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Vale of White Horse Local Plan
Land West of Milton Heights, Oxfordshire
Agricultural Land Classification Survey
ALC Map and Report
October 1996.

Resource Planning Team
Guildford Statutory Group
ADAS Reading

ADAS Reference: 3304/108/96
MAFF Reference: EL 33/00127
LUPU Commission: 02571

AGRICULTURAL LAND CLASSIFICATION REPORT

VALE OF WHITE HORSE LOCAL PLAN
LAND WEST OF MILTON HEIGHTS, OXFORDSHIRE.

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey on 5.6 hectares of land to the west of Milton Heights and south of the A4130 road in Oxfordshire. The survey was carried out during July 1996.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading, in connection with the Vale of White Horse Local Plan. The results of this survey supersede any previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey almost the entire site was under a wheat crop. To the east of the site a mast has recently been constructed for mobile phone communication, this has not been included on the enclosed map as it is small (<0.05 ha).

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

6. The whole site (5.6 ha) has been classified as Subgrade 3a quality land.

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 6 borings and one soil pit were described.

8. The land on this site has been classified as Subgrade 3a (good quality), the key limitation being soil wetness. The soils on the site were found to be similar throughout. The profiles commonly comprise a heavy silty clay loam topsoil overlying deep silty clay subsoils which become gleyed and slowly permeable at moderate depth. Slowly permeable horizons cause drainage to be impeded such that land utilisation is restricted. In the local climate the depth of these slowly permeable horizons and the degree of soil wetness is sufficient to place this land in Subgrade 3a.

FACTORS INFLUENCING ALC GRADE

Climate

11. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

12. The key climatic variables used for grading this site are given in Table 1 below and were obtained from the published 5km grid datasets using standard interpolation procedures (Met. Office, 1989).

13. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

Table 1: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SU 476 913
Altitude	m, AOD	98
Accumulated Temperature	day°C	1409
Average Annual Rainfall	mm	622
Field Capacity Days	days	130
Moisture Deficit, Wheat	mm	110
Moisture Deficit, Potatoes	mm	103

14. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (ATO, January to June), as a measure of the relative warmth of a locality.

15. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors, such as exposure and frost risk, are not believed to significantly affect the site. The site is climatically Grade 1.

Site

16. The site lies at altitudes in the range 90-95m AOD. The land rises slightly from the east to the west of the site. None of the slopes on the site are sufficient to affect agricultural land quality.

Geology and soils

17. The published geological information for the site (BGS, 1971), shows the site to be underlain by Upper Greensand deposits.

18. The most detailed published soils information for the site (SSEW 1973) shows the site to comprise soils of the Harwell Series. The profiles are described as commonly well to moderately well drained loamy and clayey soils over malmstone. The profiles are usually

slightly stony and are of grey or olive colours. Soils at this site were found to be clayey and drainage was significantly impeded.

Agricultural Land Classification

19. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1.

20. The location of the auger borings and pits is shown on the attached sample location map and details of the soils data are presented in Appendix III.

Subgrade 3a

21. Land of good quality has been mapped across the whole site. The principal limitation is soil wetness. A single soil type was found across the site. This comprises a heavy silty clay loam topsoil commonly overlying a gleyed and slowly permeable (as seen in the pit observation, 1P) silty clay to depth. Occasionally, the upper subsoil horizon was a heavy silty clay loam. The observed profiles commonly contained some weathered siltstone, occasionally up to approximately 40%. However the depth to the slowly permeable clay horizons was the key limitation, restricting these soils to Wetness Class II and Subgrade 3a given the local climate and the low workability status of the topsoil. Soil wetness limits land use by restricting the number of days when fieldwork can occur without damaging the soil.

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SOURCES OF REFERENCE

British Geological Survey (1981) *Sheet 253, Abingdon. Solid and Drift Edition. 1:63 360. Scale.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

Meteorological Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1973) *Soils of the Wantage and Abingdon District. 1:63 360 Scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1983) *Soils of South East England. 1:250 000 Scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils of South East England. Bulletin No. 15.*
SSEW: Harpenden.

APPENDIX I

DESCRIPTIONS OF THE 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 includes 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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years.[2]
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 only wet within 40 cm depth for 30 days in most years.
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 present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.

[2] 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

Contents:

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF**: national 100 km grid square and 8 figure grid reference.

