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Land at Green Lane, Meopham, Kent

**Agricultural Land Classification
ALC Map and Report**

April 1997

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT

LAND AT GREEN LANE, MEOPHAM, KENT

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 5.8 ha of land south of Green Lane near Camer Park, at Meopham in Kent. 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 a proposed sports and recreation area. This survey supersedes 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 land use on the site was winter wheat.

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 fieldwork was conducted at an average density of 1 boring per hectare. A total of 7 borings and 1 soil pit was described.
7. All of the site (5.8 ha) has been classified as Subgrade 3a, good quality agricultural land, with soil wetness and soil droughtiness as the main limiting factors. The soils are generally heavy to work (mostly heavy clay loams overlying clays) and show evidence of shallow soil wetness and subsoils that are poorly structured that inhibit drainage. The soils show some evidence of being calcareous (something that would assist the drainage and improve their classification), related to the presence of chalk at depth. This occasionally occurs close to the surface, but this is not consistent enough to warrant a better classification. Where the chalk occurs at shallower depths, soil droughtiness becomes the most significant limiting factor.

FACTORS INFLUENCING ALC GRADE

Climate

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

9. The key climatic variables used for grading this site are given in Table 1 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 1: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	TQ648668
Altitude	m, AOD	115
Accumulated Temperature	day°C (Jan-June)	1374
Average Annual Rainfall	mm	673
Field Capacity Days	days	136
Moisture Deficit, Wheat	mm	106
Moisture Deficit, Potatoes	mm	98
Overall climatic grade	N/A	Grade 1

10. 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.

11. 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.

12. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation; the site is climatically Grade 1.

Site

13. The site is flat to very gently sloping, lying at an altitude 110-115 metres. Nowhere on the site do gradient, microrelief or flooding affect the classification.

Geology and soils

14. The most detailed published geological information for the site (BGS, 1977) shows the area to be underlain by a drift deposit composed of clay-with-flints, covering a solid deposit of Upper Chalk.

15. The most detailed published soils information for the site (SSEW, 1980) shows the area to be covered by a map unit that comprises three principal soil series, Batcombe, Carstens and Winchester. Less detailed information (SSEW, 1983 and 1984) places the area in the Batcombe Association. The Batcombe series is described as 'flinty, fine silty over clayey, non-calcareous soils...with strong brown or redder clay' (SSEW 1980). Fieldwork on the site revealed some soils similar to this, but with occasional calcareous and chalky profiles.

AGRICULTURAL LAND CLASSIFICATION

16. The details of the classification of the site are shown on the attached ALC map. 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

17. All of the site has been placed in this grade. Soil wetness and soil droughtiness are both active factors in the classification. The soils are generally heavy clay loams overlying clay or heavy clay loam subsoils. Most of the topsoils appear to be calcareous but the profiles in general are non-calcareous, except where chalky patches occur. Where there is a wetness problem in such a low FCD area, the impact of the wetness limitation may be lessened on naturally calcareous soils in which better structure leads to better drainage and easier cultivation. On this site, however, the calcareous option is not applicable; the profiles are generally non-calcareous in the subsoil. This is so, even for the pit which contains a chalky clay lower horizon overlying chalk. Although the lower subsoil is calcareous, the critical upper horizon between 25-50cm (which will have a big impact on drainage through the profile and, hence, ease of cultivation) is non-calcareous.

18. The pit (see Appendix II) was located between two borings that showed evidence of shallow gleying and slowly permeable clays, and was originally targeted at examining this evidence of wetness. Although shallow gleying was confirmed, the profile changed unexpectedly into chalky horizons and then chalk itself from 57cm. As a result, no slowly permeable layer was observed within the pit, though there are still believed to be slowly permeable layers present at some borings on the site; many of the clay subsoils came out as 'bullets' from the auger. Where they occur in combination with shallow gleying and non-calcareous soils, the profiles are placed in Wetness Class III and Subgrade 3b. No Subgrade 3b has been mapped because of the spatial variability of these wetter soils and the presence of scattered chalky profiles on the site.

19. The pit itself is classified as Subgrade 3a - it is placed in Wetness Class II and this, in combination with the heavy topsoil textures and the prevailing FCD level and its non-calcareous nature, produces the classification. There is also a soil droughtiness limitation related to the degree of chalk stone in the lower subsoil and the limited assumed depth of rooting into the chalk (30cm).

20. Where soil wetness is the more important limitation, it will act to restrict the range of crops that can produce consistently good yields under such conditions as well as limiting the number of days when the land is in a suitable condition for trafficking, cultivations or grazing without causing structural damage. Where soil droughtiness is the more important limitation, the lack of water at critical times of the growing season will impair crop growth and result in lower or less consistent yields.

DE Black
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

British Geological Survey (1977) *Sheet No.271, Dartford*.
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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.

