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**WYCOMBE DISTRICT LOCAL PLAN  
Abbey Barn Lane (North-east)  
High Wycombe  
Agricultural Land Classification**

**ALC Map and Report**

**April/May 1997**

**Resource Planning Team  
Eastern Region  
FRCA Reading**

**RPT Job Number: 0305/052/97  
FRCA Reference: EL 03/01404A  
LURET Job Number: 02952**

# AGRICULTURAL LAND CLASSIFICATION REPORT

## WYCOMBE DISTRICT LOCAL PLAN ABBEY BARN LANE (NORTH-EAST) HIGH WYCOMBE.

### INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 10.5 hectares of land to the south-west of Wycombe Marsh, High Wycombe. The survey was carried out during April and May 1997.
2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with the Wycombe Local Plan. This survey supersedes any previous ALC information for this land including a reconnaissance survey (ADAS Ref: 0305/1/77) covering a wider area of land of which this site forms only a part. This reconnaissance survey was undertaken in 1977 at a comparatively low sampling density. Since the 1977 survey, MAFF has updated the ALC system (MAFF, 1988) and consequently a new and more detailed survey was undertaken using the revised 1988 guidelines.
3. The work was conducted by members of the Resource Planning Team in the Eastern Region of the 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 majority of land was in permanent and rough grassland with small patches of scrub encroaching some areas. Towards the north-east of the site, disused allotments were observed which were overgrown. It was considered that these areas of land could be managed sufficiently by normal operational equipment if they were being put back into agricultural production. The area mapped as 'Other Land' consists dominantly of dense scrub and woodland, with horse stables making up the remainder.

### 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 overleaf.
7. The fieldwork was conducted at an average density of 1 boring every hectare. A total of 11 borings and 1 soil pit were described.

**Table 1: Area of grades and other land**

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	1.3	15.1	12.4
3b	5.9	68.6	56.2
4	1.4	16.3	13.3
Other Land	1.9	-	18.1
Total Surveyed Area	8.6	100	-
Total site area	10.5	-	100

8. The relatively small area of Grade 2 (very good quality agricultural land) occupies the lower lying land of the dry valley, where deep, free draining, silty drift deposits have been identified. The main limitation associated with these soils is the amount of topsoil stone, which typically amounts to more than 5% flints larger than 2 cm diameter. The presence of these large stones may result in increased production costs caused by extra wear and tear to equipment and a minor reduction in crop quality of root crops. Furthermore, stones may also impair crop establishment in the case of precision drilled crops.

9. Subgrade 3b, (moderate quality agricultural land) has been mapped on the more steeply sloping land on the site, where shallow, fine silty soils overlying chalk are dominant. However, the major limitation associated with most of this area mapped as Subgrade 3b is gradient, as slopes are generally within the range of 8-10°. This will affect the safe and effective use of farm machinery.

10. Two small areas of Grade 4, (poor quality agricultural land) have been mapped in the north-west and south-west corners of the site where the land is very steep (11.5 - 16°) and unsuited for arable cultivation, due to restrictions on mechanised operations.

## **FACTORS INFLUENCING ALC GRADE**

### **CLIMATE**

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

12. A detailed assessment of the prevailing climate was made by interpolation from the published 5km grid point datasets (Met. Office, 1989). Due to the range in altitude on this site, (i.e. 67m-100m) interpolations were performed at 5m altitude increments (a total of 11 interpolations) to assess the degree of climatic variation across the site. Three interpolations are given in table 2 overleaf representing the climatic and altitude range at the site.

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.

**Table 2: Climatic and altitude data**

Factor	Units	Values	Values	Values
Grid Reference	N/A	SU 884 916	SU 884 915	SU 881 916
Altitude	m, AOD	67	85	100
Accumulated Temperature	day°C (Jan-June)	1435	1414	1397
Average Annual Rainfall	mm	706	713	719
Field Capacity Days	days	152	153	154
Moisture Deficit, Wheat	mm	102	99	98
Moisture Deficit, Potatoes	mm	93	90	87
Overall climatic grade	N/A	Grade 1	Grade 1	Grade 1

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 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 not believed to have a significant adverse effect on the site. The site is climatically Grade 1.