2. **USE**: Land use at the time of survey. The following abbreviations are used:

ARA:	Arable	**WHT**:	Wheat	**BAR**:	Barley
CER:	Cereals	**OAT**:	Oats	**MZE**:	Maize
OSR:	Oilseed rape	**BEN**:	Field Beans	**BRA**:	Brassicae
POT:	Potatoes	**SBT**:	Sugar Beet	**FCD**:	Fodder Crops
LIN:	Linseed	**FRT**:	Soft and Top Fruit	**FLW**:	Fallow
PGR:	Permanent Pasture	**LEY**:	Ley Grass	**RGR**:	Rough Grazing
SCR:	Scrub	**CFW**:	Coniferous Woodland	**DCW**:	Deciduous Wood
HTH:	Heathland	**BOG**:	Bog or Marsh	**FLW**:	Fallow
PLO:	Ploughed	**SAS**:	Set aside	**OTH**:	Other
HRT:	Horticultural Crops				

3. **GRDNT**: Gradient as estimated or measured by a hand-held optical clinometer.

4. **GLEY/SPL**: Depth in centimetres (cm) to gleying and/or slowly permeable layers.

5. **AP (WHEAT/POTS)**: Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS)**: Moisture Balance. (Crop adjusted AP - crop adjusted MD)

7. **DRT**: Best grade according to soil droughtiness.

8. If any of the following factors are considered significant, 'Y' will be entered in the relevant column.

MREL:	Microrelief limitation	**FLOOD**:	Flood risk	**EROSN**:	Soil erosion risk
EXP:	Exposure limitation	**FROST**:	Frost prone	**DIST**:	Disturbed land
CHEM:	Chemical limitation				

9. **LIMIT**: The main limitation to land quality. The following abbreviations are used:

OC:	Overall Climate	**AE**:	Aspect	**EX**:	Exposure
FR:	Frost Risk	**GR**:	Gradient	**MR**:	Microrelief
FL:	Flood Risk	**TX**:	Topsoil Texture	**DP**:	Soil Depth
CH:	Chemical	**WE**:	Wetness	**WK**:	Workability
DR:	Drought	**ER**:	Erosion Risk	**WD**:	Soil Wetness/Droughtiness
ST:	Topsoil Stoniness				

Soil Pits and Auger Borings

1. **TEXTURE**: soil texture classes are denoted by the following abbreviations:

S:	Sand	**LS**:	Loamy Sand	**SL**:	Sandy Loam
SZL:	Sandy Silt Loam	**CL**:	Clay Loam	**ZCL**:	Silty Clay Loam
ZL:	Silt Loam	**SCL**:	Sandy Clay Loam	**C**:	Clay
SC:	Sandy Clay	**ZC**:	Silty Clay	**OL**:	Organic Loam
P:	Peat	**SP**:	Sandy Peat	**LP**:	Loamy Peat
PL:	Peaty Loam	**PS**:	Peaty Sand	**MZ**:	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content:
M: Medium (<27% clay) **H**: Heavy (27-35% clay)

2. **MOTTLE COL**: Mottle colour using Munsell notation.

3. **MOTTLE ABUN**: Mottle abundance, expressed as a percentage of the matrix or surface described.
   F: few <2% **C**: common 2-20% **M**: many 20-40% **VM**: very many 40% +

4. **MOTTLE CONT**: Mottle contrast.
   F: faint - indistinct mottles, evident only on close inspection
   D: distinct - mottles are readily seen
   P: prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. **PED. COL**: Ped face colour using Munsell notation.

6. **GLEY**: If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

7. **STONE LITH**: Stone Lithology. One of the following is used:

HR:	all hard rocks and stones	**SLST**:	soft oolitic or dolimitic limestone
CH:	chalk	**FSST**:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	**GH**:	gravel with non-porous (hard) stones
MSST:	soft, medium grained sandstone	**GS**:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock		

   Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **STRUCT**: the degree of development, size and shape of soil peds are described using the following notation:

degree of development	**WK**: weakly developed	**MD**: moderately developed
	ST: strongly developed	
ped size	**F**: fine	**M**: medium
	C: coarse	**VC**: very coarse
ped shape	**S**: single grain	**M**: massive
	GR: granular	**AB**: angular blocky
	SAB: sub-angular blocky	**PR**: prismatic
	PL: platy	

9. **CONSIST**: Soil consistence is described using the following notation:

   L: loose **VF**: very friable **FR**: friable **FM**: firm **VM**: very firm
   EM: extremely firm **EH**: extremely hard

10. **SUBS STR**: Subsoil structural condition recorded for the purpose of calculating profile droughtiness:
    G: good **M**: moderate **P**: poor

11. **POR**: Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

12. **IMP**: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

13. **SPL**: Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

14. **CALC**: If the soil horizon is calcareous, a 'Y' will appear in this column.

