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**CHERWELL DISTRICT LOCAL PLAN REVIEW
Land South East of Bodicote**

**Agricultural Land Classification
ALC Map and Report**

July 1999

**Resource Planning Team
Eastern Region
FRCA Reading**

**RPT Job Number 3301/047/99
MAFF Reference EL 33/01588**

AGRICULTURAL LAND CLASSIFICATION REPORT

CHERWELL DISTRICT LOCAL PLAN REVIEW LAND SOUTH EAST OF BODICOTE OXFORDSHIRE RECONNAISSANCE SURVEY

INTRODUCTION

- 1 This report presents the findings of a reconnaissance Agricultural Land Classification (ALC) survey of approximately 69 ha of land south east of Bodicote in Oxfordshire. The survey was carried out during July 1999.
- 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). The survey was carried out in connection with MAFF's statutory input to the Cherwell district Local Plan Review. 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 agricultural land on the site was wheat, oilseed rape, potatoes and ley grass. The areas mapped as 'Other land' include farm buildings, a nursery, residential dwellings and a reservoir.

SUMMARY

- 5 The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:25,000. 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	58.8	93.6	86.0
3b	4.0	6.4	5.8
Other land	5.6	N/A	8.2
Total surveyed area	62.8	100	91.8
Total site area	68.4		100

- 7 The fieldwork was conducted at an average density of 1 boring per 4 hectares of agricultural land. In total 17 borings and 1 soil pit were described.

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

- 8 Most of the agricultural land has been classified as Grade 2 (very good quality) with a small area of Subgrade 3b (moderate quality) Soil droughtiness or soil wetness are the principal limitations
- 9 Grade 2 land with a minor soil droughtiness limitation is associated with well drained variably stony fine silty soils on the higher land adjacent to the A4260 Moisture balance calculations which take account of these soil properties and their interaction with the local climate indicate a limitation in the amount of water available for crops and this will affect the consistency and level of yields particularly in drier years On the sloping land Grade 2 soils suffer from a minor soil wetness limitation These soils comprise fine silty topsoils which become heavier with depth sometimes clayey resulting in moderately well drained soils This may cause a reduction in crop yield and limit the flexibility of the land particularly in wetter years
- 10 Subgrade 3b land is found along the valley bottom on the floodplain of the Sor Brook The soils are stoneless and comprise fine silty topsoils over clayey subsoils These subsoils are poorly drained which results in a significant soil wetness limitation This will affect the range and yield of crops that can tolerate such wet conditions as well as restricting the number of days when the land is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

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)

Table 2 Climatic and altitude data

Factor	Units	Values	
		SP 470 372	SP 465 370
Grid reference	N/A		
Altitude	m AOD	115	95
Accumulated Temperature	day C (Jan June)	1369	1392
Average Annual Rainfall	mm	689	686
Field Capacity Days	days	155	154
Moisture Deficit Wheat	mm	101	103
Moisture Deficit Potatoes	mm	91	94
Overall climatic grade	N/A	Grade 1	Grade 1

- 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
- 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 average in regional terms

Site

- 14 The site lies at altitudes in the range 90–117m AOD. The highest land occurs close to Cotefield Farm along the Banbury Road. From here the land falls through gentle to moderate gradients to the lowest lying land westwards along the course of the Sor Brook. Gradient and microrelief do not affect land quality on the site. There is a possibility that flooding does occur but it does not downgrade the land already restricted to Subgrade 3b

Geology and soils

- 15 The most detailed published geological information for the site (BGS 1968) maps the higher land as the Marlstone Rock Bed and the sloping land as the clays, silts and siltstones of the Middle and Lower Lias. On the Sor Brook flood plain alluvium is shown
- 16 The most recently published soils information covering the site (SSEW 1983) maps two soil associations. Soils of the Banbury association covers most of the area. These are described as well drained brashy fine and coarse loamy ferruginous soils over ironstone. Some deeper fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Soils of the Fladbury 1 association make up the soils on the flood plain of the Sor Brook. These are described as stoneless clayey soils in places calcareous, variably affected by groundwater. Flat land. Risk of flooding. Soils corresponding to both these associations were found on the site

AGRICULTURAL LAND CLASSIFICATION

- 17 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
- 18 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

