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**South Oxfordshire District Local Plan
Land at Whitchurch on Thames**

**Agricultural Land Classification
ALC Map and Report**

September 1997

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT

SOUTH OXFORDSHIRE DISTRICT LOCAL PLAN LAND AT WHITCHURCH ON THAMES

INTRODUCTION

1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 70 hectares of land to the east of Whitchurch on Thames in South Oxfordshire. The survey was carried out during September 1997.

2 The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture Fisheries and Food (MAFF) in connection with the South Oxfordshire District Local Plan. This survey supersedes any previous ALC information for this land.

3 The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. 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 the land use on the site was permanent grazing. The areas mapped as 'Other land' include a cricket ground and associated buildings and a small area of woodland adjacent to the river.

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 area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1 Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	1.5	29.4	21.4
3b	2.8	54.9	40.0
4	0.8	15.7	11.4
Other land	1.9	N/A	27.1
Total surveyed area	5.1	100	72.9
Total site area	7.0		100

¹ FRCA is an executive agency of MAFF and the Welsh Office.

7 The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. A total of 8 borings and 1 soil pit were described.

8 The land on this site has been classified as Grade 2 (very good quality) agricultural land and Subgrade 3b (moderate quality) agricultural land. A small area of Grade 4 (poor quality) agricultural land is mapped to the south of the site. The land slopes gently down to the River Thames which forms the southern boundary of the site. The better quality land is found on the higher land to the north of Eastfield Lane. Soil wetness, soil droughtiness and flooding are the main limitations.

9 On the slightly higher land north of Eastfield Lane soils are typically deep medium loams which are well drained and calcareous. The combination of this locally dry climate and soil characteristics cause a minor soil droughtiness limitation and the land is classified as Grade 2. Soil droughtiness may cause the level and consistency of crop yields to be reduced and restrict the range of crops which can tolerate droughty conditions.

10 On the lower land south of Eastfield Lane the soils are similar to the above and may be calcareous but the lower subsoils are more clayey. This land is also flat and low lying being adjacent to the River Thames. Natural drainage is variable across this area and the high groundwater levels hinder drainage improvement and cause this land to be limited by soil wetness and possible flood risk. Flooding is believed to occur regularly in localised patches and can affect the choice of crops able to be grown, reduces yields and may cause soil management problems. This moderate degree of limitation places this land in Subgrade 3b. The land adjacent to the River Thames is classified as Grade 4 due to a more severe flooding limitation which restricts the land to summer grazing only.

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 2 and were obtained from the published 5km grid datasets using the 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.

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 (AT0 January to June) as a measure of the relative warmth of a locality.

Table 2 Climatic and altitude data

Factor	Units	Values	
		SU 639 771	SU 639 774
Grid reference	N/A	SU 639 771	SU 639 774
Altitude	m AOD	41	43
Accumulated Temperature	day C (Jan June)	1477	1474
Average Annual Rainfall	mm	675	677
Field Capacity Days	days	143	143
Moisture Deficit Wheat	mm	114	114
Moisture Deficit Potatoes	mm	109	108
Overall climatic grade	N/A	Grade 1	Grade 1

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 do not affect land quality at this location. The site is climatically Grade 1. However climatic factors do interact with soil properties to influence soil wetness and soil droughtiness. At this locality the climate is relatively warm in national terms. The likelihood of soil droughtiness problems may therefore be enhanced.

Site

16 The site lies at an altitude of 40-45m AOD. The highest land occurs to the north of Eastfield Lane and is highest adjacent to Hardwick Road. In the south of the site the land falls gently towards the river which is the southern boundary. Here the ground is slightly uneven and is separated from the river by a small raised tree lined bank. Most of the site is not affected by site restrictions (i.e. gradient micro relief) however the southern half of the site may be affected by flooding from the River Thames. Flooding typically occurs adjacent to the river every winter between November and March. The low lying land south of Eastfield Lane may also flood during the winter and after summer rainfall.

Geology and soils

17 The most detailed published geological information for the site (BGS 1946) shows the majority of it to be underlain by valley gravel with Upper Chalk underlying the higher land to the north. There is also a small area of alluvium mapped adjacent to the River Thames.

