A1

WYCOMBE DISTRICT LOCAL PLAN
Land east of High Barbers Wood, High Wycombe, Buckinghamshire

Agricultural Land Classification
ALC Map and Report

April 1997

Resource Planning Team
Eastern Region
FRCA Reading

RPT Job Number: 0305/054/97
FRCA Reference: EL 03/01404A
LURET Job Number: 02952

AGRICULTURAL LAND CLASSIFICATION REPORT

WYCOMBE DISTRICT LOCAL PLAN.
LAND EAST OF HIGH BARBERS WOOD,
HIGH WYCOMBE, BUCKINGHAMSHIRE

INTRODUCTION

1. This summary report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 9.9 hectares of land between High Barbers Wood and Lane End Road to the south west of High Wycombe in Buckinghamshire. The survey was carried out during April 1997.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA) on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with the Wycombe 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 agricultural land on this site was under permanent grass. The area mapped as 'Other Land' comprises a farmyard area with agricultural buildings located towards the north of the site.

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 below.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	5.7	59.4	57.6
3b	3.3	34.4	33.3
4	0.6	6.2	6.1
Other land	0.3	N/A	3.0
Total surveyed area	9.6	100	97.0
Total site area	9.9	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. A total of 8 borings and 2 soil pits were described.

8. The agricultural land at this site has been classified as Subgrade 3a (good quality), Subgrade 3b (moderate quality) and Grade 4 (poor quality). Principal limitations include soil droughtiness and gradient.

9. Land of Subgrade 3a quality has been mapped over the majority of the agricultural land, predominantly on the lowest lying land to the east. The soils comprise either slightly to very stony medium silts, or slightly stony medium silty topsoils overlying clayey and chalk horizons. In the local climate, profiles of this nature are limited by soil droughtiness. This can lead to a reduction in plant growth and yield, especially in drier years. In a small area in the east of the site land quality is restricted to Subgrade 3b on the basis of topsoil stoniness. This limitation causes an increase in crop production costs through wear and tear on machinery and, commonly, results in a reduction in crop quality.

10. Towards the west of the site, gradient is the principal limitation, restricting this land to Subgrade 3b and Grade 4, depending on the steepness of the slope and the impact on the safe and efficient use of farm machinery.

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	
Grid reference	N/A	SU 836 928	SU 835 925
Altitude	m, AOD	95	115
Accumulated Temperature	day°C (Jan-June)	1403	1381
Average Annual Rainfall	mm	752	756
Field Capacity Days	days	162	162
Moisture Deficit, Wheat	mm	98	96
Moisture Deficit, Potatoes	mm	89	85
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. Other local climatic factors such as exposure and frost risk are also believed not to affect the site. The site is climatically Grade 1.

Site

16. The site lies at an altitude between approximately 95 and115m AOD. The site lies in a dry valley, the base of which is towards the east of the site. The valley is on a north - south axis. Towards the west and east of the site, the land rises. In significant areas to the west of the site, the slope is steep enough to directly affect agricultural land quality, restricting some sections to Subgrade 3b and Grade 4 on this basis alone. The slopes to the east of the site are not sufficient to affect land quality. Microrelief and flood risk do not affect land quality at this site.

Geology and soils

17. The published geological information for the site (BGS, 1949) shows the majority of the site to be underlain by Cretaceous Upper Chalk. Towards the north of the site, on the lowest lying land, this gives way to Chalk rock and Middle Chalk.

18. The most detailed published soils information for the site (SSEW, 1983 and 1984) shows this site as containing soils from the Andover 1 association. These are described as, 'Shallow well drained calcareous silty soils over chalk on slopes and crests. Deep calcareous and non-calcareous fine silty soils in valley bottoms. Striped patterns locally,' (SSEW, 1983). Soils of this general description were found at this 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.

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 the majority of the agricultural land at this site, predominantly to the east on the lower lying areas. In this area the principal limitation is soil droughtiness. The soils are characterised by the soil pits, 1P and 2P (see Appendix II).