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Soil Survey of England and Wales (1980) *Soils of Kent*.

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SSEW: Harpenden.

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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 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

- GRID REF:** national 100 km grid square and 8 figure grid reference.
- 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
- GRDNT:** Gradient as estimated or measured by a hand-held optical clinometer.
- GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.
- AP (WHEAT/POTS):** Crop-adjusted available water capacity.
- MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted MD)
- DRT:** Best grade according to soil droughtiness.
- 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		

- 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	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 : SPORTS&REC AREA, MEOPHAM Pit Number : 1P

Grid Reference: TQ64856680 Average Annual Rainfall : 673 mm
 Accumulated Temperature : 1374 degree days
 Field Capacity Level : 136 days
 Land Use : Wheat
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	HCL	10YR42 00	3	5	HR					Y
25- 50	C	10YR53 00	0	2	HR	C	MCSAB	FM	M	
50- 57	C	10YR54 00	0	50	CH				M	Y
57- 87	CH		0	0					M	Y

Wetness Grade : 3A Wetness Class : II
 Gleying : 025 cm
 SPL : No SPL

Drought Grade : 3A APW : 108mm MBW : 2 mm
 APP : 104mm MBP : 6 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Soil Wetness/Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS	
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST		LIMIT
1	TQ64706690	WHT	040	050	2	3A	97	-9	109	11	3A			WE	3A	
1P	TQ64856680	WHT	025		2	3A	108	2	104	6	3A			WD	3A	25-50 NON-CALC
2	TQ64806690	WHT	025	050	3	3B	96	-10	108	10	3A			WE	3B	
3	TQ64906690	WHT	038	038	3	3B	86	-20	92	-6	3A			WE	3B	
4	TQ64806680	WHT	0	045	3	3A	91	-15	100	2	3A			WE	3A	CALC
5	TQ64906680	WHT	025	040	3	3B	87	-19	93	-5	3A			WE	3B	
6	TQ65006680	WHT			1	1	148	42	124	26	1				1	SL GLEY 78
7	TQ64796690	WHT			1	2	85	-21	88	-10	3B			DR	3A	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED	----STONES----			STRUCT/	SUBS	IMP	SPL	CALC
				COL	ABUN	CONT	COL.	GLEY >2	>6	LITH	TOT	CONSIST			
1	0-25	hc1	10YR42 00					2	0	HR	3				
	25-40	hc1	10YR53 00					0	0	HR	2	M			
	40-50	c	10YR53 00 000C00 00 C					Y	0	0	HR	1	M		
	50-70	c	75YR53 00 000C00 00 C				00MN00 00 Y	0	0	HR	1	P	Y		Y
1P	0-25	hc1	10YR42 00					3	0	HR	5				Y
	25-50	c	10YR53 00 75YR46 00 C				10YR53 00 Y	0	0	HR	2	MCSAB	FM	M	
	50-57	c	10YR54 00					0	0	CH	50		M		Y
	57-87	ch						0	0		0		M		Y
2	0-25	hc1	10YR42 00					2	0	HR	5				Y
	25-50	c	10YR53 00 000C00 00 C					Y	0	0	HR	2	M		
	50-70	c	10YR53 00 000C00 00 C					Y	0	0	HR	1	P	Y	Y
3	0-30	hc1	10YR42 00					2	0	HR	5				Y
	30-38	c	75YR44 00					0	0	HR	5	M			
	38-60	c	75YR53 00 000C00 00 C				00MN00 00 Y	0	0	HR	1	P	Y		Y
4	0-28	hc1	10YR32 00 000C00 00 C					Y	2	0	HR	5			Y
	28-35	hc1	10YR42 00						0	0	CH	15	M		Y
	35-45	c	75YR53 00 000C00 00 C				00MN00 00 Y	0	0	HR	2	M			Y
	45-65	c	75YR53 00 000C00 00 C				00MN00 00 Y	0	0	HR	1	P	Y		Y
5	0-25	hc1	10YR42 00					1	0	HR	3				Y
	25-40	c	10YR53 00 000C00 00 C					Y	0	0	HR	1	M		
	40-60	c	10YR53 00 000C00 00 C				00MN00 00 Y	0	0	HR	1	P			Y
6	0-20	fsz1	10YR42 00					1	0	HR	3				
	20-40	mzc1	10YR43 00					0	0	HR	1	M			
	40-50	hc1	10YR43 00					0	0	HR	1	M			
	50-78	c	10YR54 00					0	0	HR	1	M			
	78-120	c	10YR54 00 000C00 00 F				00MN00 00 S	0	0	HR	1	M			
7	0-28	hc1	10YR42 00					1	0	HR	4				Y
	28-45	hc1	10YR54 00 75YR56 00 F					0	0	HR	4	M			Y
	45-55	hc1	10yr54-00					0	0	CH	50	M			Y