

**CRETINGHAM GOLF COURSE,  
SUFFOLK**

**Agricultural Land Classification Report  
& Statement of Soil Physical  
Characteristics**

**April 1999**

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Eastern Region  
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**RPT Job Number: 28/99  
MAFF Reference: EL38/02968  
LURET Job No: MLDG02968A**

# AGRICULTURAL LAND CLASSIFICATION REPORT & STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

## CRETINGHAM GOLF COURSE, SUFFOLK

### INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 22.7 ha of land at Cretingham golf course in Suffolk. The survey was carried out during April 1999.
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 an application to extend the existing golf course. 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 most of the agricultural land on site comprised cereal stubble, occasionally undersown with grass, or permanent grassland.

### 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.
7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 23 auger borings and 4 soil pits was described.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area
3a	8.6	38
3b	14.1	62
Total site area	22.7	100

8. Just over one third of the site has been graded 3a (good quality agricultural land) and is restricted to this subgrade by moderate wetness and workability constraints or by moderate droughtiness. The remainder of the site has been assessed as subgrade 3b (moderate quality agricultural land) and is all limited by significant wetness and workability imperfections.

## 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	TM 233 611
Altitude	m, AOD	35
Accumulated Temperature	day°C (Jan-June)	1409
Average Annual Rainfall	mm	626
Field Capacity Days	days	118
Moisture Deficit, Wheat	mm	119
Moisture Deficit, Potatoes	mm	114
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 (AT0, January to June), as a measure of the relative warmth of a locality.

13. The combination of rainfall and temperature at this site mean it is relatively warm and dry. Therefore, the climatic grade for this site has been assessed as 1.

### Site

14. The site comprises three separate areas of land. The northern part of the site slopes gently to the north, east and south from a maximum altitude of 40 m AOD in the west. The lowest altitude of 25 m AOD occurs in the south and south-east extremities. The part of the site which lies just south-east of the golf club buildings slopes very gently towards the south and east, altitudes range from approximately 23 to 29 m AOD. The most southerly part of the site lies adjacent to the river and is flat. Its altitude is approximately 20 m AOD. Nowhere on site do altitude or gradient impose a limitation to the agricultural quality of the land.

## Geology and soils

15. No detailed geology map exists for this site. At a scale of 1:253 440 (Geological Survey of England and Wales, 1931) Sheet 16 (drift edition) maps most of the main (northern) part of the site as boulder clay whilst the southern extremities of this area and the two southern parts of the site are mapped as glacial sand and gravel.

16. On the 1:250 000 reconnaissance scale published soils map, sheet 4, Soils of Eastern England (Soil Survey of England and Wales, 1983) the site is mapped as follows. Most of the northern part of the site is mapped as the Hanslope Association, extending into the Beccles 1 Association on the highest ground in the west. The two southern parts of the site are mapped as the Midelney Association close to the river extending into the Hanslope Association towards their northern extremities. These 3 Associations are briefly described as:

- Hanslope: Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils. Slight risk of water erosion
- Beccles 1: Slowly permeable seasonally waterlogged fine loamy over clayey soils, associated with similar clayey soils
- Midelney: Stoneless clayey soils mostly overlying peat. Soils variably affected by groundwater which is, in places, controlled

17. During the current detailed survey 3 main soil types (the first of which comprises two variants) were identified. The distribution of these is shown on the accompanying soil types map.

### *Soil Type I* (10.5 hectares)

18. Soil Type I occupies the majority of the northern part of the site. Topsoils comprise very slightly stony, non-calcareous heavy clay loams which typically extend to 30 cm depth. Upper subsoils consist of very slightly stony, typically calcareous clay which occasionally contains sandy lenses. Below 50/75 cm depth the lower subsoil is encountered. This lower horizon, which continues to depth, comprises calcareous, very slightly to slightly stony clay. Profiles have been assessed as imperfectly drained.

