Oaklands College, St. Albans, Hertfordshire

Agricultural Land Classification & Soil Physical Characteristics Report

November 1997

Resource Planning Team
Eastern Region
FRCA Cambridge

RPT Job Number: 64/97
MAFF Ref.: EL18/2539
LURET Job No:ME3WP4J

AGRICULTURAL LAND CLASSIFICATION & SOIL PHYSICAL CHARACTERISTICS REPORT

Oaklands College, St. Albans, Hertfordshire

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 73.6 ha of land at Oaklands College, St. Albans in Hertfordshire. The survey was carried out during September and October 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 planning application by St. Albans Sand and Gravel Co. Ltd. to extract mineral from the site. 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 a variety of land uses were on the site in keeping with an agricultural education centre. These included permanent grass and grass leys, wheat and maize stubble, potatoes and soft fruits. 'Other' land includes playing fields, houses, agricultural buildings, roads, golf course management area and tree and shrub nursery plots.

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
2	21.3	32.8	29.0
3a	17.3	26.7	23.5
3b	26.3	40.5	35.7
Other land	8.7	N/A	11.8
Total surveyed area	64.9	100	-
Total site area	73.6	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 65 borings and 6 soil pits was described.

8. The site has been graded almost equally between grades 2, 3a and 3b. Grade 2 land (very good quality agricultural land) is mapped in three locations on the site. The main limitation to this land is slight droughtiness and to a lesser extent, wetness and workability also acts as a limitation. Subgrade 3a land (good quality agricultural land) is mapped in two areas and the main limitation is one of moderate droughtiness. Subgrade 3b land (moderate quality agricultural land) is mapped in five areas, a majority of which are limited by wetness and workability constraints. Two small areas (adjacent to North Drive and to the south of East Drive are equally limited by topsoil stone and droughtiness. The area to the north of Oaklands Lane has been disturbed and may have been affected by landfill.

FACTORS INFLUENCING ALC GRADE

Climate

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

10. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	TL 186078
Altitude	m, AOD	80
Accumulated Temperature	day°C (Jan-June)	1406
Average Annual Rainfall	mm	666
Field Capacity Days	days	137
Moisture Deficit, Wheat	mm	110
Moisture Deficit, Potatoes	mm	102
Overall climatic grade	N/A	Grade 1

11. 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.

12. 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.

13. The combination of rainfall and temperature at this site mean there is no climatic limitation to the agricultural use of the land. The climatic grade is assessed as grade 1.

Site

14. The site is situated to the north of Hatfield Road (A1057) between St. Albans and Hatfield. The site is very gently undulating with low ridges and shallow valley features. Overall the land slopes in an easterly direction. The land falls from the highest point of 89m AOD in the south west corner to about 73 m AOD along Boggymead Spring on the south east boundary. Nowhere on the site does gradient or relief impose any restriction to the agricultural use of the land.

Geology and soils

15. The 1:50 000 scale drift edition geology map (Geological Survey of Great Britain, 1978) shows the majority of the site to be covered by glacial boulder clay which overlays Cretaceous Upper Chalk. To the east of Boggymead Spring and straddling Sandpit Lane in the north glacial gravels with Bunter Pebbles are mapped.

16. The 1:250 000 reconnaissance scale soils map (Soil Survey of England & Wales, 1983) of the area shows three soil associations mapped across the site. The main soil association which is mapped over the central and western parts comprises the Hornbeam 3 Association. This is derived from chalky till and is briefly described as; 'Deep fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy over clayey soils which may be calcareous in places.

17. Along the south eastern boundary Hamble 2 Association soils are mapped. These are described as deep stoneless well drained silty soils and similar soils affected by groundwater. These soils are derived from aeolian drift and may be over gravel locally.

18. In the north of the site a small area of Charity 2 Association soils have been mapped. These are derived from flinty and chalky drift over chalk and are described as well drained flinty fine silty soils in valley bottoms. Calcareous fine silty soils over chalk or chalk rubble on valley sides, sometimes shallow.

19. During the detailed survey of the site four soil types have been found with a complex distribution which reflects the nature of deposition.

Soil type I

20. This soil type occurs in three areas on the site. These soils are found on the top of the ridge in the north of the site, in a band to the north east of Oaklands College and between Hatfield Road and the College.

21. These soils typically comprise very slightly stony non calcareous medium clay loam or heavy clay loam topsoil over clay which is slowly permeable immediately below the topsoil. Subsoils are gleyed and mottled typically within 35 cm and are stoneless or slightly stony and non calcareous throughout.

Soil Type II

22. The second soil type is found in three areas on the site, mainly in the south east corner, but also a small area to the south of East Drive and in another small area to the south of the ridge in the north.

