cm

Wetness Class: IV

Wetness Grade: 3b

NL336j

Available Water Wheat: 141 mm

Potatoes: 117 mm

Moisture Deficit Wheat: 100 mm

Potatoes: 92 mm

Moisture Balance Wheat: 41 mm

Potatoes: 25 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks:

Pit dug to 85 cm, augered to 120 cm. No pale ped faces.