

**FROGS HALL FARM,
TAKELEY, ESSEX.**

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

May 1999

**Resource Planning Team
Eastern Region
FRCA Cambridge**

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AGRICULTURAL LAND CLASSIFICATION REPORT & STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

FROGS HALL FARM, TAKELEY, ESSEX.

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 36 ha of land at Frogs Hall Farm, Takeley in Essex. The survey was carried out during May 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 by RMC Aggregates to extract sand and gravel from the site for use in the construction of the nearby A120 dual carriageway. After the mineral extraction it is proposed to restore part of the site agricultural land. The remainder is to comprise an irrigation reservoir. This survey supersedes previous ALC information for this land, namely the Essex Minerals Subject Plan, RPT job number C/9/87.
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 site comprised growing crops of wheat, beans and linseed. The area mapped as 'Other land' comprises a wide tree lined green lane in the northern half of the site.

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	8.2	23	23
3a	26.9	77	75
Other land	0.9	N/A	2
Total surveyed area	35.1	100	98
Total site area	36.0	-	100

7. The fieldwork was conducted at an average density of one auger boring per hectare. A total of 38 auger borings and 4 soil pits was described.

8. Most of the site has been graded 3a (good quality agricultural land) and is limited to this subgrade by moderate wetness and workability constraints. The remainder of the site has been assessed as grade 2 (very good quality agricultural land) and is typically equally limited by minor wetness and workability and minor droughtiness 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	TL 585 225
Altitude	m, AOD	90
Accumulated Temperature	day°C (Jan-June)	1379
Average Annual Rainfall	mm	618
Field Capacity Days	days	119
Moisture Deficit, Wheat	mm	112
Moisture Deficit, Potatoes	mm	105
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 that it is relatively warm and dry. The site suffers no climatic limitation and is therefore of climatic grade 1.

Site

14. The site is located to the north-east of Takeley. To the west it adjoins an unclassified road which runs from Bambers Green to the A120 east of Takeley and to the east it abuts the River Roding. The northern and southern boundaries of the site adjoin open fields. The site

slopes gently from a maximum altitude of approximately 98 m AOD in the west to 90 m AOD in the east. Neither altitude nor gradient impose any limitation to the agricultural land quality.

Geology and soils

15. At a scale of 1:50 000 the geology map, sheet 222 (British Geological Survey [England and Wales], 1990) shows boulder clay in the west of the site and a narrow band adjacent to the River Roding is mapped as alluvium. Between the boulder clay and alluvium a band of head, corresponding to approximately half the site area, is mapped.

16. The Soils Survey of England and Wales have mapped the area on two occasions, at 1:63 360 in 1968 and at the reconnaissance scale of 1:250 000 in 1983.

17. The former map depicts soils of the Hanslope Association in the west and describes the association as comprising calcareous gley soils. Soils of the Chelmer Association, described as a gleyed brown earth, are mapped in the east.

18. The reconnaissance scale map depicts the whole site as the Hanslope Association which is briefly described as slowly permeable calcareous soils with some non-calcareous clayey soils.

19. The current detailed survey identified 4 main soil types.

Soil Type I (16.4 ha)

20. Soil Type I occurs on the mid and lower slopes in the north-east and south of the site. Topsoils comprise very slightly stony clay or heavy clay loam (occasionally medium clay loam) and extend to 25/30 cm. Upper subsoils are very slightly stony and typically comprise clay (occasionally heavy clay loam). Below 50/60 cm, a very slightly stony, typically gleyed and slowly permeable clay lower subsoil is encountered, which typically extends to depth. Occasionally a stony horizon, impenetrable to auger, is encountered at 75/90 cm. These profiles are non-calcareous throughout and have typically been assessed as moderately well drained.

Soil Type II (9.5 ha)

21. Soil Type II occurs in three small discrete areas in the north, middle and south of the site. Topsoils are non-calcareous, very slightly stony and comprise clay or heavy clay loam textures; they extend to 25/30 cm depth. Upper subsoils mostly comprise non-calcareous clay, are typically very slightly stony (occasionally slightly to moderately stony) and extend to 65/75 cm. Lower subsoils comprise calcareous clay which contains 1–5% small chalk pieces and extends to depth. Profiles have typically been assessed as moderately well drained, occasionally imperfectly drained.