23. This soil type typically comprises very slightly stony, non calcareous medium clay loam (occasionally medium silty clay loam or medium sandy silt loam) to 30 cm depth. The upper subsoil consists of medium silty clay loam or medium clay loam (occasionally heavy clay loam or heavy silty clay loam) which is typically stoneless or very slightly stony and non calcareous. Lower subsoils are typically slightly heavier, with heavy silty clay loam or clay. These are stoneless and tend to show signs of drainage impedance, with gleying and mottling being common. Profiles are either slowly permeable at depth or affected by groundwater.

Soil type III

24. This soil type has been divided into two depending on the depth to stonier horizons. Soil type IIIa tends to have less stony upper subsoils whilst soil type IIIb tends to have stony subsoils throughout.

Soil Type IIIa

25. This is a transitional soil type and occurs in three areas to the north and east of the College. Soils typically comprise very slightly to slightly stony medium clay loam over a similar or slightly heavier (including medium silty clay loam or heavy clay loam) upper subsoil. Soils become impenetrable to auger typically between 50/70 cm where dry gravely soils are encountered. Some soils exhibit evidence of gleying and mottling which is likely to indicate fluctuating groundwater levels. In localised instances a lower subsoil of clay is encountered which is slowly permeable typically between 45/50 cm.

Soil type IIIb

26. This soil type occurs immediately to the south of Sandpit Lane and in an area to the east of the College. These profiles typically comprise medium sandy silt loam or medium clay loam topsoils which are slightly or occasionally moderately stony. The depth is typically 25 cm under grass and 30 cm in arable cultivation. Upper subsoils are similar but are often impenetrable to auger. The maximum depth of augering was 50 cm and frequently shallower. Pits have revealed a very stony subsoil with 40/60% flints in a medium sandy silt loam or medium sandy loam matrix. Soils are typically free draining but in some instances show signs of being affected by groundwater.

Soil type IV

27. This soil type occurs on the small area to the north of Sandpit Lane and has been disturbed. Topsoils comprise slightly to moderately stony medium clay loam over a mixed subsoil which ranges from medium clay loam through to clay of similar stone content. Profiles typically become impenetrable to auger between 50/60 cm. Profiles exhibit evidence of poor drainage characteristics at a shallow depth and occasionally have bricks and other debris in the subsoil.

AGRICULTURAL LAND CLASSIFICATION

28. 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.

29. 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

30. Grade 2 land has been mapped in association with Soil Type II and the non clayey variant of Soil Type IIIa as described in paragraphs 23 and 25 respectively.

31. Soil Type II has been assessed typically as Wetness Class II (occasionally I) with a slowly permeable layer at depth or evidence that groundwater affects the lower part of the profile. In combination with the fine loamy or fine silty topsoils, this restricts the land to grade 2 because of minor wetness and workability constraints.

32. Soil Type IIIa is limited to this grade due to minor droughtiness limitations. The combination of profile textures and structural condition in combination with the gravely lower subsoils restrict the amount of available water for crop growth sufficiently to exclude the land from a higher grade.

Subgrade 3a

33. The land graded 3a is in association with the majority of Soil Type IIIb described in paragraph 26 above. This land is excluded from a higher grade due to the significantly reduced available water for plant growth due to the occurrence of shallower stonier soils which result in a moderate droughtiness limitation.

34. A small area of land is also graded 3a in conjunction with the clayey variant of Soil Type IIIa. These profiles have been assessed as Wetness Class III with a slowly permeable layer typically encountered at 45/50 cm. Thus this land is limited by a moderate wetness and workability limitation.

Subgrade 3b

35. Subgrade 3b land is largely associated with Soil Type I as described in paragraph 21. Slowly permeable subsoils are encountered immediately below the topsoil and have been assessed as Wetness Class IV. In combination with fine loamy topsoils this reduces 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. Hence this land is excluded from a higher grade.

36. Land is also graded 3b in association with Soil Type IV which is described above in paragraph 27. These profiles have been disturbed and have very mixed subsoils. Profiles have been assessed as Wetness Class IV (occasionally III) which results in this land being excluded from a higher grade due to a significant wetness and workability limitation.

37. Very localised areas of Soil Type IIIb have also been included in this subgrade where the topsoil stone content > 2 cm exceeds 15% of the soil volume. A high stone content acts as an impediment to cultivation, harvesting and crop growth thus excluding this land from a higher grade.

