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WYCOMBE DISTRICT LOCAL PLAN
Site 2, Tralee Farm, High Wycombe, Buckinghamshire

Agricultural Land Classification
ALC Map and Report

December, 1997

Resource Planning Team
Eastern Region
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AGRICULTURAL LAND CLASSIFICATION REPORT

WYCOMBE DISTRICT LOCAL PLAN
SITE 2, TRALEE FARM, HIGH WYCOMBE, BUCKINGHAMSHIRE

INTRODUCTION

1. This report presents the findings of a detailed, Agricultural Land Classification (ALC) survey of 16.9 ha of land between Hazlemere and Holmer Green, east of High Wycombe in Buckinghamshire. The survey was carried out during December 1997.

2. The work 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 Wycombe District Local Plan. This survey supersedes any previous ALC information for this land.

3. The field 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 this site was in permanent grassland. Areas mapped as 'Other Land' comprise derelict cherry orchards, residential properties and farm 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
3b	8.0	100.0	47.3
Agricultural land not surveyed	2.2	-	13.1
Other land	6.7	-	39.6
Total surveyed area	8.0	100.0	47.3
Total site area	*16.9*	-	*100.0*

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

8. All of the agricultural land at this site has been classified as Subgrade 3b (moderate quality). Soil wetness is the principal limitation and, in places, topsoil stoniness or gradient are also significant.

9. The majority of the land suffers from a significant soil wetness limitation. The topsoils comprise fine loamy textures which often overlie shallow, similar or slightly heavier, upper subsoils which pass to poorly structured clayey lower subsoils which significantly impede the drainage of the soils. These clay horizons occur at shallow depths causing the drainage to be significantly restricted and land to be classified as Subgrade 3b. A significant wetness limitation such as this will affect land utilisation by restricting the range of crops that can be grown and reducing crop yield. In addition, soil wetness will determine the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

10. In the south-east of the survey area, some of the soils experience a topsoil stoniness limitation. This will have the effect of increasing production costs by enhancing wear and tear to farm machinery, and impairing the establishment, growth and quality of crops.

11. A small dry valley splits the site in two, trending north-east to south-west. Slope measurements along parts of the valley sides show gradients in the Subgrade 3b range. Gradients of this size will impair the safe and efficient use of agricultural machinery which otherwise performs best on level ground.

FACTORS INFLUENCING ALC GRADE

Climate

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

13. 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	
Grid reference	N/A	SU 901 965	SU 901 963
Altitude	m, AOD	175	170
Accumulated Temperature	day°C (Jan-June)	1309	1315
Average Annual Rainfall	mm	766	763
Field Capacity Days	days	164	163
Moisture Deficit, Wheat	mm	90	91
Moisture Deficit, Potatoes	mm	77	78
Overall climatic grade	N/A	Grade 2	Grade 2

14. 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.

15. 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.

16. The combination of rainfall and temperature at this site mean that there is an overall climatic limitation. The whole site is Grade 2 climatically. Local climatic factors such as frost risk and exposure do not affect the site. Climatic factors do interact with soil properties to influence soil wetness and soil droughtiness. At this locality the climate is relatively cool and moist, in regional terms.

Site

17. The site lies at altitudes in the range 160-175m AOD. The highest ground occurs along the eastern boundary of the site and the lowest land is located on the western boundary. Most of the site is not affected by site restrictions (i.e., microrelief or flooding), but a small valley trending north-east to south-west contains steep slopes that do affect the ALC grade.

Geology and soils

18. The most detailed published geological information for the site (BGS, 1948) shows the majority of the area to be underlain by clay-with-flints. In the low lying land of the valley bottom Upper Chalk is mapped.

19. The most detailed published soils information covering the area (SSEW, 1983) shows the area to be mapped as soils of the Batcombe association. These are described as, 'fine silty over clayey and fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some well drained clayey soils over Chalk. Variably flinty'. Soils with this description were found to cover the site; fine loamy over clayey soils with slowly permeable subsoils which were variably flinty.

AGRICULTURAL LAND CLASSIFICATION

20. 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.

21. 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 3b

22. All the agricultural land is classified as moderate quality and is coincident with deposits of clay-with-flints over Upper Chalk.