### *Soil Type Ia* (3.7 hectares)

19. Soil Type Ia is essentially the same as Soil Type I. In this variant topsoils are however naturally calcareous. As this characteristic improves the workability of the soil, this resource should not be mixed with the adjacent non-calcareous topsoils.

*Soil Type II (4.9 hectares)*

20. Soil Type II is non-calcareous throughout. Topsoils comprise very slightly stony (occasionally slightly stony) medium sandy loams which extend to 30/35 cm depth. Upper subsoils are similarly stony and mostly comprise medium sandy loam textures. Within this horizon broken iron pan fragments are occasionally encountered. Below 50/70 cm the lower subsoil occurs. Comprising very slightly to slightly stony loamy medium sand (with occasional medium sand lenses), this horizon typically extends to depth. Occasionally however, clay is encountered below 70/100 cm. Profiles are typically well drained.

*Soil Type III (3.6 hectares)*

21. Soil Type III occurs on the lowest lying, flat land adjacent to the river. Topsoils comprise non-calcareous and calcareous heavy clay loam or clay, they are stoneless and typically extend to 20 cm (occasionally to 30 cm). Upper subsoils are stoneless, typically non-calcareous clay, often with a very plastic consistency. Below 50/70 cm plastic clay either continues to depth or occasionally merges into a mix of clay and fibrous peat which in turn merges into peat. These profiles have been assessed as poorly drained because high groundwater levels are considered likely to persist for much of the year.

## **AGRICULTURAL LAND CLASSIFICATION**

22. 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.

23. 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*

24. The subgrade 3a land on site occurs in two situations. Firstly it corresponds with Soil Type Ia (described in paragraph 19). Within this soil type subsoils are strongly gleyed and slowly permeable. Profiles have therefore been assessed as Wetness Class III. This factor, combined with the naturally calcareous heavy clay loam topsoils imposes a moderate wetness and workability constraint to the land, thus limiting it to subgrade 3a.

25. Secondly, subgrade 3a land corresponds with Soil Type II (described in paragraph 20). Within this soil type the combination of coarse loamy over medium sandy soils (occasionally clayey at depth) and profile stone contents mean the soil has a moderately limited ability to retain water for crop growth. The land therefore suffers from a moderate droughtiness constraint which precludes it from a higher grade.

*Subgrade 3b*

26. The 3b land on site corresponds to Soil Types I and III (described in paragraphs 18 and 21 respectively). Within Soil Type I profiles have been assessed as Wetness Class III due to the gleyed and slowly permeable subsoil.

27. Within Soil Type III subsoils are gleyed and slowly permeable throughout and typically become very wet and plastic at moderate depth. As this degree of wetness is likely to occur for much of the year, due to high ground water levels and the flatness of the land, this area has been assessed as Wetness Class IV.

28. The above wetness classes in combination with the heavy textured topsoils present impose significant wetness and workability constraints which restrict the land corresponding to both Soil Types (I and III) to subgrade 3b.

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## SOURCES OF REFERENCE

Geological Survey of England and Wales (1931) *Sheet 16, drift edition, 1:253 440 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) *Sheet 4, Soils of Eastern England, 1:250 000 scale.*  
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
	Colour	2.5Y and 10YR 4/2
	Stone content	very slightly stony, comprising small and medium angular flints
	Roots	common very fine and fine
	Calcium carbonate	non-calcareous
	Boundary form	abrupt, smooth/wavy
	Depth	typically 30 cm
Upper subsoil	Texture	clay with occasional sandy clay loam or sandy clay lenses
	Colour	2.5Y 5/3 (occasionally 5/2 or 5/4) with common distinct ochreous and grey mottles (10YR 5/6 and 5Y 6/1, 6/2 respectively).
	Stone content	very slightly stony, mix of small and medium flints and chalk pieces
	Structure	moderately developed coarse angular blocky and weakly developed coarse and very coarse subangular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	common very fine and fine
	Calcium carbonate	typically calcareous
	Concretions	few manganese concretions
	Boundary form	abrupt/clear, wavy
	Depth	50/75 cm
Lower subsoil	Texture	clay (chalky boulder clay)
	Colour	5Y 5/1, 5/2, 5/3, 6/2 and 6/3 with common distinct ochreous mottles (10 YR 5/5 and 5/6)
	Stoniness	very slightly to slightly stony, mostly small and medium chalk pieces with some flints.
	Structure	weakly to moderately developed very coarse angular blocky and subangular blocky.
	Consistence	firm to very firm
	Porosity	<0.5%
	Roots	common very fine and fine
	Calcium carbonate	calcareous
	Concretions	occasional manganese concretions
	Depth	120 cm