18 The most detailed published soils information covering the area (SSEW 1983) shows it to predominantly comprise soils of the Sutton 2 association. These are described as well drained fine and coarse loamy soils usually over gravel with a calcareous matrix (SSEW 1983). Soils of the Upton 1 association are mapped overlying the Upper Chalk in the north of the site. These are described as shallow well drained calcareous silty soils over chalk. Mainly on moderately steep sometimes very steep land. Deeper fine silty calcareous soils in coombes and dry valleys (SSEW 1983). In the south of the site soils of the Thames association are mapped adjacent to the river. These are described as stoneless mainly calcareous clayey soils affected by groundwater. Flat land. Risk of flooding (SSEW 1983). Soils consistent with these descriptions were found on site being better drained in the north.

in association with the chalk. However, soils were not found to be gravelly within augering depth but typically possessing clayey subsoils and having impeded drainage in the southern part of the site.

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 page 1

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

Grade 2

21 Land of good quality is mapped on the slightly higher land north of Eastfield Lane mainly coincident with the valley gravel over Upper Chalk

22 This land is classified as Grade 2 on the basis of a minor soil droughtiness limitation. Soils comprise calcareous or non calcareous medium silty clay loam or medium clay loam topsoils. These may be very slightly stony (2.5% total flints or chalk up to 2% >2cm). Topsoils generally overlie heavy clay loam upper subsoils which again are very slightly stony (2.5% total flints or chalk). These pass to moderately structured clay horizons which may be stoneless to very slightly stony (up to 5% total flints). This clay horizon overlies silt loam, medium silty clay loam or medium sandy loam lower subsoils which may contain 10-20% total chalk. These soils are typically well drained. However, the combination of topsoil textures and stone contents within this comparatively dry local climate slightly restricts the amount of water available to a growing crop. As a result the slight drought stress may cause the level and consistency of yields to be depressed and Grade 2 is appropriate.

Subgrade 3b

23 Land of moderate quality has been mapped on the lower land south of Eastfield Lane where the land is uneven and low lying. The land is classified due to a significant soil wetness limitation. The area is also prone to flooding.

24 Soils typically comprise stoneless to very slightly stony medium clay loam topsoils (up to 2% total chalk). Occasionally profiles are calcareous. Topsoils overlie heavy clay loam upper subsoils which again may be very slightly stony (up to 1.2% total chalk). These soils are gleyed or slightly gleyed below the topsoil. They overlie clay lower subsoils which are poorly structured and significantly impede drainage within these soils as evidenced by gleying at shallow depth. Pit 1 Appendix II is typical of the soils encountered. The clay may contain up to 2% total chalk. The depth to these slowly permeable layers (41-50cm) places these soils in Wetness Class III assuming that underdrainage would be effective. In view of the high ground waters which would be difficult to control by normal drainage methods due to lack of freeboard it is considered that these soils are more appropriately placed in Wetness Class IV. When considered alongside topsoil textures and the prevailing climatic conditions this results in a land classification of Subgrade 3b. Excessive soil wetness may adversely affect crop growth and development as well as limiting the flexibility

of the land due to the reduction in the number of days when the soil is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

25 This Subgrade 3b agricultural land is also prone to flooding from the River Thames and suffers from wet patches when groundwater levels are high This area has poor natural drainage flooding more typically occurs during the winter (between November and April) This flood risk limits the choice of crops able to be grown reduces yields and may cause soil management problems

Grade 4

26 Land adjacent to the River Thames is classified as Grade 4 due to a more severe flooding limitation The soils are typically similar to those described in paragraph 24 However land here may be flooded every winter for a maximum of 3 months between November and March This severely restricts land use to summer grazing only and Grade 4 is the appropriate classification

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SOURCES OF REFERENCE

British Geological Survey (1946) *Sheet No 268 Reading 1 6 3360 Drift Edition*
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

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

Soil Survey of England and Wales (1983) *Sheet 6 Soil of South East England 1 250 000*
SSEW Harpenden

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
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 DATA

Contents

Sample location map

Soil abbreviations explanatory note

Soil pit descriptions

Soil boring descriptions (boring and horizon levels)

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	Brassicacae
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	OTH	Other
DCW	Deciduous woodland	BOG	Bog or marsh	SAS	Set Aside
HTH	Heathland	HRT	Horticultural crops	PLO	Ploughed

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	ST	Topsoil Stoniness
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
EX	Exposure				

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	FSST	soft fine grained sandstone
ZR	soft argillaceous or silty rocks	CH	chalk
MSST	soft medium grained sandstone	GS	gravel with porous (soft) stones
SI	soft weathered igneous/metamorphic rock	GH	gravel with non porous (hard) stones

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		
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	FM firm	EH extremely hard
VF very friable	VM very firm	
FR friable	EM extremely firm	