22. In this area, the soils were found to be of two distinct types. Firstly, on the lowest lying land towards the east of the site they commonly comprise a slightly to moderately stony (up to 27% v/v total flints), calcareous medium silty clay loam topsoil passing to a similar upper subsoil horizon which was commonly impenetrable to the soil auger. In the pit

observation, 1P, the upper subsoil was discovered to overlie a very stony lower subsoil containing 60% v/v total flints. Secondly, towards the west of the site, on the slopes with a gradient less than 7°, the soils were found to comprise a slightly stony and chalky (up to 8% v/v total flints and 3% chalk fragments), calcareous medium silty clay loam topsoil. This overlies a moderately stony and chalky (20% v/v total flints and 5% chalk fragments), moderately structured, calcareous silty clay upper subsoil. This passes to either weathered chalk or a chalky drift containing approximately 60% chalk material. Pure chalk and chalk derived drift commonly cause a plant rooting restriction. At this site grass roots were observed to penetrate the chalk/chalky drift horizon to approximately 70cm. It would be expected that cereal crops would be able to penetrate further into the substrate; the estimate is approximately a further 10cm, to 80cm where the chalk substrate becomes harder, more compact and impenetrable to the soil auger and spade.

23. In the local climate, these soil profiles are moderately restricted in terms of water availability to plants and as such are restricted to Subgrade 3a on the basis of soil droughtiness. In the first soil type, towards the east of the site, this is due to the stone contents restricting the water holding capability of the soil profile. In the second soil type, to the west of the site, the stones in the upper horizons affect the water holding capacity, but also the rooting restriction that the chalk causes leads to a further reduction in water availability. Soil droughtiness may affect plant growth and yield potential, as the supply of available water may be deficient, especially in drier years.

Subgrade 3b

24. Land of moderate quality has been mapped predominantly towards the west of the site, with a small section extending across to the east. Principal limitations include slope and topsoil stoniness.

25. To the west of the site slopes were measured between 7 and 11°. This causes the operation of certain farm machinery to be compromised in terms of safety and efficiency, to the extent that Subgrade 3b is the best possible grade in this area. Where Subgrade 3b extends to the east of the site, topsoil stoniness is the principal limitation. In this area a total of 27% v/v flints were measured in the top 25cm. Of this, 20% were greater than 2cm diameter. This volume of large flints causes an impediment to cultivation, harvesting and crop growth. It also causes production costs to increase by causing extra wear and tear on implements and tyres to the extent that Subgrade 3b is the best grade in this area.

Grade 4

26. Land of poor quality has been mapped towards the north west of the site. The principal limitation is slope. In this part of the site slopes were measured between 11 and 18° causing farm machinery operation to be compromised to the extent that Grade 4 is appropriate.

Matthew Larkin
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

British Geological Survey (1949) *Sheet No.255. Beaconsfield. Drift Edition. 1:63 360 scale* 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) *Soils of South East England. 1:250 000 Scale.* SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils of South East England. Bulletin No. 15.* 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

SOIL PIT DESCRIPTION

Site Name : WYCOMBE DLP HIGH BARBERS Pit Number : 1P

Grid Reference: SU83609248
Average Annual Rainfall : 753 mm
Accumulated Temperature : 1392 degree days
Field Capacity Level : 162 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 27	MZCL	10YR33 00	20	27	HR					Y
27- 57	MZCL	10YR43 44	20	28	HR		MDCSAB	FR	M	Y
57-100	MZCL	10YR44 54	55	60	HR			FR	M	Y

Wetness Grade : 1
Wetness Class : I
Gleying : cm
SPL : cm

Drought Grade : 3A
APW : 91 mm MBW : -7 mm
APP : 85 mm MBP : -4 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Topsoil Stoniness

SOIL PIT DESCRIPTION

Site Name : WYCOMBE DLP HIGH BARBERS Pit Number : 2P

Grid Reference: SU83509270
Average Annual Rainfall : 753 mm
Accumulated Temperature : 1392 degree days
Field Capacity Level : 162 days
Land Use : Permanent Grass
Slope and Aspect : 6 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	MZCL	10YR43 53	2	8	HR					Y
25- 48	ZC	75YR44 00	0	20	HR		WDCSAB	FR	M	Y
48- 80	MZCL	10YR66 00	0	60	CH		MDCPL	FR	P	Y

