

**Knotwood Farm and Furtho Pit
Old Stratford, Northamptonshire.**

**Agricultural Land Classification
and Soil Physical Characteristics
Report.**

December 1998

**Resource Planning Team
Eastern Region
FRCA Cambridge**

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AGRICULTURAL LAND CLASSIFICATION and SOIL PHYSICAL CHARACTERISTICS REPORT.

Knotwood Farm and Furtho Pit, Old Stratford, Northamptonshire.

INTRODUCTION

1. This report presents the findings of a detailed, Agricultural Land Classification (ALC) survey of 58.2 ha of land at Knotwood Farm and Furtho Pit, Old Stratford, Northamptonshire. The survey was carried out during December 1998.
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 for a proposed 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 the land on the site was under permanent pasture apart from one small field in the east which was under maize stubble. The areas mapped as 'Other land' include hard tracks and roads, the farm house and out buildings, and a commercial company compound.

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	5.5	10	9
3a	9.6	17	17
3b	32.2	59	56
4	7.8	14	13
Other land	3.1	N/A	5
Total surveyed area	55.1	100	95
Total site area	58.2	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 55 borings and 4 soil pits was described.

8. Land mapped as grade 2 (very good quality agricultural land) occurs in two small areas in the southeast of the site and is restricted to this grade due to a minor wetness and workability limitation.

9. Land mapped as subgrade 3a (good quality agricultural land) occurs in four small areas across the site and is restricted to this subgrade due to a moderate wetness and workability limitation.

10. Land mapped as subgrade 3b (moderate quality agricultural land) covers over half the site, predominating in the north, and in a small area in the east. In the main it is restricted to this subgrade due to a more severe wetness and workability limitation. Land in the northeast (one field) adjacent to the A508 road is limited to this subgrade due to a micro-relief limitation.

11. Land mapped as grade 4 (poor quality agricultural land) occurs in the eastern part of the site in the area of an infilled sand pit. It is restricted to this grade due to disturbance and poor restoration.

FACTORS INFLUENCING ALC GRADE

Climate

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

13. 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	SP 777 421
Altitude	m, AOD	70
Accumulated Temperature	day°C (Jan-June)	1412
Average Annual Rainfall	mm	656
Field Capacity Days	days	144
Moisture Deficit, Wheat	mm	107
Moisture Deficit, Potatoes	mm	99
Overall climatic grade	N/A	Grade 1

14. 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.

15. 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.

16. The combination of rainfall and temperature impose no overall limitation to land quality at this site and hence it has a climatic grade of 1.

Site

17. Approximately one fifth of the site lies on the eastern side of the A508 with the remainder being on the western side of the road

18. The eastern part of the site is bounded on three sides by roads and in the north by the Dogsmouth Brook. The land is generally level but is uneven in the central part due to an infilled sand pit. A commercial company compound is situated in the north central part.

19. The western part of the site is bounded in the east by the A508 road, the south by the A5(T) road, with remaining boundaries to open farmland. The land slopes in a northeasterly direction, from an approximate height of 75 m AOD on the southeastern boundary, to the Dogsmouth Brook at an approximate height of 68 m AOD. The land rises from the brook to the northeastern boundary at an approximate height of 75 m AOD. The field adjacent to the A508 road in the northeast part of the site consists of an infilled borrow pit which exhibits severe micro-relief problems.

Geology and soils

20. The published 1:63 360 scale geology map for the area (BGS, 1969) shows a complex geological pattern. The majority of the area is mapped as boulder clay with glacial sands and gravels in two areas in the east. Alluvium and 2nd terrace gravels are mapped along the course of the Dogsmouth Brook, with a small area of head approximately in the centre of the site.

21. The published 1:250 000 scale reconnaissance soil map (SSEW 1983) shows the site to comprise soils of the Hanslope Association which are briefly described as, slowly permeable calcareous clayey soils with occasionally a non-calcareous variant.

22. During the current survey four main soil types were encountered.

Soil Type I

23. Soil Type I occurs in a small area south of the track leading to Knotwood Farm and in the southeast corner of the site. Profiles typically comprise slightly stony, non-calcareous medium clay loam topsoils over moderately stony, calcareous heavy clay loam or clay upper subsoils. Lower subsoils comprises slightly stony, calcareous slowly permeable clay at approximately 70 cm depth.

Soil Type II

24. Soil Type II occurs in four small areas across the site. Profiles typically comprise very slightly stony, calcareous heavy clay loam topsoils over slightly stony, calcareous heavy clay

loam or clay upper subsoils. Lower subsoils comprise calcareous, slightly stony slowly permeable clay at 45/50 cm depth.

Soil Type III

25. Soil Type III occurs in the western part of the site and a small area in the east. Profiles typically comprise very slightly stony, calcareous heavy clay loam or clay topsoils over stoneless, calcareous slowly permeable clay at 35/40 cm depth.