## **RELIEF**

16. A marked dry valley feature runs south-west to north-east across the central part of the site. The altitude of the land varies considerably. The highest land lies at about 100m and occurs at the extreme north-west and south of the site. Land quality is limited to Subgrade 3b and Grade 4 by steep gradients in the range 7.5-16° across the majority of the site. On the lower valley slopes the land is generally gently sloping with gradients measuring between 2-5°.

## **GEOLOGY AND SOILS**

17. The published geological information for the site (Geological Survey of England and Wales, 1948) shows the western and central parts of the site to be underlain by Upper Chalk. To the eastern side, the Middle Chalk and Chalk Rock is mapped at the surface. This tends to follow the lower slopes of the dry valley feature.

18. The most recently published soil information for the site (SSEW, 1983) shows the Newmarket 2 association to cover the entire area. These soils are described as 'shallow well drained calcareous coarse loamy and sandy soils over chalk rubble associated with well drained deeper coarse loamy and sandy soils often in an intricate pattern. Slight risk of water erosion.' (SSEW, 1983 and 1984).

19. Upon detailed field examination, soils were not consistent with the above description. Medium silty soils were found, resting over chalk at variable depths in most places. Whilst deeper and more flinty, well drained silty soils were observed in the central dry valley area.

## **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.

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.

## **Grade 2**

22. The area of Grade 2, (very good quality agricultural land) is located at the base of, and on the lower slopes of, the dry valley feature where deep, silty drift deposits have been identified. The land is limited by topsoil stone restrictions.

23. Typical profiles comprise calcareous, slightly stony (up to 12% total flints, 8% > 2cm and 3% > 6cm in size) medium silty clay loam topsoils. Upper subsoils are impenetrable (to the soil auger), due to flinty horizons at depth between 20cm and 25cm. Soil inspection pit 1 (Appendix 2) is considered representative of these soils in this mapping unit and confirms that the upper subsoils contain a moderate amount of flint. The pit observation indicates that the subsoils also comprise calcareous, medium silty clay loams which have many stones (approximately 18% total flints) in the upper horizons and few stones (about 8% total flints) in the lower horizons. The profiles are permeable and well drained (Wetness Class 1). The climate is relatively cool with annual rainfall figures which are about average for the south east and these deep silty soils have good reserves of available water for plant growth. There is consequently little or no drought risk as a result. The amount of topsoil stone is the major limitation associated with these soils, typically amounting to 7-8% flints larger than 2 cm diameter. This has the effect of, (in addition to reducing available water), impeding cultivation, harvesting and crop growth, and increasing the cost of cropping in terms of machinery wear and tear and yield reduction. Despite this, land of this quality is expected to produce generally high yields of a wide range of crops.

## **Subgrade 3b**

24. The majority of the agricultural land in this area is shown as being of moderate quality with gradient being the major limitation.

25. The soils in these areas are well drained (Wetness Class 1), and typically consist of calcareous, medium silty clay loam topsoils which are very slightly or slightly stony (typically 2-5% total flint and/or approximately 5-10% chalk fragments). These fine silty topsoils lie directly over chalk in most cases at depths between 25cm and 30cm, although occasional borings of better quality with deeper soil resources were observed. These profiles will probably suffer from a slight soil droughtiness limitation due to the shallow rooting depth into the chalk. Despite soil observations with only minor drought restrictions, it is gradient that is the overriding limitation which restricts the land to Subgrade 3b. On the middle and occasionally upper slopes of the dry valley feature to the north-west and south-east of the site, gradients were measured with an optical reading clinometer at between 7.5° and 10.5° on average. Slopes within this range are sufficient to compromise the safe and efficient operation of farm machinery, particularly for cultivation and harvesting, to the extent that 3b is appropriate for this land, due to restrictions in the versatility of the land.

**Grade 4**

26. Two small areas of Grade 4, (poor quality agricultural land) have been mapped in the north-west and south-west corners of the site where the land is very steep (11.5 - 16°) and unsuited for arable cultivation as slopes cannot be negotiated safely and the turning space for machinery at the top of these slopes is insufficient.

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## SOURCES OF REFERENCE

Geological Survey of England and Wales (1948) *Sheet No. 255, Beaconsfield 1:63,360 scale*  
Drift Edition: GSEW.

