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Hanham Abbots
Avon

Agricultural Land Classification

Prepared for MAFF by
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MAFF

HANHAM ABBOTS

AGRICULTURAL LAND CLASSIFICATION

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HANHAM ABBOTS

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 for a planning appeal on land adjacent to Abbots Road, Hanham. The fieldwork at Hanham Abbots, between Hanham Green and Longwell Green was completed in June 1994 and 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: Hanham Abbots

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (93.8Ha)
2	21.2	21.7	22.6
3a	8.5	8.7	9.1
3b	39.4	40.3	42.0
4	24.7	25.3	26.3
Urban	2.5	2.6	0.0
Non Agricultural	1.5	1.5	0.0
TOTAL	97.8	100.0	100.0

Light textured well drained soils in the West are mapped as Grade 2. Subgrade 3a soils have a moderate wetness limitation. The rest of the site has heavy soils with moderate and severe wetness and gradient limitations and is mapped as Subgrade 3b and Grade 4.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in June 1994 and October 1995 at Hanham Abbots on behalf of MAFF as part of its statutory role in preparation for a planning appeal on land at Abbots Road, Hanham. The fieldwork covering 97.8 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 69 auger borings were examined and 5 soil profile pits used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1971) shows the grades of the site at a reconnaissance scale. The higher land is mapped as Grade 3 and the lower land as Grade 2.

Part of the area was also surveyed in 1980 and 1982 at a scale of 1:10,000. This showed the higher land to be predominantly Subgrades 3b and 3c and Grade 4. The lower land was a mixture of Grades 2, 3a and 3b.

The recent survey supersedes these maps 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: Hanham Abbots

Grid Reference		ST 648 701
Altitude (m)		32
Accumulated Temperature (day °)		1513
Average Annual Rainfall (mm)		787
Overall Climatic Grade		1
Field Capacity Days		176
Moisture deficit (mm):	Wheat	98
	Potatoes	90

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 land rises from 40m AOD in the south, gently to 55m AOD and then steeply to 95m AOD with gradients up to 16°. The land drops away from the hill top plateau in the north and east. At the time of survey all the fields were in permanent grass.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:50,000 scale solid and drift geology map, Institute of Geological Sciences 1974. The lowest land is mapped as Carboniferous Coal Measures. The sequence as the height increases is Keuper Marl; Triassic clay and shale; Jurassic Limestone.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000. A small area of the Sherborne Association is mapped in the south east. These soils are described as shallow well drained, brashy calcareous clayey soils over limestone, associated with slowly permeable calcareous clayey soils. The lower land is mapped as the Neath Association, described as well drained fine loamy soils over rock. The majority of the site is mapped as the slowly permeable reddish clayey soils of the Worcester Association.

The soils found during the recent survey reflected the mapped associations and geology. The soils on the lower land were lighter textured and better drained then those on the higher land. Soils associated with the Triassic clay and shale were stony and poorly drained clays. The Jurassic limestone also had stony clays but these were well drained. Much of the reddish soils were slowly permeable clays.

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: Hanham Abbots

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (93.8Ha)
2	21.2	21.7	22.6
3a	8.5	8.7	9.1
3b	39.4	40.3	42.0
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Urban	2.5	2.6	0.0
Non Agricultural	1.5	1.5	0.0
TOTAL	97.8	100.0	100.0

Grade 2

The Grade 2 land consists of medium clay loams over heavy clay loams and some clays. The majority of these soils are stony. The subsoils are stonier than the topsoils. Stone contents measured in soil pits rise to 46% in the subsoil. A minor droughtiness limitation exists as a result of the stony soils and the climatic moisture deficit for the site. A minor workability limitation also exists caused by the combination of medium clay loam topsoils and the field capacity day value of 176. This value creates a borderline situation to Grade 1 for the workability regime. The soils are well drained and are Wetness Class I (see appendix 3).

Subgrade 3a

The Subgrade 3a land adjacent to the new bypass is the same as the Grade 2 land, but with a heavy clay loam topsoil which leads to a moderate workability limitation. This field has been disturbed during the building of the bypass, and some mixing of the topsoil and subsoil has occurred.

The other areas of Subgrade 3a have medium clay loam topsoils over clays. There is a slowly permeable layer below 50cm and the soils are assessed as Wetness Class III. These soils have a moderate wetness limitation.

Subgrade 3b

The areas of sloping land with gradients of 8-11° are mapped as Subgrade 3b. This moderate limitation restricts the versatility of the land because not all agricultural machinery can be safely used.

The lower area of 3b land experiences a moderate wetness limitation. These reddish soils have heavy clay loam topsoils over clays which are slowly permeable at depth. The soils are assessed as Wetness Class III. The higher area of 3b has a moderate workability limitation. These soils are well drained and are Wetness Class I but have clay topsoils. These soils are borderline Subgrade 3a with respect to the FCD value of 176 days. The soils are also stony.

Grade 4

The steepest slopes with gradients measured up to 16° are mapped as Grade 4. These gradients impose severe limitations on the use of agricultural machinery.