Notes: Profiles have been assessed as Wetness Class III

#### Soil Type Ia

Notes: Soil type Ia is essentially the same as Soil Type I, but is differentiated due to its calcareous topsoil which imparts to it significant workability benefits.

Throughout this soil type, profiles have been assessed as Wetness Class III.

## Soil Type II

Topsoil	Texture	medium sandy loam
	Colour	typically 10YR 4/2
	Stone content	very slightly stony (occasionally slightly stony)
	Roots	abundant very fine and fine roots
	Calcium carbonate	non-calcareous
	Boundary form	abrupt, smooth/wavy
	Depth	30/35 cm
Upper subsoil	Texture	medium sandy loam (occasionally with broken iron pan pieces)
	Colour	typically 10YR 4/4, 5/4, 5/3 occasionally with common distinct ochreous mottles (10YR and 7.5YR 4/6 and 5/6)
	Stone content	typically very slightly stony
	Structure	weakly to moderately developed coarse and very coarse subangular blocky
	Consistence	friable
	Porosity	>0.5%
	Roots	many very fine and fine
	Calcium carbonate	non-calcareous
	Concretions	none
	Boundary form	gradual, wavy
Depth	50/70 cm	
Lower subsoil	Texture	loamy medium sand (occasionally with broken iron pan pieces), becoming variable below 70/100 cm and including medium sand, sandy clay loam and clay.
	Colour	typically 10YR 4/4 and 5/4 occasionally with common distinct ochreous mottles (10YR 5/6). Where clayey, 2.5Y 6/1, 6/2 with common prominent ochreous mottles (10YR and 7.5YR 5/6 and 5/8)
	Stoniness	very slightly to slightly stony
	Structure	weakly to moderately developed coarse and very coarse subangular blocky
	Consistence	very friable to friable
	Porosity	typically >0.5%
	Roots	common becoming few very fine and fine
	Calcium carbonate	non-calcareous
	Concretions	none
	Depth	120 cm

Notes: Profiles are typically well drained (Wetness Class I)

### Soil Type III

Topsoil	Texture	heavy clay loam or clay
	Colour	10YR 4/2
	Stone content	stoneless
	Roots	abundant very fine and fine and some medium.
	Calcium carbonate	typically non-calcareous, occasionally calcareous
	Boundary form	abrupt, smooth
	Depth	20 cm (occasionally to 30 cm)
Upper subsoil	Texture	plastic clay
	Colour	2.5Y 5/2, 5/3, 6/1 and 6/2 with common to many prominent ochreous mottles (typically 7.5YR 5/6)
	Stone content	stoneless
	Structure	moderately developed coarse angular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	common very fine and fine
	Calcium carbonate	typically non-calcareous
	Concretions	few manganese nodules
	Boundary form	clear, smooth
	Depth	50/70 cm
Lower subsoil	Texture	wet plastic clay (occasionally becoming a mix of clay and fibrous peat or peat at depth)
	Colour	5Y 6/1 and 5/1 with many prominent ochreous mottles (7.5YR 4/6 and 5/6)
	Stoniness	stoneless
	Structure	strongly developed coarse and very coarse angular blocky.
	Consistence	firm
	Porosity	<0.5%
	Roots	common very fine
	Calcium carbonate	typically non-calcareous
	Concretions	few manganese nodules
Depth	120 cm	

Notes: These profiles have been assessed as Wetness Class IV.