Wetness Grade : 1
Wetness Class : I
Gleying : cm
SPL : cm

Drought Grade : 3A
APW : 92 mm MBW : -6 mm
APP : 93 mm MBP : 4 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1P	SU83609248	PGR				1	1	91	-7	85	-4	3A				TS	3B	PIT85 AUG100
2	SU83609280	PGR E	3			1	1	45	-53	45	-44	4				DR	3A	IMP 30 SEE 1P
2P	SU83509270	PGR E	6			1	1	92	-6	93	4	3A				DR	3A	IMP80 CHDRIFT
3	SU83529270	PGR E	6			1	1	89	-9	98	9	3A				DR	3A	IMP 70 SEE 2P
4	SU83609270	PGR W	2			1	1	95	-3	105	16	3A				DR	3A	IMP 65 SEE 1P
5	SU83529260	PGR E	6			1	1	72	-26	75	-14	3B				DR	3A	IMP 60 SEE 2P
6	SU83599258	PGR				1	1	52	-46	52	-37	3B				DR	3B	IMP 30 SEE 1P
8	SU83609248	PGR				1	1	49	-49	49	-40	3B				DR	3B	IMP 30 SEE 1P
9	SU83509240	PGR NE	3			1	1	81	-17	84	-5	3A				DR	3A	IMP 55 SEE 1P
10	SU83599238	PGR W	1			1	1	111	13	105	16	2				DR	2	IMP 90 SEE 1P

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	STR	POR	IMP	SPL	CALC	
1P	0-27	mzcl	10YR33 00						20	15	HR	27					Y		SIEVED+RIDDLE
	27-57	mzcl	10YR43 44						20	15	HR	28	MDCSAB	FR	M		Y		SIEVED+RIDDLE
	57-100	mzcl	10YR44 54						55	40	HR	60		FR	M		Y		SIEVED+RIDDLE
2	0-25	mzcl	10YR33 00						14	8	HR	20					Y		
	25-30	mzcl	10YR34 00						0	0	HR	30			M		Y		IMP FLINTS 30
2P	0-25	mzcl	10YR43 53						2	1	HR	8					Y		+3% CHALK
	25-48	zc	75YR44 00						0	0	HR	20	WDCSAB	FR	M		Y		+5% CHALK
	48-80	mzcl	10YR66 00						0	0	CH	60	MDCPL	FR	P		Y		+5% HR ROOTSVIS70cm
3	0-28	mzcl	10YR43 53						0	0	CH	10					Y		+5% FLINTS
	28-55	zc	75YR56 00	00MN00	00	F			0	0	HR	15			M		Y		+5% CHALK
	55-70	mzcl	10YR64 00						0	0	CH	60			P		Y		+5% FLINTS
4	0-25	mzcl	10YR43 00						4	2	HR	9					Y		
	25-45	hzcl	10YR43 00						0	0	CH	5			M		Y		
	45-65	zc	10YR44 00						0	0	CH	8			M		Y		+5%HR / IMPFLINTS65
5	0-21	mzcl	10YR43 53						10	3	HR	15					Y		+5% CHALK
	21-30	zc	75YR56 00						0	0	HR	10			M		Y		+10% CHALK
	30-50	mzcl	10YR64 81						0	0	CH	60			P		Y		+5% FLINTS
	50-60	ch	10YR81 00						0	0	HR	5			P		Y		IMP CHALK 60cm
6	0-25	mzcl	10YR43 00						6	3	HR	8					Y		IMP FLINTS 30cm
	25-30	mzcl	10YR33 00						0	0	HR	5			M		Y		+5% CHALK
8	0-25	mzcl	10YR33 00						10	5	HR	15					Y		IMP FLINTS 30cm
	25-30	hzcl	10YR34 00						0	0	HR	5			M		Y		+3% CHALK
9	0-30	mzcl	10YR43 53						8	3	HR	15					Y		+5% CHALK
	30-55	hzcl	10YR56 00						0	0	HR	10			M		Y		+10%CH / IMPFLINT55
10	0-30	mzcl	10YR43 53						8	3	HR	15					Y		+5% CHALK
	30-50	mzcl	10YR44 00						0	0	HR	10			M		Y		+10% CHALK
	50-90	mzcl	10YR44 46						0	0	CH	20			M		Y		+10%HR / IMPFLINT90