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Vale of the White Horse District Local Plan
Site H44: Land West of Drayton Road,
Abingdon
Agricultural Land Classification Report
October 1994
(Revised December 1996)

AGRICULTURAL LAND CLASSIFICATION REPORT

VALE OF THE WHITE HORSE DISTRICT LOCAL PLAN SITE H44: LAND WEST OF DRAYTON ROAD, ABINGDON

1. Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality on a number of sites in the Vale of the White Horse District of Oxfordshire. The work forms part of MAFF's statutory input to the preparation of the Vale of the White Horse District Local Plan.
- 1.2 Site H44 comprises 3.5 hectares of land to the south-west of Abingdon, adjoining Drayton Road. An Agricultural Land Classification, (ALC), survey was carried out during October 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of four borings and one soil inspection pit were described in accordance with MAFF's 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 a long term limitation on its use for agriculture.
- 1.3 The work was carried out by members of the Resource Planning Team in the Leeds Statutory Centre of ADAS.
- 1.4 At the time of the survey the site was all in arable use, having recently been ploughed.
- 1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas and extent are given in the table below. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% Total site area
2	2.9	82.9
3a	0.6	17.1
<hr/>		
Total site area	3.5	100.0

- 1.6 Appendix 1 gives a general description of the grades, subgrades and land use categories identified in the survey. The main classes are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.7 The area surveyed has been classified as Grade 2 (very good quality) land, and Subgrade 3a (good quality). The soils are well drained, with medium or heavy clay loam topsoils and upper subsoils overlying either permeable heavy clay loam or clay, or very stony loamy medium sand. The agricultural use of this land is restricted by soil droughtiness, the degree of which is dependent upon the relative stone contents of the soils.

2. Climate

2.1 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5km point dataset (Met. Office, 1989) for representative a location in the survey area

Table 2 : Climatic Interpolation

Grid Reference	SU484960
Altitude (m)	60
Accumulated Temperature (degree days, Jan-June)	1450
Average Annual Rainfall (mm)	603
Field Capacity (days)	126
Moisture Deficit, Wheat (mm)	116
Moisture Deficit, Potatoes (mm)	109
Overall Climatic Grade	1

2.2 Climatic factors are considered first when classifying land since climate can be overriding in the sense that adverse climatic conditions may restrict land quality irrespective of favourable site and soil conditions. The details in the table above show that there is no overall climatic limitation affecting this site. In addition, no local climatic factors such as exposure or frost risk affect the land quality.

2.3 However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations. At this locality, the climate is relatively warm and dry. As a result the likelihood of soil droughtiness problems will be enhanced whilst soil wetness limitations may be reduced.

3. Relief

3.1 The site lies at an altitude of approximately 60 metres and is gently sloping (2-3°) with a north-easterly aspect.

4. Geology And Soil

4.1 The British Geological Survey published map (1971, Sheet 253, Abingdon) shows the site to be underlain by beds of Kimmeridge Clay, with drift cover consisting of third terraces over parts of the site.

4.2 Soil Survey of England and Wales (1971), Sheet 253, shows the site to be Isle Abbots Series. The Soil Survey of England and Wales (1971) describes the Isle Abbots Series as 'fine loamy material over calcareous gravel'.

4.3 Detailed field examination of the soils on the site found fine loamy topsoils and upper subsoils overlying either permeable heavy clay loam or clay, or very stony loamy medium sand. In all cases the soils are well drained, falling in Wetness Class I.

5. Agricultural Land Classification

5.1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map.

5.2 The location of the soil observation points are shown on the attached sample point map.

Grade 2

5.3 Most of this site has been mapped as very good quality land, the principle limitation being that of soil droughtiness. Profiles consist of very slightly stony medium clay loam or heavy clay loam topsoils and upper topsoils overlying either heavy clay loam or clay, or very stony loamy medium sand. Profiles are well drained, falling in Wetness Class I. However, the combination of a relatively dry climatic regime (ie. high soil moisture deficits) and the fine loamy or very stony subsoils (which contain up to 50% hard stones in places) give rise to land which is slightly droughty. Moisture balance figures indicate that there is a slight restriction in soil water available throughout the growing season such that crops, particularly those which are more shallow rooting, such as potatoes, may suffer slight drought stress. Crop yields and consistency may be affected as a result. Overall though Grade 2 land may be expected to support a wide range of arable and horticultural crops, but the flexibility and yield potential of the land may be reduced in comparison to land assigned to Grade 1.