Soil Type III (5.5 ha)

22. Soil Type III occurs on the highest ground in the north-west of the site. Profiles are naturally calcareous throughout (containing more than 1% CaCO₃). Topsoils are very slightly stony (containing a mix of flints and chalk pieces), comprise clay textures and extend to

25/30cm. Subsoils comprise clay which contains 1-5% chalk pieces and the occasional flint. The subsoil is typically gleyed from above 40 cm and is slowly permeable at moderate depth. Profiles have therefore been assessed as imperfectly drained.

Soil Type IV (4.6 ha)

23. Soil Type IV occurs in a band which runs eastwards across the site starting just north of Frogs Hall Farm. Topsoils are 30 cm deep, typically non-calcareous, very slightly stony and comprise medium clay loam, heavy clay loam or occasionally clay textures. Upper subsoils extend to 40/60 cm, are very slightly to slightly stony, typically non calcareous and variable in texture, ranging from sandy clay loam to clay. Lower subsoils are typically non-calcareous, slightly to moderately stony, and typically comprise heavy clay loam or clay textures. They become impenetrable to auger at 50/80 cm. Pit information indicates that the impenetrable horizon is moderately to very stony but only 15 to 20 cm thick. Below this horizon very slightly stony medium sandy loam merges into loamy medium sand and becomes moderately stony at depth. Profiles have typically been assessed as well drained, occasionally moderately well drained.

AGRICULTURAL LAND CLASSIFICATION

24. 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.

25. 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

26. The grade 2 land on site corresponds with most of Soil Type IV (described in paragraph 23) and with parts of Soil Type I (described in paragraph 20) where due to better drainage or lighter topsoil textures, wetness and workability constraints do not impose an overriding limitation. Within both of these soil types the combination of profile textures and stone contents mean the soil profile has a slightly limited ability to retain water for crop growth. The land therefore suffers from a minor droughtiness constraint which restricts it to grade 2.

27. The majority of the grade 2 land is equally limited by wetness and workability constraints. The combination of fine loamy topsoil textures with the moderately well drained or well drained profiles (assessed as Wetness Class II or I) imposing minor wetness and workability constraints which preclude the land from a higher grade.

Subgrade 3a

28. Land mapped as subgrade 3a corresponds with Soil Types II and III (described in paragraphs 21 and 22) and the majority of Soil Type I (described in paragraph 20). Where land of subgrade 3a corresponds with Soil Types II or I, profiles have typically been assessed as Wetness Class II. This Wetness Class, in combination with the non-calcareous fine loamy

or clayey topsoils, imposes a moderate wetness and workability constraint and thus precludes the land from a higher grade.

29. Soil Type III profiles have typically been assessed as Wetness Class III. This assessment in combination with the calcareous fine loamy or clayey topsoils also imposes a moderate wetness and workability imperfection which restricts the land to subgrade 3a.

30. Within the area of land mapped as subgrade 3a, occasional poorer profiles (corresponding with the Wetness Class III profiles referred to in paragraph 28) and very occasional better profiles occur. However, as their occurrence is sporadic, they do not form discrete mapable units and cannot therefore be delineated separately at the scale of this survey.

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SOURCES OF REFERENCE

British Geological Survey (1990) *Sheet No. 222, Great Dunmow*.
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 (1968) *Sheet 148, Saffron Walden*.
SSEW: Harpenden.

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*
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	typically clay or heavy clay loam (very occasionally medium clay loam)
	Colour	typically 10YR 4/2 or 4/3
	Stone content	very slightly stony
	Roots	few very fine and fine
	Calcium carbonate	non-calcareous
	Boundary form	abrupt, smooth
	Depth	25/30 cm
Upper subsoil	Texture	typically clay, occasionally heavy clay loam
	Colour	typically 10YR 5/4, occasionally 10YR 4/3, 6/4 or 2.5Y 5/4, 5/3.
	Stone content	very slightly stony
	Structure	typically moderately developed medium and coarse sub-angular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	common very fine and fine
	Calcium carbonate	non-calcareous
	Concretions	few manganese
	Boundary form	clear, irregular
	Depth	typically to 50/60 cm
Lower subsoil	Texture	clay
	Colour	variable, most commonly 10YR and 2.5YR 5/3, 5/4, 6/3 and 6/4
	Mottles	typically common distinct ochreous mottles, 10YR 5/6
	Stoniness	typically very slightly stony, occasionally becoming moderately/very stony and impenetrable to auger at 75/90 cm
	Structure	strongly developed medium and coarse angular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	few very fine
	Calcium carbonate	non-calcareous
	Concretions	few manganese
	Depth	120 cm

