BOXTED FARM
BOURNE END, HERTS.

Agricultural Land Classification and Soil Physical Characteristics ALC Map and Report

December 1997

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Eastern Region
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AGRICULTURAL LAND CLASSIFICATION and SOIL PHYSICAL CHARACTERISTICS REPORT

Boxted Farm, Bourne End, Herts.

INTRODUCTION

1. This report presents the findings of a detailed, Agricultural Land Classification (ALC) survey of 21.5 ha of land at Boxted Farm, Bourne End, Herts. The survey was carried out during December 1997.

2. The survey was carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with a proposal for landfill improvement. 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 set aside oilseed rape, with a small grassed area in the north.

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

Grade	Area (hectares)	% site area
3b	19.2	89
4	2.3	11
Total site area	21.5	100

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 25 borings and 2 soil pits was described.

8. The majority of the site is mapped as subgrade 3b (moderate quality agricultural land) due in the main to slopes being in the range 7°-11°. In the valley bottom where slopes are less than 7° the land is restricted to this subgrade due to topsoils being moderately stony.

9. The area mapped as grade 4 (poor quality agricultural land) has slopes in excess of 11°.

FACTORS INFLUENCING ALC GRADE

Climate

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

11. 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	TL 020 074
Altitude	m, AOD	120
Accumulated Temperature	day°C (Jan-June)	1364
Average Annual Rainfall	mm	704
Field Capacity Days	days	155
Moisture Deficit, Wheat	mm	98
Moisture Deficit, Potatoes	mm	87
Overall climatic grade	N/A	Grade 1

12. 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.

13. 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 (ATO, January to June), as a measure of the relative warmth of a locality.

14. The combination of rainfall and temperature impose no overall limitation to land quality and hence the site has a climatic grade of 1.

Site

15. The site encompasses a steep sided dry valley running in a southerly direction. The area is bounded in the south by a railway line, and in the west by Little Heath Lane. The remaining boundaries are to open farmland. Apart from the valley floor and small adjacent areas, slopes are in the range 7°-12°.

Geology and soils

16. The published 1:50 000 scale geology map (Geol. Survey, 1990) shows the majority of the site to comprise Upper Chalk with the valley bottom mapped as Middle Chalk.

17. The 1:250 000 scale reconnaissance soil map of the area (SSEW, 1983) shows the majority of the site to comprise soils of the Charity 2 Association which are briefly descibed as calcareous fine silty soils over chalk or chalk rubble on valley sides, sometimes shallow. Well drained flinty fine silty soils in valley bottoms. The northwest and southeast corners of the site are mapped as Hornbeam 2 Association soils which are briefly descibed as deep fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some well drained fine loamy and fine silty over clayey soils, some being very flinty.

18. During the current detailed survey two main soil types were encountered.

Soil Type I

19. Soil Type I occurs on the valley floor and on the lower slopes. Profiles typically comprise calcareous, moderately stony heavy clay loam (occasionally heavy silty clay loam) topsoils over calcareous, very stony permeable clay or silty clay.

Soil Type II

20. Soil Type II occurs midslope ascending towards the crests. Profiles typically comprise calcareous moderately stony heavy clay loam (occasionally heavy silty clay loam) topsoils immediately over chalk. Above 70cm the chalk is weathered and contains approximately 55% hard angular chalk pieces. Below this depth the hard chalk increases to 80%.

AGRICULTURAL LAND CLASSIFICATION

21. 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.

22. 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

23. Land mapped as subgrade 3b occurs over the majority of the site. It corresponds to the soils described in paragraphs 18 and 19 where topsoil stone is in excess of 16% (>2cm) and slopes are greater than 7°. On the valley floor and lower slopes (<7°) land is restricted to this grade due to topsoil stone in excess of 16%. Stones act as an impediment to cultivation, harvesting and crop growth, cause a reduction in the available water capacity of a soil, and can increase production costs by causing extra wear and tear to implements and tyres. Slopes in the range 7°-11° reduce the safe and efficient use of farm machinery.

Grade 4

24. Land mapped as grade 4 occurs in a small area in the northeast of the site where slopes exceed 11 ° considerably reducing the safe and efficient use of farm machinery

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SOURCES OF REFERENCE

British Geological Survey (1990) *Sheet No. 238, Aylesbury, 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 4, Eastern England.* SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Eastern 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

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE I

Topsoil	Texture	:	heavy clay loam, occasionally heavy silty clay loam
	Colour	:	10YR4/2
	Mottles	:	-----
	Concretions	:	-----
	Stone	:	20% total, 18% >2cm flints, few hard chalks.
	Roots	:	many, fine and very fine
	$CaCO^3$	:	strongly calcareous
	Depth	:	38cm
	Boundary	:	smooth/clear
Upper subsoil	Texture	:	clay, or silty clay
	Colour	:	7.5YR4/6
	Mottles	:	-----
	Concretions	:	-----
	Stone	:	40% flints
	Structure	:	too stony
	Consistence	:	firm/friable
	Structural condition	:	moderate
	Pores	:	>0.5%
	Roots	:	common, fine and very fine
	$CaCO^3$	:	strongly calcareous
	Depth	:	80cm
	Boundary	:	smooth/diffuse
Lower subsoil	Texture	:	silty clay
	Colour	:	7.5YR4/6
	Mottles	:	-----
	Concretions	:	-----
	Stone	:	65% flints
	Structure	:	too stony
	Consistence	:	firm
	Structural condition	:	-----
	Pores	:	>0.5%
	Roots	:	common, fine and very fine
	$CaCO^3$	:	strongly calcareous
	Depth	:	110cm

Wetness Class: I

SOIL TYPE II

Topsoil	Texture	:	heavy clay loam, occasionally heavy silty clay loam
	Colour	:	10YR4/2+10YR4/3
	Mottles	:	-----
	Concretions	:	-----
	Stone	:	25% total. 18% >2cm--12% hard chalks, 6% flints
	Roots	:	many, fine and very fine
	$CaCO^3$	:	strongly calcareous
	Depth	:	35cm
	Boundary	:	smooth/sharp
Subsoil	Texture	:	soft chalk
	Colour	:	10YR8/1
	Mottles	:	-----
	Concretions	:	-----
	Stone	:	35-70cm-55% small medium and large hard chalks 70-110cm-80% large and very large angular hard chalks
	Roots	:	Occasional small wedges topsoil to 65cm with many fine and very fine roots. Few roots in soft chalk and round chalk stones to 70cm. None observed below 70cm.
	Depth	:	110cm
Wetness Class:			I