Subgrade 3a

5.4 Good quality land has been mapped along the western boundary of the site in connection with soils that are similar to those described above but the degree of soil droughtiness is greater due to the fact that the soils are more stony in the subsoil than elsewhere on the site.

ADAS Ref: 3304/236/94
MAFF Ref: EL 33/0127

Resource Planning Team
Leeds Statutory Group
ADAS Leeds

SOURCES OF REFERENCE

British Geographical Survey (1971) Sheet No. 253, Abingdon.

MAFF (1988) "Agricultural Land Classification of England and Wales : Revised guidelines and criteria for grading the quality of agricultural land."

Meteorological Office (1989), Climatological Data for Agricultural Land Classification.

Soil Survey of England and Wales (1971), Sheet 253.

APPENDIX I

DESCRIPTION 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 (eg. 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:

Sample location map

Soil abbreviations - Explanatory Note

Soil Pit Descriptions

Soil boring descriptions (boring and horizon levels)

Database Printout - Horizon Level Information

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. **GLEYSPL** : 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. **GLEYS** : 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 : VALE OF WHITE HORSE H44 Pit Number : 1P

Grid Reference: SU48409600 Average Annual Rainfall : 603 mm
 Accumulated Temperature : 1450 degree days
 Field Capacity Level : 126 days
 Land Use : Arable
 Slope and Aspect : 01 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MCL	10YR33 00	5	5	HR					
30-100	MCL	10YR34 00	0	5	HR		MDCAB	FM	M	
100-120	LMS	10YR64 00	0	50	HR		SG	L	M	

Wetness Grade : 1 Wetness Class : I
 Gleying : cm
 SPL : No SPL

Drought Grade : 2 APW : 135mm MBW : 19 mm
 APP : 112mm MBP : 3 mm

FINAL ALC GRADE : 2
 MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	GRDNT	GLEY	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
					SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT	
1	SU48409600	ARA NE	03		1	1	136	20	114	5	2				DR	2	
1P	SU48409600	ARA E	01		1	1	135	19	112	3	2				DR	2	
2	SU48509600	ARB NE	03		1	2	129	13	117	8	2				WD	2	IMP 95
3	SU48409590	ARB E	02		1	1	91	-25	81	-28	38				DR	38	
4	SU48439595	ARB E	02	055	1	1	118	2	109	0	3A				DR	2	DR TO 120

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED	----STONES----			STRUCT/	SUBS	IMP	SPL	CALC
				COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT			
1	0-30	mc1	10YR33 00					4	0	CH	4				
	30-100	mc1	10YR34 00					0	0	HR	5		M		
	100-120	lms	10YR64 00					0	0	HR	50		M		
1P	0-30	mc1	10YR33 00					5	0	HR	5				
	30-100	mc1	10YR34 00					0	0	HR	5	MDCAB	FM	M	
	100-120	lms	10YR64 00					0	0	HR	50	SG	L	M	
2	0-35	hc1	10YR42 00					2	0	CH	3				
	35-60	hc1	10YR43 00					0	0	CH	3		M		
	60-95	hc1	10YR56 00					0	0	CH	15		M		IMP 95
3	0-40	mc1	10YR42 00					5	0	HR	5				
	40-120	lms	10YR46 00					0	0	HR	50		M		
4	0-30	mc1	10YR42 00					5	0	HR	5				
	30-55	mc1	10YR44 00					0	0	HR	5		M		
	55-100	c	10YR62 00	10YR6B	00	C		Y	0	0	0		P		IMP 100