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.*  
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Soil Survey of England and Wales (1983) *Sheet 6, Soils of South East England 1:250,000 scale*  
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*  
SSEW: Harpenden.

M.S Temple (1929) *The Soils of Buckinghamshire.* Bulletin XXXVIII, University Of Reading.

## 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:

<b>ARA:</b> Arable	<b>WHT:</b> Wheat	<b>BAR:</b> Barley
<b>CER:</b> Cereals	<b>OAT:</b> Oats	<b>MZE:</b> Maize
<b>OSR:</b> Oilseed rape	<b>BEN:</b> Field beans	<b>BRA:</b> Brassicae
<b>POT:</b> Potatoes	<b>SBT:</b> Sugar beet	<b>FCD:</b> Fodder crops
<b>LIN:</b> Linseed	<b>FRT:</b> Soft and top fruit	<b>FLW:</b> Fallow
<b>PGR:</b> Permanent pasture	<b>LEY:</b> Ley grass	<b>RGR:</b> Rough grazing
<b>SCR:</b> Scrub	<b>CFW:</b> Coniferous woodland	<b>OTH:</b> Other
<b>DCW:</b> Deciduous woodland	<b>BOG:</b> Bog or marsh	<b>SAS:</b> Set-Aside
<b>HTH:</b> Heathland	<b>HRT:</b> Horticultural crops	<b>PLO:</b> 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:

<b>MREL:</b> Microrelief limitation	<b>FLOOD:</b> Flood risk	<b>EROSN:</b> Soil erosion risk
<b>EXP:</b> Exposure limitation	<b>FROST:</b> Frost prone	<b>DIST:</b> Disturbed land
<b>CHEM:</b> Chemical limitation		

9. **LIMIT:** The main limitation to land quality. The following abbreviations are used:

<b>OC:</b> Overall Climate	<b>AE:</b> Aspect	<b>ST:</b> Topsoil Stoniness
<b>FR:</b> Frost Risk	<b>GR:</b> Gradient	<b>MR:</b> Microrelief
<b>FL:</b> Flood Risk	<b>TX:</b> Topsoil Texture	<b>DP:</b> Soil Depth
<b>CH:</b> Chemical	<b>WE:</b> Wetness	<b>WK:</b> Workability
<b>DR:</b> Drought	<b>ER:</b> Erosion Risk	<b>WD:</b> Soil Wetness/Droughtiness
<b>EX:</b> Exposure		

## Soil Pits and Auger Borings

1. **TEXTURE:** soil texture classes are denoted by the following abbreviations:

<b>S:</b> Sand	<b>LS:</b> Loamy Sand	<b>SL:</b> Sandy Loam
<b>SZL:</b> Sandy Silt Loam	<b>CL:</b> Clay Loam	<b>ZCL:</b> Silty Clay Loam
<b>ZL:</b> Silt Loam	<b>SCL:</b> Sandy Clay Loam	<b>C:</b> Clay
<b>SC:</b> Sandy Clay	<b>ZC:</b> Silty Clay	<b>OL:</b> Organic Loam
<b>P:</b> Peat	<b>SP:</b> Sandy Peat	<b>LP:</b> Loamy Peat
<b>PL:</b> Peaty Loam	<b>PS:</b> Peaty Sand	<b>MZ:</b> 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:

<b>F:</b> Fine (more than 66% of the sand less than 0.2mm)
<b>M:</b> Medium (less than 66% fine sand and less than 33% coarse sand)
<b>C:</b> 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:

<b>HR:</b> all hard rocks and stones	<b>FSST:</b> soft, fine grained sandstone
<b>ZR:</b> soft, argillaceous, or silty rocks	<b>CH:</b> chalk
<b>MSST:</b> soft, medium grained sandstone	<b>GS:</b> gravel with porous (soft) stones
<b>SI:</b> soft weathered igneous/metamorphic rock	<b>GH:</b> 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	<b>WK</b> : weakly developed	<b>MD</b> : moderately developed
	<b>ST</b> : strongly developed	
Ped size	<b>F</b> : fine	<b>M</b> : medium
	<b>C</b> : coarse	
Ped shape	<b>S</b> : single grain	<b>M</b> : massive
	<b>GR</b> : granular	<b>AB</b> : angular blocky
	<b>SAB</b> : sub-angular blocky	<b>PR</b> : prismatic
	<b>PL</b> : platy	