- 19 Very good quality agricultural land is mapped over most of the site and suffers principally from a minor soil droughtiness limitation with minor soil wetness in places
- 20 Grade 2 land is coincident with the underlying Marlstone Rock Beds. These soils are well drained (Wetness Class I) and moderately well drained (Wetness Class II) non calcareous and

variably stony. Soils typically comprise medium silty clay loam or medium clay loam topsoils which contain up to 14% (2% > 2cm in size) total medium soft sandstone (MSST). These overlie similarly texture or heavy silty clay loam upper subsoils which may contain up to 29% total MSST. These passed to heavy silty clay loam or heavy clay loam lower subsoils some of which are sandier. Total stone contents in these horizons varied from 0–40% MSST. The stonier subsoils impeded the auger at depths in the range 50–90cm. Pit 1 (see Appendix II) is typical of these impeded soils. Moisture balance calculations derived from the interaction of these soil properties with the local climate result in a shortfall in the water available to a growing crop. The resulting drought stress may affect crop consistency and level of yield particularly in drier years. Some of these soils are gleyed within 40cm of the surface due to fluctuating groundwater which makes them moderately well drained.

Subgrade 3b

- 21 Moderate quality land suffers from a significant soil wetness limitation and is associated with the alluvium on the flood plain of the Sor Brook
- 22 Soils in this area are non calcareous and comprise a stoneless heavy silty clay loam topsoil. These overlie a slowly permeable clay upper subsoil which in the dry conditions was friable. A denser more plastic clay is encountered at 48cm which continued down to 90cm. It is the depth to these slowly permeable layers combined with the topsoil texture which interacts with the local climate to determine the overall ALC grade. Where these slowly permeable layers occur within 40cm these soils are assigned to Wetness Class IV. This combination of factors restricts agricultural land quality to Subgrade 3b. The effect of a significant soil wetness limitation may adversely affect crop growth and development as well as limiting the flexibility of the land due to a reduction in the number of days when the soil is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

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SOURCES OF REFERENCE

British Geological Survey (1968) *Sheet No 218 Chipping Norton*
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 Soils 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 and 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	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	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 **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 | 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 NO	GRID REF	ASPECT USE	-WETNESS		-WHEAT		POTS		M REL		EROSN	FROST	CHEM	ALC	COMMENTS	
			GRONT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP		DIST
2	SP46603750	POT SE	1	43	1	1	116	15	113	22	2			DR	2	SEE1P
7	SP46503740	POS W	1	55	55	2	2	167	66	131	40	1		WE	2	1P 048/99
9	SP46403740	WHT S	2	82	1	1	160	59	124	33	1				1	
20	SP46803720	WHT SE	2	66	66	2	2	146	45	122	31	1		WE	2	1P-048/99
22	SP47003720	WHT		60	85	1	1	128	27	101	10	2		DR	2	SEE1P
23	SP46403710	WHT S	1	32	85	2	2	149	48	117	26	1		WE	2	H2 GLEYED
26	SP46703710	WHT SW	3	25	58	3	38	144	43	119	28	1		WE	38	1P 048/99
31	SP46503700	WHT		35		2	2	165	64	122	31	1		WE	2	G WATER
32	SP46603700	WHT SW	1	32	95	2	2	153	52	125	34	1		WE	2	G WATER
35	SP46903700	OSR				1	1	93	-8	101	10	3A		DR	2	I63-SEE1P
38	SP46403690	WHT		32	48	4	38	117	16	115	24	2		WE	38	
44	SP47103690	LEY				1	1	113	12	104	13	2		DR	2	I97 SEE1P
46	SP46903680	OSR				1	1	78	23	79	12	38		DR	2	I52 SEE1P
48	SP46803670	OSR				1	1	92	9	101	10	3A		DR	2	I73 SEE1P
52	SP47203670	LEY				1	1	75	26	75	16	38		DR	2	I50 SEE1P
58	SP47003650	LEY SW	1			1	1	158	57	121	30	1			1	
61	SP47103640	LEY				1	1	95	6	106	15	3A		DR	2	I70 SEE1P
1P	SP46903680	OSR				1	1	109	8	92	1	2		DR	2	