The remaining areas of Grade 4 have a severe wetness limitation. Most of these clay soils are stony and have slowly permeable layers in the subsoil. The soils are assessed as Wetness Class IV which in combination with the 176 field capacity clays and clay topsoil downgrade the soil to Grade 4. These soils would be Subgrade 3b of the FCD value was 175 and are thus borderline. The area of Grade 4 on the hill top also includes slowly permeable reddish clays.

Other land

A new farm track has been constructed beside the bypass and is mapped as urban. Playgrounds have been mapped as non agricultural land.

Resource Planning Team
Taunton Statutory Unit
October 1995

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1974) Solid and Drift Edition, Sheet 264, Bristol 1:50,000

MAFF (1971) Agricultural Land Classification Map, Sheet 155, 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
Hanham Abbots	Pit 1	0°	PGR	Av Rainfall: 787 mm ATO: 1513 day °C	White and Blue Lias Limestone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 176 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES
67/95	5/10/95	ST 651 571 32	GMS		GMS 516

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	7.5YR32	3% SLST > 2cm 8% SLST > 2mm 11% SLST TOTAL (S+D)	None	None					MVF		Clear Smooth
2	35	C	10YR54	30% SLST (Visual)	None	None	Assessment difficult		Assume Mod	Good	MVF		Clear Smooth
3	35 +	C	10YR54	> 70% SLST (Visual)	None	None					CVF in cracks		

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3b

Available Water Wheat: 60 mm

Potatoes: 61 mm

Moisture Deficit Wheat: 98 mm

Potatoes: 90 mm

Moisture Balance Wheat: - 38 mm

Potatoes: - 29 mm

Droughtiness Grade: 3b (Calculated to 55 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Droughtiness

Remarks: Droughtness 3b even if calculated to 100cm.
Also good structural condition does not improve grade.

Wetness grade borderline 3a because of FCD value.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hanham Abbots	Pit 2	3°	PGR	Av Rainfall: 787 mm ATO: 1513 day °C	Keuper Marl
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 176 Climatic Grade: 1	SOIL SAMPLE REFERENCES
67/95	5/10/95	ST 650 711	GMS	Exposure Grade: 1	GMS 517

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	28	ZC	7.5YR32	3% SLST > 2cm Visual	None	None					MVF		Clear Smooth
2	42	C	7.5YR54	None	None	None	WCSAB	Friable	M	Good	MVF		Clear Smooth
3	70	C	2.5YR34 (05YR53)	None	None	Common	MCAB	Firm	M	Poor	CVF (ped faces)		

Profile Gleyed From: 42 cm

Depth to Slowly Permeable Horizon: 42 cm

Wetness Class: III

Wetness Grade: 4

Available Water Wheat: 100 mm

Potatoes: 116 mm

Moisture Deficit Wheat: 98 mm

Potatoes: 90 mm

Moisture Balance Wheat: 2 mm

Potatoes: 26 mm

Droughtiness Grade: 3a (Calculated to 70 cm)

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks: Wetness Grade borderline 3b because of FCD value.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hanham Abbots	Pit 3	0°	PGR	Av Rainfall: 787 mm ATO: 1513 day °C	Upper Coal Measures
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 176 Climatic Grade: 1	SOIL SAMPLE REFERENCES
67/95	6/10/95	ST 648 703	GMS	Exposure Grade: 1	GMS 518

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	30	MCL/ SCL	05YR32	5% MSST > 2cm 9% MSST > 2mm 14% MSST TOATL (S+D)	None	None					MVF		Clear Smooth
2	55+	HCL	2.5YR34	30% MSST > 2cm 16% MSST > 2mm 46% MSST TOTAL (S+D)	None	None	WDMSAB	Friable	Good	Good	CVF		

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 107 mm

Potatoes: 99 mm

Moisture Deficit Wheat: 98 mm

Potatoes: 90 mm

Moisture Balance Wheat: 9 mm

Potatoes: 9 mm

Droughtiness Grade: 2 (Calculated to 90 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Droughtness

Remarks: Large stone at bottom of pit, but where fractured at edge soil and roots continued down. Topsoil borderline MCL/SCL.

Wetness Grade borderline Grade 1.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hanham Abbots	Pit 4	6°	PGR	Av Rainfall: 787 mm ATO: 1513 day °C	Clay and shale
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 176 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES
67/95	6/10/95	ST 652 702	GMS		GMS 519

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	< 1% SLST > 2cm 9% SLST > 2mm 10% SLST TOTAL (S+D)	None	None							Clear Smooth
2	33	C	10YR53	10% SLST (Visual)	None	None	Too thin to assess						Clear Smooth
3	55+	C	2.5Y64	5% > 2cm 20% TOTAL SLST (Visual)	CDFOG 10YR58,52		WCSAB	Firm	Mod	Poor	CVF		

Profile Gleyed From: 33 cm

Depth to Slowly Permeable Horizon: 33 cm

Wetness Class: IV

Wetness Grade: 4

Available Water	Wheat:	98 mm
	Potatoes:	101 mm
Moisture Deficit	Wheat:	98 mm
	Potatoes:	90 mm
Moisture Balance	Wheat:	0 mm
	Potatoes:	11 mm

Droughtiness Grade: 3a *(Calculated to 85 cm)*

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks: Rock quite soft, possibly a silty rock.

Wetness Grade borderline 3b because of FCD Value.