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White Horse Farm, Westbury Wilts

AGRICULTURAL LAND CLASSIFICATION

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MAFF

WHITE HORSE FARM, WESTBURY, WILTSHIRE

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WHITE HORSE FARM, WESTBURY, WILTSHIRE

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 Wiltshire Minerals Local Plan. The fieldwork at White Horse Farm, Westbury, was completed in November 1994 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: White Horse Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (48.5 ha)
3a	45.3	31.2	93.4
5	3.2	2.2	6.6
Non-agricultural	1.5	1.0	0.0
Not surveyed	95.4	65.6	0.0
TOTAL	145.4	100.0	100.0

Nearly all of the agricultural land surveyed is Subgrade 3a. The mostly medium sandy silt loam topsoils overlie heavy clay loams over chalk. Chalk is typically found at 50 cm. The majority of the site is unsurveyed because it falls within the Ministry of Defence Danger Area. It is expected that this land would also be Subgrade 3a except for the steep land in the west which would be downgraded. A small area has been mapped as Grade 5 on the basis that it is only suitable for grazing due to the presence of historical mounds.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in November 1994 at White Horse Farm, Westbury, on behalf of MAFF as part of its statutory role in the preparation of the Wiltshire Minerals Local Plan. The fieldwork covering 145.4 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 49 auger borings were examined and 2 soil profile pits used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1972) shows the grades of the site at a reconnaissance scale. Most of the site is shown as non-agricultural land with areas of Grade 3 around Bratton Down, Combe Hill and Winklands Down.

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 an overall climatic limitation which restricts the land to Grade 2. A very small area is Grade 1 climatically in the west.

Table 1: Climatic Interpolations: White Horse Farm

Grid Reference		ST 901 511
Altitude (m)		230
Accumulated Temperature (day °)		1290
Average Annual Rainfall (mm)		845
Overall Climatic Grade		2
Field Capacity Days		184
Moisture deficit (mm):	Wheat	84
	Potatoes	69

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 site lies on the edge of Salisbury Plan. The majority of the site is between 210 and 230 m AOD whilst dry valleys to the east and south-west fall away to 175 m. At the time of survey all the land was in agricultural use, either in arable/set aside or for grazing.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:63,360 scale solid and drift geology map, sheet 281, Institute of Geological Sciences 1965. The site is completely underlain by chalk from the Cretaceous Era, with Upper Chalk on the higher land and Middle Chalk lower down the valleys.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000. This showed that most of the site consists of soils from the Icknield Association. These are described as being shallow, mostly humose, well drained calcareous soils over chalk on steep slopes and hill tops. There are deeper, flinty calcareous silty soils in small combes and valleys. Part of Winklands Down consists of soils from the Upton 1 Association which are described as shallow, well drained, calcareous silty soils over chalk, mainly found on moderately and sometimes steep land.

The soils found during the recent survey were fairly uniform across the area surveyed. Generally medium sandy silt loam topsoils were found over heavy clay loams. Chalk was found at around 50 cm. Some heavy clay loam topsoils were found in the western block surveyed. The soils were stony with around 30% hard rock in the topsoil increasing to over 50% in the subsoil before parent chalk was found in the profile. The soils are well drained.

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: White Horse Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (48.5 ha)
3a	45.3	31.2	93.4
5	3.2	2.2	6.6
Non-agricultural	1.5	1.0	0.0
Not surveyed	95.4	65.6	0.0
TOTAL	145.4	100.0	100.0

Subgrade 3a

Nearly all of the land surveyed has been mapped as Subgrade 3a. Medium sandy silt loams overlie heavy clay loams with chalk found at about 50 cm. The soil is stony as described in Section 4. The soils are well drained and are Wetness Class I. The main limitation affecting these soils is a moderate droughtiness limitation. In 2 soil profile pits rooting was observed to at least 70 and 80 cm depth, penetrating the chalk.

Grade 5

A small area has been downgraded to Grade 5. This area is only suitable for grazing because of the presence of historical mounds associated with Bratton Camp Fort.