Notes: Profiles have typically been assessed as Wetness Class II

Soil Type II

Topsoil	Texture	clay or heavy clay loam
	Colour	2.5Y or 10YR 4/2
	Stone content	typically very slightly stony
	Roots	few very fine and fine
	Calcium carbonate	non-calcareous
	Boundary form	abrupt, wavy
	Depth	25/35 cm
Upper subsoil	Texture	clay
	Colour	typically 10YR 5/4, occasionally 10YR 4/4 or 6/4
	Mottles	occasionally common distinct ochreous mottles, 10YR 5/6
	Stone content	typically very slightly stony, occasionally slightly to moderately stony
	Structure	typically moderately developed coarse and medium sub-angular blocky becoming coarse angular blocky at bottom of horizon
	Consistence	firm
	Porosity	<0.5%
	Roots	few very fine
	Calcium carbonate	typically non-calcareous
	Concretions	few manganese
	Boundary form	clear, irregular
	Depth	typically 65/75 cm
Lower subsoil	Texture	clay
	Colour	2.5Y 6/3, 6/4 and 10YR 5/4, 4/4
	Mottles	typically common distinct ochreous mottles, 10YR 5/6 and 5/8
	Stoniness	very slightly stony, comprising 1–5% small chalk pieces
	Structure	moderately developed coarse sub-angular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	few very fine
	Calcium carbonate	calcareous
	Concretions	none
Depth	120 cm	

Notes: Profiles are typically Wetness Class II, very occasionally Wetness Class III

Soil Type III

Topsoil	Texture	clay
	Colour	typically 10YR or 2.5YR 4/3, occasionally 10YR 4/2
	Stone content	very slightly stony, comprising a mix of chalks and flints
	Roots	common very fine and fine
	Calcium carbonate	calcareous
	Boundary form	abrupt, wavy
	Depth	25/30 cm
Subsoil	Texture	clay
	Colour	2.5 Y 6/3, 6/4 and 5/4, often becoming 5Y 6/1, 6/2 or 7/1 at depth.
	Mottles	typically common distinct ochreous mottles 10YR 5/6 or 6/6
	Stone content	very slightly stony, comprising 1–5% small chalk pieces + occasional flints
	Structure	moderately developed coarse angular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	common very fine
	Calcium carbonate	calcareous
	Concretions	typically few manganese, decreasing with depth
	Depth	120 cm

Notes: These profiles have typically been assessed as Wetness Class III

Soil Type IV

Topsoil	Texture	medium clay loam, heavy clay loam (occasionally clay)
	Colour	typically 10YR 4/2
	Stone content	very slightly stony
	Roots	many very fine and fine
	Calcium carbonate	non-calcareous
	Boundary form	smooth, abrupt
	Depth	30 cm
Upper subsoil	Texture	variable, sandy clay loam to clay
	Colour	variable, including 2.5Y 4/6 and 6/2, and 10YR 4/4, 4/3, 5/3 and 6/3
	Mottles	very occasionally common distinct ochreous mottles, 10YR 5/6
	Stone content	very slightly to slightly stony
	Structure	moderately developed coarse sub-angular blocky
	Consistence	firm
	Porosity	<0.5%
	Roots	many very fine
	Calcium carbonate	non-calcareous
	Concretions	none
	Boundary form	clear wavy
	Depth	40/60 cm
Lower subsoil 1	Texture	variable, typically heavy clay loam or clay
	Colour	10YR 6/3, 5/4 and 4/4
	Mottles	occasionally common distinct ochreous mottles, 10YR 5/6
	Stoniness	slightly to very stony
	Structure	too stony to assess
	Consistence	firm
	Porosity	<0.5%
	Roots	many very fine
	Calcium carbonate	non-calcareous
	Concretions	none
	Depth	55/60 cm at pit, but variable across the soil type, range 55–95 cm.
Lower subsoil 2 (info from pit only)	Texture	medium sandy loam merging into loamy medium sand
	Colour	10YR 4/5 and 5/5, becoming 5/6
	Stoniness	very slightly stony increasing to moderately stony at depth
	Structure	moderately developed coarse sub-angular blocky, becoming a mix of moderately developed coarse angular blocky and single grain
	Consistence	friable, becoming very friable
	Porosity	initially <0.5%, becoming >0.5%
	Roots	many, decreasing to few, very fine
	Calcium carbonate	non-calcareous
	Concretions	none
	Depth	120 cm

Notes: Profiles are typically Wetness Class I, occasionally Wetness Class II.