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**WEST OXFORDSHIRE LOCAL PLAN
Land North of Long Hanborough
Oxfordshire**

**Agricultural Land Classification
ALC Map and Report**

October 1998

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT
WEST OXFORDSHIRE LOCAL PLAN
LAND NORTH OF LONG HANBOROUGH, OXFORDSHIRE

INTRODUCTION

1. This summary report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 7 hectares of land north of Long Hanborough in Oxfordshire. The survey was carried out during October 1998.
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 West Oxfordshire 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 agricultural land use on the site was a mixture of horticultural crops, land which had been recently seeded for winter cereals and a small area of rough grassland. The areas mapped as 'Other land' include a metal trackway and two out-buildings.

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
3a	5.8	93.6	90.6
3b	0.3	4.8	4.7
4	0.1	1.6	1.6
Other land	0.2	N/A	3.1
Total surveyed area	6.2	100	96.9
Total site area	6.4	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. In total, 7 borings and 2 soil pits were described.

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

8. The agricultural land on this site has been classified as Subgrade 3a (good quality), Subgrade 3b (moderate quality) and Grade 4 (poor quality). The limitations to land quality include soil droughtiness and gradient.
9. Subgrade 3a land is mapped over most of the site. Soils in this mapping unit are calcareous throughout and comprise slightly to moderately stony fine loamy topsoils. These pass to upper subsoils which are stonier and have heavier textures and then to lower subsoils where the stone contents again increase and the textures are medium sand. Given the local climate, soils such as these experience a droughtiness limitation which will cause a reduction in crop yield and reduce the flexibility of the land.
10. Subgrade 3b and Grade 4 land is restricted to the north-east corner of the site where gradient is the main limitation; the Grade 4 land pinpoints the area of steepest slopes. Gradients such as these will have the effect of restricting the safe and efficient use of farm machinery and thereby significantly restricting the versatility of this land.

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 418 143	SP 419 144
Grid reference	N/A	SP 418 143	SP 419 144
Altitude	m, AOD	96	93
Accumulated Temperature	day°C (Jan-June)	1403	1406
Average Annual Rainfall	mm	699	697
Field Capacity Days	days	152	152
Moisture Deficit, Wheat	mm	100	101
Moisture Deficit, Potatoes	mm	91	91
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.

Site

16. The site lies at altitudes in the range 98–87 m AOD. The survey area is not affected by any site limitations such as microrelief or flooding. However, there is a small area of land towards the north-eastern boundary, where steep slopes result in a gradient limitation and the land is classified as Subgrade 3b and Grade 4.

Geology and soils

17. The most detailed published geological information for the site (BGS, 1982) shows the higher ground to be underlain by the 4th Hanborough Terrace Deposits (River Gravel). On the lower sloping land these solid deposits give way to Kellaway's Clay, Kellaway's Sand, and Cornbrash.
18. The most detailed published soils information covering the site (SSEW, 1983) maps it entirely as soils of the Sutton 1 association. These soils are described as 'well drained fine and coarse loamy soils locally calcareous and in places, shallow over limestone gravel' (SSEW, 1983). Soils fitting this description were observed across the whole 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.

Subgrade 3a

21. Land of good quality has been mapped over most of the site and suffers from a soil droughtiness limitation, coincident with the Hanborough Terrace Deposits.
22. Soils are typically calcareous and comprise medium clay loam topsoils, which may contain up to 25% total flint by volume. These overlie similarly textured or heavy clay loam upper subsoils, which may contain up to 40% total flint by volume. At a depth between 42–50 cm, most of the soils on this site were impenetrable to the soil auger. Soil pits 1P and 2P (see Appendix II) are typical of these stony soils and confirmed the gravelly nature of these lower subsoils. In 1P, a sandy clay loam lower subsoil with 40% total flints by volume was observed. This passed to a loamy coarse sand from 50–120 cm, where stone contents increased with depth to a maximum of 60% total flints by volume. In 2P, located close to the eastern boundary, a medium sand lower subsoil, with up to 51% total flints by volume, was recorded. From 67 cm, this passed to a similarly textured and stony horizon down to 90 cm. For both pits, this combination of soil properties limits the available water to a growing plant and the interaction with the local climate results in a minor soil droughtiness limitation. The

resulting moisture balance calculations indicate that subgrade 3a is the appropriate grade for this land. The resulting drought stress may cause the level and consistency of yields to be depressed, particularly in drier years.