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

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES		PED	GLEYS	STONES		STRUCT/		SUBS		SPL	CALC	
				COL	ABUN	CONT		COL	2	6	LITH	TOT	CONSIST			STR
1P	0 26	MCL	10YR34					0	0	HR	2				1% CH	
	26 41	HCL	10YR53	10YR56	C D	00MN00	Y	0	0	CH	1	MDCSAB	FR M		Moist	
	41 68	C	25Y53	10YR56	M D	00MN00	Y	0	0		0	WKCPR	FM P	Y	Y	V Moist Heavy

SAMPLE NO	GRID REF	ASPECT USE	WETNESS		WHEAT		POTS		M REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	SU639 774	PGR			1	1	153	39 118	9	2				DR 2	Calc
1P	SU639 771	PGR	26	41	4	3B	94	20 105	4	3A				WE 3B	DiffToDrain
2	SU639 773	PGR			1	1	152	38 113	4	2				DR 2	
3	SU640 773	OTH	78	78	2	2	133	19 122	13	2				WD 2	See1P0therLand
4	SU639 772	PGR	45	62	4	3B	108	6 115	6	3A				WE 3B	D ffToDrain
5	SU640 772	PGR	45	45	4	3B		0	0					WE 3B	DiffToDrain
6	SU639 771	PGR	25	45	4	3B	104	10 109	0	3A				WE 3B	DiffToD ain
7	SU640 771	PGR	50	50	4	3B	119	5 110	1	2				WE 3B	DiffToDrain
8	SU640 770	PGR	45	75	4	3B	125	11 119	10	2				FL 4	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES			PED		STONES			STRUCT/	SUBS			SPL	CALC	
				COL	ABUN	CONT	COL	GLEY	2	6	LITH	TOT	CONSIST	STR	POR			IMP
1	0 35	MZCL	10YR33						0	0	CH	5				Y	+5%Flints	
	35 55	HCL	10YR34						0	0	CH	2		M		Y		
	55 72	C	10YR34						0	0		0		M		Y	Flaky Dry	
	72 82	ZL	10YR54						0	0	CH	10		M		Y	Weathered CH	
	82 120	MZCL	10YR6466						0	0	CH	20		M		Y	Weathered CH	
2	0 28	MCL	10YR33						2	0	HR	2						
	28 60	HCL	10YR34						0	0	HR	5		M				
	60 80	C	10YR34						0	0	HR	5		M				
	80 120	MSL	10YR36						0	0		0		M				
3	0 35	MZCL	10YR33	10YR58		F	D				0	0	HR	2			Flints	
	35 52	HZCL	10YR44								0	0	HR	5		M		
	52 78	HCL	10YR44								0	0		0		M		
	78 100	C	10YR53	10YR56		C	D		Y		0	0		0		P	Y	
4	0 28	MCL	10YR34								0	0		0			Root Mottles	
	28 45	HCL	10YR43	10YR46		C	D		S		0	0		0		M		
	45 62	C	10YR53	10YR56		C	D	00MN00	Y		0	0		0		P	Y	Firm
	62 80	C	25Y63	10YR56		M	D	00MN00	Y		0	0		0		P	Y	V Moist Firm
5	0 25	MCL	10YR43								0	0		0				
	25 45	HCL	10YR44								0	0		0				
	45 80	C	10YR53	10YR56		C	D		Y		0	0		0		P	Y	V Firm
6	0 25	MCL	10YR34								0	0		0				
	25 45	HCL	10YR53	10YR46		C	D	00MN00	Y		0	0	CH	2		M		Firm
	45 62	C	25Y53	10YR56		M	D	00MN00	Y		0	0		0		P	Y	Moist Firm
	62 80	C	25Y63	10YR46		M	D	00MN00	Y		0	0		0		P	Y	V Moist
7	0 25	MCL	10YR34								0	0	CH	2			Y	
	25 50	HCL	10YR44	10YR56		C	D	00MN00	S		0	0	CH	2		M	Y	
	50 78	C	10YR52	10YR58		M	D	00MN00	Y		0	0	CH	2		P	Y	VFirm 2%Flints
	78 100	C	10YR61	10YR56		M	D	00MN00	Y		0	0		0		P	Y	V Moist
8	0 25	MZCL	10YR32								0	0		0			Y	
	25 45	HCL	10YR43								0	0	CH	2		M	Y	
	45 75	C	25Y62	10YR58		C	D	00MN00	Y		0	0	CH	2		P	Y	V Solid
	75 100	C	25Y62	10YR58		C	D		Y		0	0	CH	2		P	Y	WT V Moist