9. **CONSIST**: Soil consistence is described using the following notation:

**L**: loose    **VF**: very friable    **FR**: friable    **FM**: firm    **VM**: very firm  
**EM**: extremely firm    **EH**: extremely hard

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 ABB BARN NE Pit Number : 1P

Grid Reference: SU88219150 Average Annual Rainfall : 713 mm  
 Accumulated Temperature : 1435 degree days  
 Field Capacity Level : 154 days  
 Land Use : Rough Grazing  
 Slope and Aspect : 02 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	MZCL	10YR32 00	8	12	HR					Y
25- 57	MZCL	10YR43 44	0	18	HR		MDCSAB	FR	M	Y
57-120	MZCL	10YR43 00	0	8	HR		MDCSAB	FR	M	Y

Wetness Grade : 1 Wetness Class : I  
 Gleying : cm  
 SPL : cm  
 Drought Grade : 1 APW : 141mm MBW : 41 mm  
 APP : 108mm MBP : 17 mm

FINAL ALC GRADE : 2  
 MAIN LIMITATION : Topsoil Stoniness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--				-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT	
1	SU88229169	RGR SE	09			1	1	088	-10	094	6	3A			GR	38	
1P	SU88219150	RGR SE	02			1	1	141	41	108	17	1			ST	2	Pit at 8
2	SU88299169	RGR NE	08			1	1	084	-16	089	-2	3A			GR	38	
3	SU88109160	RGR SE	12			1	1	087	-11	093	6	3A			GR	4	
4	SU88209160	RGR SE	08			1	1	087	-12	087	-4	3A			GR	38	Imp 50
5	SU88309160	RGR SE	04			1	1	082	-19	087	-5	3A			DR	3A	
6	SU88399160	RGR NE	02			1	1	038	-64	038	-55	4			ST	2	Imp 20, see 1p
7	SU88509161	RGR NW	08			1	1	088	-13	094	2	3A			GR	38	
8	SU88219150	RGR NE	02			1	1	056	-44	056	-35	3B			ST	2	Imp 25, see 1p
9	SU88309150	PGR NE	02			1	1	046	-54	046	-45	4			ST	2	Imp 25, see 1p
10	SU88399150	PGR NW	08			1	1	086	-13	092	2	3A			GR	38	
11	SU88309140	PGR NW	12			1	1	087	-11	093	5	3A			GR	4	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED		----STONES----			STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR		
1	0-30	mzc1	10YR42 00						0	0	CH	5					Y
	30-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk
1P	0-25	mzc1	10YR32 00						8	3	HR	12					Y
	25-57	mzc1	10YR43 44						0	0	HR	18	MDCSAB	FR M			Y
	57-120	mzc1	10YR43 00						0	0	HR	8	MDCSAB	FR M			Y
2	0-25	mzc1	10YR42 00						0	0	CH	5					Y
	25-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk
3	0-30	mzc1	10YR42 00						0	0	CH	5					Y +2% hr
	30-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk
4	0-25	mzc1	10YR42 00						0	0	CH	5					Y
	25-50	mzc1	10YR54 56						0	0	HR	3		M			Y Imp +5%ch
5	0-25	mzc1	10YR42 00						0	0	CH	10					Y +2% hr
	25-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk
6	0-20	mzc1	10YR42 00						7	2	HR	10					Y Imp, flints
7	0-30	mzc1	10YR42 00						0	0	HR	3					Y +6% chalk
	30-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk
8	0-25	mzc1	10YR42 43						8	3	HR	12					Y Imp, flints
9	0-25	mzc1	10YR42 00						8	3	HR	11					Y Imp, flints
10	0-30	mzc1	10YR42 00						0	0	HR	5					Y +3% chalk
	30-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk
11	0-30	mzc1	10YR42 00						0	0	HR	2					Y +5% chalk
	30-70	ch	10YR81 00						0	0	HR	5		P			Y Imp, chalk