Subgrade 3b

23. Moderate quality land is located close to the north-eastern boundary and suffers from a gradient limitation. Gradients of 8° were measured with an optical clinometer and this will restrict land quality to Subgrade 3b. These will affect the safe and efficient use of farm machinery.

Grade 4

24. Poor quality land with gradients in excess of 11° were also observed in the extreme north-east of the site. Grade 4 is the appropriate grade for this land.

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SOURCES OF REFERENCE

British Geological Survey (1982) *Sheet No. 236, Witney*, 1:50,000, Solid and 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, 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	GRDNT	GLEY	--WETNESS--		-WHEAT-		-POTS-		M. REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
					SPL	CLASS	GRADE	AP	MB	AP	MB	DRT					
1	SP41801450	PLO NE	4		1	1	56	-44	56	-35	3B					DR 3A	IMP42 SEE1P
2	SP41801440	PLO E	1		1	1	102	2	96	5	3A					DR 2	IMP90 SEE1P
3	SP41901440	PLO NE	4		1	2	79	-21	79	-12	3B					DR 3A	IMP50 SEE2P
4	SP41801430	PLO			1	1	64	-36	64	-27	3B					DR 3A	IMP45 1P LOC
5	SP41901430	PLO N	1	82	1	1	130	30	103	12	1						1
6	SP41981424	PLO NW	2		1	1	64	-36	64	-27	3B					DR 3A	IMP45 2P LOC
7	SP41851422	PLO			1	1	44	-56	44	-47	4					DR 3B	IMP40 SEE 1P
1P	SP41801430	PLO NE	2		1	1	93	-7	79	-12	3A					DR 3A	MIXED S+C U\S
2P	SP41981424	PLO NW	2		1	1	87	-13	77	-14	3A					DR 3A	PIT TO 90

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED COL.	-----STONES-----				STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT		GLY	>2	>6	LITH		TOT	STR	POR		
1	0-25	MCL	10YR43 53					10	4	HR	25						Y
	25-42	MCL	75YR34 44					0	0	HR	20		M				Y
2	0-25	MCL	10YR43					12	4	HR	25						Y
	25-55	HCL	75YR46					0	0	HR	15		M				Y
	55-80	HCL	10YR56					0	0	HR	15		M				Y
	80-90	SCL	10YR56					0	0	HR	30		M				Y
3	0-28	HCL	10YR44					6	2	HR	10						
	28-50	C	75YR46					0	0	HR	5		M				
4	0-27	MCL	10YR43					4	0	HR	12						Y
	27-45	HCL	75YR44					0	0	HR	30		M				Y
5	0-31	MCL	10YR43					3	0	HR	12						Y
	31-82	HCL	75YR44					0	0	HR	15		M				Y
	82-120	C	75YR56	75YR58	F	D		0	0		0		P			Y	
6	0-27	MCL	10YR43					3	0	HR	12						Y
	27-45	HCL	10YR44					0	0	HR	22		M				Y
7	0-28	MCL	10YR42 43					8	1	HR	23						Y
	28-40	LCS	10YR42					0	0	HR	40		M				Y
1P	0-24	MCL	10YR43					4	0	HR	12						Y
	24-40	MCL	75YR46					0	0	HR	24	MDCSAB	FR	M			Y
	40-50	SCL	10YR56					0	0	HR	40	WDCSAB	FR	M			
	50-100	LCS	10YR46					0	0	HR	29	S	L	M			Y
	100-120	LCS	10YR46					0	0	HR	60	S	L	M			Y
2P	0-26	MCL	10YR43					3	0	HR	12						Y
	26-51	HCL	10YR44					0	0	HR	32	WKCSAB	FR	M			Y
	51-67	MS	10YR66 56					0	0	HR	51	WKS	L	M			Y
	67-90	MS	10YR66 56					0	0	HR	55	WKS	L	M			Y