Other Land

A track runs across the site which is mapped as non-agricultural. The majority of the site was not surveyed because it falls within the Ministry of Defence Danger Area. It is anticipated that this area would also be Subgrade 3a except where there is steeper land in the dry valleys which would be downgraded.

Resource Planning Team
Taunton Statutory Unit
November 1994

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1965) *Solid and Drift Edition, Sheet 281, Frome*, 1:63,360.

MAFF (1972) Agricultural Land Classification Map, Sheet 166, 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
White Horse Farm, Westbury	Pit 1	4° North	Fallow	Av Rainfall: 845 mm ATO: 1290 day °C FC Days: 184 Climatic Grade: 2 Exposure Grade: 1	Middle Chalk
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
117/94	3/11/94	ST909514 (ASP 9)	G M Shaw/H Lloyd-Jones		HLJ 85

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	MSZL	10YR42	3% HR >2cm (S) 28% HR <2cm (S+D) 31% HR Total	None	None	WMSAB	Friable	Moderate	Good	Many VF	Calcareous	Clear smooth
2	50	HCL	10YR53	25% HR >2cm (S) 34% HR <2cm (S+D) 59% HR Total	None	None	WFSAB (Determined by stones)	Very friable	Good	Good	Many VF	Calcareous	Gradual smooth
3	70+	CH	10YR74	>70% CH (Vis)	None	None	Determined by stones	Very friable	Moderate (assumed)	Good	Common VF (between stones)	Calcareous	-

Profile Gleyed From: N/A

Depth to Slowly Permeable Horizon: N/A

Wetness Class: I

Wetness Grade: 1

Available Water	Wheat:	78 mm
	Potatoes:	77 mm
Moisture Deficit	Wheat:	84 mm
	Potatoes:	69 mm
Moisture Balance	Wheat:	-6 mm
	Potatoes:	+8 mm
Droughtiness Grade:		3a (Calculated to 80 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks:

Roots observed to 70 cm.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
White Horse Farm, Westbury	Pit 2	0°	Fallow	Av Rainfall: 845 mm ATO: 1290 day °C FC Days: 184 Climatic Grade: 2 Exposure Grade: 1	Upper Chalk
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
117/94	3/11/94	ST905512 (ASP 24)	G M Shaw/H Lloyd-Jones		GMS 447

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	MCL	10YR32	3% HR >2cm (S) 26% HR <2cm (S+D) 29% HR Total	None	None	WMSAB	Friable	Moderate	Good	Many VF	Calcareous	Clear smooth
2	45	HCL	10YR54	30% HR >2cm (S) 38% HR <2cm (S+D) 68% HR Total	None	None	WFSAB	Friable	Good	Good	Common VF	Calcareous	Abrupt smooth
3	80+	CH	10YR81	>70%	None	None	Too stony	-	- (m)	-	Common VF	Calcareous	-

Profile Gleyed From: N/A

Depth to Slowly Permeable Horizon: N/A

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 72 mm

Potatoes: 74 mm

Moisture Deficit Wheat: 84 mm

Potatoes: 69 mm

Moisture Balance Wheat: -12 mm

Potatoes: 5 mm

Droughtiness Grade: 3a (Calculated to 85 cm)
2 to 100 cm

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks:

Soil staining stops at 50 cm. Roots to 80 cm.

SOIL PLASTICITY RECORDING SHEET

ANNEX 2

SITE DATA

Grid Ref	ST903513		Site Name	White Horse Farm, 117/94		LPA	W Wilts		
AAR	845	ATO	1290	FCD	184	MD (wheat)	84	MD (potatoes)	69

SOIL PIT DATA

	PIT ONE ST909514 SOIL SERIES Icknield			PIT TWO ST905512 SOIL SERIES Icknield			PIT THREE SOIL SERIES		
DEPTH	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS
10 cm	MSZL	N		MSZL	N				
20 cm	MSZL	N		MSZL	N				
30 cm	HCL	N		HCL	N				
40 cm	HCL	Y		HCL	N				
50 cm	HCL	Y		Stone (chalk)	-				
60 cm	HCL	Y		Stone (chalk)	-				