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES			PED		STONES			STRUCT/		SUBS				
				COL	ABUN	CONT	COL	GLEY	2	6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
2	0 25	MZCL	10YR43						2	0	HR	10						
	25-43	HZCL	10YR44						0	0	MSST	10				M		
	43-87	MZCL	10YR44.54	10YR56	C	D		Y	0	0	MSST	10				M		
7	0 35	FSZL	10YR43						1	0		0						
	35-55	ZC	05Y 64						0	0	ZR	10				M		
	55-120	ZC	25Y 63	10YR56	C	D		Y	0	0	ZR	10				P	Y	
9	0 32	MZCL	10YR43						0	0		0						
	32-60	MZCL	10YR54						0	0	MSST	2				M		
	60-82	MZCL	10YR54.56						0	0	MSST	2				M		
	82 120	HZCL	25Y 53	10YR46	C	F		Y	0	0	MSST	2				M		
20	0 29	MZCL	10YR42						0	0	HR	2						
	29 66	MZCL	10YR43						0	0	MSST	2				M		
	66 120	ZC	25Y 61.64	10YR56	M	D		Y	0	0	MSST	5				P	Y	
22	0 29	MCL	75YR44						1	0	HR	10						
	29 45	MCL	75YR54						0	0	MSST	20				M		
	45 60	MCL	75YR54						0	0	MSST	35				M		
	60 85	HCL	25Y 63.64	10YR56	C	D		Y	0	0	MSST	10				M		
	85-120	C	25Y 62.73	10YR56	C	D		Y	0	0	MSST	5				P	Y	
23	0 32	MCL	10YR43						0	0		0						
	32 60	HCL	25Y 53	10YR56	M	D		Y	0	0		0				M		
	60-85	SCL	25Y 53	10YR56	M	D		Y	0	0		0				M		
	85 120	C	05Y 61	10YR58	M	D		Y	0	0		0				P	Y	
26	0 25	HZCL	10YR43						0	0	HR	2						
	25-58	HZCL	25Y 52	10YR56	M	D		Y	0	0	MSST	2				M		
	58 120	ZC	25Y 61.64	10YR56	M	D		Y	0	0	MSST	5				P	Y	
31	0 35	MZCL	25Y 54	10YR46	F	D			0	0		0						
	35-55	MCL	25Y 53	10YR56	C	D		Y	0	0		0				M		
	55-65	HCL	25Y 53	10YR56	C	D		Y	0	0		0				M		
	65-80	SCL	25Y 63.53	10YR56	C	D		Y	0	0		0				M		
	80 120	MSL	25Y 53	10YR56	C	D		Y	0	0		0				M		
32	0 32	MZCL	25Y 54	10YR56	F	D			0	0		0						
	32 65	MZCL	25Y 53	10YR56	C	D		Y	0	0		0				M		
	65-95	HZCL	25Y 53	10YR56	C	D		Y	0	0		0				M		
	95-120	ZC	25Y 63	10YR56	C	D		Y	0	0	MSST	5				P	Y	
35	0 30	MZCL	75YR43						2	0	HR	10						
	30 63	MZCL	75YR44						0	0	MSST	15				M		
38	0 32	HZCL	25Y 54	10YR56	F	D			0	0		0						
	32-48	C	25Y 53	10YR56	M	D		Y	0	0		0				P	Y	
	48 90	C	05Y 61	10YR46	M	D		Y	0	0		0				P	Y	

FRIABLE/DRY
PLASTIC

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES			PED		STONES			STRUCT/	SUBS			CALC
				COL	ABUN	CONT	COL	GLEY	2	6	LITH	TOT	CONSIST	STR	POR	
44	0 20	MZCL	75YR43						0	0	HR	10				
	20 65	MZCL	75YR44						0	0	MSST	20			M	
	65-97	MZCL	10YR4454						0	0	MSST	35			M	
46	0 25	MZCL	75YR43						2	0	HR	10				
	25-52	MZCL	75YR44						0	0	MSST	25			M	
48	0 25	MZCL	75YR43						2	0	HR	10				
	25-73	MZCL	75YR44						0	0	MSST	30			M	
52	0 20	MZCL	75YR43						0	0	HR	5				
	20 50	MZCL	75YR44						0	0	MSST	30			M	
58	0 30	MZCL	75YR44						0	0	HR	2				
	30-40	MZCL	75YR4434						0	0	MSST	5			M	
	40 75	HZCL	75YR34						0	0	MSST	5			M	
	75 120	HZCL	75YR33						0	0		0			M	
61	0 30	MZCL	75YR44						1	0	HR	10				
	30 70	MZCL	75YR4644						0	0	MSST	25			M	
1P	0 25	MZCL	75YR43						1	0	MSST	14				WET SIEVE
	25 52	MZCL	75YR44						0	0	MSST	29			M	WET SIEVE
	52 120	MZCL	75YR44						0	0	MSST	40			M	WET SIEVE