15. Other notations:

    APW: available water capacity (in mm) adjusted for wheat
    APP: available water capacity (in mm) adjusted for potatoes
    MBW: moisture balance, wheat
    MBP: moisture balance, potatoes.

SOIL PIT DESCRIPTION

Site Name : VOWH LP MILTON HEIGHTS Pit Number : 1P

Grid Reference: SU48109120 Average Annual Rainfall : 619 mm
Accumulated Temperature : 1412 degree days
Field Capacity Level : 129 days
Land Use : Wheat
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 26	HZCL	05Y 41 00	0	2	ZR					
26- 45	ZC	05Y 51 52	0	5	ZR	F	MDCAB	VM	M	
45- 72	ZC	05Y 52 61	0	10	ZR	C	MDCAB	FM	P	

Wetness Grade : 3A Wetness Class : II
Gleying : 45 cm
SPL : 45 cm

Drought Grade : 2 APW : 130mm MBW : 20 mm
APP : 106mm MBP : 3 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SU47709120	WHT		55	55	2	3A		0		0					WE	3A	
1P	SU48109120	WHT		45	45	2	3A	130	20	106	3	2				WE	3A	PIT 72 @ NO.5
2	SU47809120	WHT		28	28	3	3B		0		0					WE	3B	IMP 80
3	SU47909120	WHT		50	50	2	3A		0		0					WE	3A	
4	SU48009120	WHT		52	52	2	3A		0		0					WE	3A	
5	SU48109120	WHT		55	55	2	3A	120	10	095	-8	2				WE	3A	
6	SU47709110	WHT		50	50	2	3A	126	16	102	-1	2				WE	3A	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
1	0-30	hzcl	25Y 41 00						0	0	ZR	2							
	30-55	zc	05Y 51 00	10YR68 00	F				0	0	ZR	5		M					
	55-70	zc	05Y 51 00	10YR68 00	C			Y	0	0	ZR	5		P			Y		
	70-90	zc	05Y 52 71	10YR68 00	C			Y	0	0	ZR	10		P			Y		
	90-120	zc	05Y 62 71	10YR68 00	M			Y	0	0	ZR	10		P			Y		
1P	0-26	hzcl	05Y 41 00						0	0	ZR	2							
	26-45	zc	05Y 51 52	10YR66 68	F		05Y 51 00		0	0	ZR	5	MDCAB	VM	M	Y			
	45-72	zc	05Y 52 61	10YR66 68	C		05Y 51 00	Y	0	0	ZR	10	MDCAB	FM	P	Y		Y	
2	0-28	hzcl	25Y 41 00						0	0		0							
	28-60	zc	05Y 51 00	10YR68 00	C			Y	0	0	ZR	10		P			Y		
	60-75	zc	05Y 52 71	10YR68 00	C			Y	0	0	ZR	15		P			Y		
	75-80	hzcl	05Y 61 71	10YR68 00	M		00MN00 00	Y	0	0	ZR	25		P			Y		IMP DRY SOIL 80
3	0-30	hzcl	05Y 41 00	10YR68 00	F				0	0	ZR	3							
	30-50	hzcl	05Y 51 52	10YR68 00	F				0	0	ZR	25		M					
	50-80	zc	05Y 52 71	10YR68 00	C			Y	0	0	ZR	15		P			Y		
4	0-28	hzcl	05Y 41 00	10YR68 00	F				0	0	ZR	3							
	28-52	zc	05Y 51 00	10YR68 00	F				0	0	ZR	40		M					
	52-75	zc	05Y 52 71	10YR68 00	C			Y	0	0	ZR	15		P			Y		
5	0-20	hzcl	05Y 41 00						0	0	ZR	2							
	20-40	zc	05Y 51 00						0	0	ZR	5		M					
	40-55	zc	05Y 41 71	10YR68 00	F				0	0	ZR	25		M					
	55-75	zc	05Y 52 71	10YR58 00	C			Y	0	0	ZR	5		P			Y		
	75-120	zc	05Y 61 62	10YR68 00	C			Y	0	0	ZR	5		P			Y	Y	
6	0-28	hzcl	25Y 41 00						0	0	ZR	2							
	28-50	zc	05Y 51 00	10YR68 00	F				0	0	ZR	5		M					
	50-85	zc	05Y 51 00	10YR68 00	C			Y	0	0	ZR	5		P			Y		
	85-120	zc	05Y 72 00	10YR68 78	M			Y	0	0	ZR	15		P			Y		