23. Much of the land classified as Subgrade 3b is affected by a significant soil wetness problem. Over the northern half of the site, soils comprise non-calcareous medium clay loam topsoils. These may contain up to 5% total flints by volume. These pass into a poorly structured heavy clay loam upper subsoil between 15-38 cm or pass through a shallow medium silty clay loam, to the heavier texture beneath. These profiles are all gleyed within 40 cm. This evidence of severely impeded drainage arises from the presence of shallow slowly permeable horizons. The depth to these slowly permeable layers results in soils being assigned to Wetness Class IV and this, alongside topsoil texture and climatic factors, gives rise to 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.

24. The central and southern half of the site is affected by a number of limitations which include soil wetness, topsoil stoniness and gradient. Soils comprise non-calcareous medium clay loam topsoils. These contain between 10-40% total flints by volume (30% > 2 cm in size). These pass to similar subsoils or into heavy clay loam or clay upper subsoils which were commonly impenetrable to the soil auger from 30 and 35 cm depth. Stone contents were estimated to be in the region 10-40% total flints by volume. Soil pit 1 (see Appendix II) is typical of these soils. It proved the existence of very stony top and upper subsoil horizons, and confirmed the poorly structured nature of the clayey lower subsoil. The depth to these slowly permeable horizons (between 24 and 44 cm) results in soils being assigned to Wetness Class IV. The combination of poor to imperfect drainage, topsoil texture and climatic factors, results in a land classification of Subgrade 3b.

25. Within the southern half of the site topsoil stoniness is an equal limitation. Measurements of 30% > 2 cm were recorded. This degree of stoniness will have the effect of increasing production costs by enhancing wear and tear to farm machinery, and impairing the establishment, growth and quality of crops.

26. The valley in the central portion of the site contains slopes with gradients of 8°. This degree of slope will affect the safe and efficient use of farm machinery, and this land cannot therefore be classified higher than Subgrade 3b.

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SOURCES OF REFERENCE

British Geological Survey (1948) *Sheet No. 255, Beaconsfield.* 1:63,360. 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:

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. **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	**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 NO.	GRID REF	USE	ASPECT	GRDNT	--WETNESS-- GLEY	SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
4	SU89809650	PGR			28	28	4	3B	104	13	99	21					WE	3B	SEE PIT 1
5	SU89909650	PGR			15	15	4	3B	69	-22	72	-6					WE	3B	SEE PIT 1
8	SU89909640	PGR	SW	2	38	38	4	3B	85	-6	90	12					WE	3B	SEE PIT 1
9	SU90009640	PGR	W	2					47	-44	47	-31					WE	3B	SEE PIT 1
11	SU90009630	PGR	W	3	20	20	4	3B	80	-11	86	8					WE	3B	3B TSST
12	SU90109630	PGR	W	1	24	24	4	3B	94	3	82	4					WE	3B	SEE PIT 1
14	SU90089621	PGR	W	1					54	-37	54	-24					WE	3B	SEE PIT 1
1P	SU90009630	PGR	W	3	28	44	4	3B	62	-29	70	-8					WE	3B	PIT 1 AT AB11

				----MOTTLES-----			PED		----STONES----				STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
4	0-28	MCL	10YR43						0	0	HR	5							
	28-46	HCL	10YR63	10YR56	C			Y	0	0	HR	10			P			Y	
	46-95	C	75YR56	75YR64	M			S	0	0		0			P			Y	
5	0-15	HCL	10YR42						0	0	HR	5							
	15-55	HCL	10YR66	000C00	C	D		S	0	0	HR	5			P			Y	
8	0-20	MCL	10YR43						0	0	HR	5							
	20-38	MZCL	10YR54						0	0	HR	2			M				
	38-60	HCL	10YR53	000C00	C	D		Y	0	0	HR	2			P			Y	
9	0-20	MCL	10YR42						0	0	HR	10							
	20-30	MCL	10YR54						0	0	HR	10			M				IMP FLINTS
11	0-20	MCL	10YR42						30	11	HR	40							
	20-60	C	10YR66	000C00	C	D		S	0	0	HR	1			P			Y	
12	0-24	MCL	10YR42						0	0	HR	10							
	24-78	HCL	10YR56	75YR56	C			S	0	0	HR	25			P			Y	
	78-100	C	10YR72	10YR56	M			Y	0	0		0			P			Y	
14	0-29	MCL	10YR42						0	0	HR	10							
	29-35	MCL	10YR64						0	0	HR	30			M				IMP FLINTS
1P	0-28	MCL	10YR42						30	11	HR	40							
	28-44	C	10YR64	10YR56	C			Y	0	0	HR	40			M				
	44-65	C	25Y 73	75YR56	M			Y	0	0	HR	20	MASS	FM	P	Y		Y	