Roger Orpin
Resource Planning Team
Eastern Region
FRCA Cambridge

SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet No. 239, Hertford 1:50 000*
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, Soils of Eastern England.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Eastern England 1:250 000*
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 (22.0 ha)

Topsoil	Texture:	medium clay loam or heavy clay loam
	Colour:	10YR4/3, occasionally 10YR4/2
	Stone:	2 - 8% flints
	Roots:	many fine and very fine
	Boundary form:	abrupt, smooth
	Depth:	25/30 cm
Subsoil	Texture:	clay
	Colour:	10YR 5/4 and 5/3
	Stone:	0 - 5% flints
	Structure:	moderately developed coarse prismatic
	Consistence:	very firm
	Porosity:	<0.5%
	Roots:	common very fine
	Concretions:	few, occasionally many
	Boundary form:	n/a
	Depth:	120 cm
	Comment:	assessed as Wetness Class IV
		mottled and gleyed from 25/30 cm
		typically non calcareous throughout

Soil Type II (11.2 ha)

Topsoil	Texture:	medium clay loam (occasionally medium silty clay loamor medium sandy silt loam)
	Colour:	10YR4/3
	Stone:	3 - 5% flint
	Roots:	many medium, fine and very fine
	Boundary form:	abrupt/wavy
	Depth:	30 cm
Upper Subsoil	Texture:	medium silty clay loam or medium clay loam (occasionally heavy silty clay loam or heavy silty clay loam)
	Colour:	10YR5/5, 6/4, 5/4 and 7.5YR5/4
	Stone:	typically stoneless, occasionally >5% flints
	Structure:	moderately developed very coarse subangular blocky
	Consistence:	friable
	Porosity:	>0.5%
	Roots:	many fine and very fine
	Concretions:	few
	Boundary form:	gradual, wavy
	Depth:	typically 55/70 cm
Lower Subsoil	Texture:	heavy silty clay loam or clay
	Colour:	10YR6/4, 6/3 (occasionally 10YR5/4 and 5/3)
	Stone:	typically stoneless (occasionally >10% 90 cm+)
	Structure:	moderately developed very coarse subangular blocky
	Consistence:	friable/firm
	Porosity:	<0.5% if clay
	Roots:	common/few very fine roots
	Concretions:	common, occasionally few
	Depth:	120 cm
	Comment:	typically assessed as Wetness Class II either due to slowly permeable layer in lower subsoil or affected by groundwater.
		typically non calcareous throughout
		mottling and gleying common in lower subsoil

Soil Type IIIa (11.7 ha)

Topsoil	Texture:	medium clay loam
	Colour:	10YR4/3 (occasionally 10YR4/2, and 10YR3/2)
	Stone:	3 - 10% flints
	Roots:	many fine and very fine
	Boundary form:	abrupt, wavy
	Depth:	typically 30 cm
Upper Subsoil*	Texture:	medium clay loam or medium silty clay loam (occasionally heavy clay loam or sandy clay loam)
	Colour:	10YR5/3, 4/4, 5/4, 6/3 and 6/4
	Stone:	range 0 - 15% flints (typically 5-8%)
	Structure:	moderately developed very coarse subangular blocky
	Consistence:	friable
	Porosity:	>0.5%
	Roots:	many fine and very fine
	Concretions:	few
	Boundary form:	clear wavy
	Depth:	50/70 cm (typically impenetrable to auger below)
Lower Subsoil	Texture:	medium silty clay loam, occasionally clay**
	Colour:	10YR5/5, 5/4, 6/3 and 6/2
	Stone:	40 - 50% flints
	Structure:	too stony
	Consistence:	too stony
	Porosity:	>0.5%
	Roots:	few fine and very fine
	Concretions:	common
	Depth:	120 cm

Comment: *no soil pit dug in this soil type. Information interpolated from adjacent pits. When impenetrable to auger assumed similar stone content to Soil Type IIIb

**where clay occurs in lower subsoil, assessed as similar to clay in Soil Type I. i.e. slowly permeable resulting in Wetness Class III assessment

profiles non calcareous throughout

Soil type IIIb (17.0 ha)

Topsoil	Texture:	medium sandy silt loam or medium clay loam
	Colour:	10YR4/2, occasionally 10YR4/3
	Stone:	typically 8 -12% flints (occasionally 25%+)
	Roots:	many fine and very fine
	Boundary form:	abrupt or clear/wavy
	Depth:	25/30 cm
Upper Subsoil*	Texture:	medium clay loam, medium sandy silt loam
	Colour:	10YR4/4,5/4,6/3 & 6/2
	Stone:	40 -50% flints
	Structure:	too stony
	Consistence:	too stony
	Porosity:	>0.5%
	Roots:	common fine and very fine
	Concretions:	none, occasionally common
	Boundary form:	clear wavy
	Depth:	50/70 cm
Lower Subsoil*	Texture:	medium sandy silt loam or medium sandy loam
	Colour:	10YR6/3, 7/3, 5/5, 5/4 and 5/3
	Stone:	40 -60% flints
	Structure:	too stony
	Consistence:	too stony
	Porosity:	>0.5%
	Roots:	few fine and very fine
	Concretions:	common
	Boundary form:	n/a
	Depth:	120 cm
	Comment:	*subsoil information interpolated from pits as auger borings frequently impenetrable 30/50 cm
		profiles non calcareous throughout
		Profiles assessed as Wetness Class I possibly Wetness Class II where affected by groundwater

Soil type IV (3.1 ha)

No soil pit has been dug in this soil type. Description as in paragraph 28 above.