Soil Type IVa

26. Soil Type IVa occurs in the northeast of the site. It is an infilled borrow pit with very variable profiles. These comprise a mix of variably calcareous, slightly stony medium sandy loam, sandy clay loam, and occasionally sandy clay occurring in any order within the profile.

Soil Type IVb

27. Soil Type IVb occurs in the east of the site and is in the area of an infilled sandpit and surrounding workings. Profiles are disturbed, with compacted clay throughout containing clinker, stones and pieces of brick.

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.

Grade 2

30. Land mapped as grade 2 occurs in two small areas in the southern part of the site and corresponds to the soils described in paragraph 23. The fine loamy over clayey soils have been assessed as Wetness Class II and the combination of these two factors restricts the land to this grade due to a minor wetness and workability limitation.

Subgrade 3a

31. Land mapped as subgrade 3a occurs in four small areas across the site and corresponds to the soils described in paragraph 24. The fine loamy over clayey soils have been assessed as Wetness Class III and the combination of these two factors restricts the land to this subgrade due to a moderate wetness and workability limitation.

Subgrade 3b

32. Land mapped as subgrade 3b occurs in the western part of the site and a small area in the east and corresponds in the main to the soils described in paragraph 25. The fine loamy and clayey overclay soils have been assessed as Wetness Class IV and the combination of these two factors restricts the land to this subgrade due to a more severe wetness and workability limitation.

33. Land in the northeast part of the site, with soils described in paragraph 26, is restricted to this subgrade due to a micro-relief limitation, which severely limits mechanical operations and arable production.

Grade 4

34. Land mapped as grade 4 occurs in the east of the site and corresponds to the description in paragraph 27. The land is poorly restored and very compacted thus restricting it to this grade.

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SOURCES OF REFERENCE

British Geological Survey (1969) *Sheet No. 202, Towcester. Solid and Drift. Scale 1:63 360*
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. Scale 1:250 000*
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	:	medium clay loam	
	Colour	:	10YR4/3	
	Stone	:	8% medium and small flints	
	Roots	:	many, fine and very fine	
	CaCO ₃	:	non-calcareous	
	Depth	:	30 cm	
	Boundary	:	smooth/clear	
	Upper subsoil	Texture	:	heavy clay loam/clay
Colour		:	10YR5/4	
Mottles		:	none	
Concretions		:	none	
Stone		:	15-20% flints	
Structure		:	moderate development, medium and coarse subangular blocky	
Consistence		:	firm	
Structural condition		:	moderate	
Pores		:	>0.5%	
Roots		:	common, fine	
CaCO ₃		:	calcareous	
Depth		:	60/70 cm	
Boundary		:	undulating/clear	
Lower subsoil		Texture	:	clay
	Colour	:	2.5Y6/3	
	Mottles	:	common distinct ochreous 10YR5/8 common distinct grey 10YR6/1	
	Concretions	:	none	
	Stone	:	10-15%, flints and chalk	
	Structure	:	moderate development, coarse angular blocky	
	Consistence	:	very firm	
	Structural condition	:	poor	
	Pores	:	<0.5%	
	Roots	:	few, fine	
	CaCO ₃	:	calcareous	
	Depth	:	90 cm ⁺	
	Wetness	Class	:	II

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE II

Topsoil	Texture	: heavy clay loam
	Colour	: 10YR4/3
	Stone	: 5% flints
	Roots	: many, fine
	CaCO ₃	: calcareous
	Depth	: 30 cm
	Boundary	: smooth/clear
Upper subsoil	Texture	: clay
	Colour	: 10YR5/4
	Mottles	: few faint ochreous, 10YR5/8
	Concretions	: few manganese
	Stone	: 8% flints and chalk
	Structure	: moderate development, coarse subangular blocky
	Consistence	: friable/firm
	Structural condition	: moderate
	Pores	: 0.5%
	Roots	: few, fine
	CaCO ₃	: calcareous
	Depth	: 45/50 cm
	Boundary	: smooth/clear
Lower subsoil	Texture	: clay
	Colour	: 2.5Y6/3
	Mottles	: common distinct ochreous, 10YR5/6 common distinct grey, 10YR6/1
	Concretions	: few manganese
	Stone	: 5% flints and chalk
	Structure	: moderate development, coarse angular blocky, some prismatic
	Consistence	: firm/very firm
	Structural condition	: poor
	Pores	: <0.5%
	Roots	: few, fine
	CaCO ₃	: calcareous
	Depth	: 90 cm ⁺
	Wetness	Class

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE III

Topsoil	Texture	:	heavy clay loam / clay
	Colour	:	10YR4/2
	Mottles	:	---
	Concretions	:	---
	Stone	:	<1%, flints
	Roots	:	many, fine and very fine
	CaCO ₃	:	calcareous
	Depth	:	35 cm
	Boundary	:	smooth / clear
Subsoil	Texture	:	clay
	Colour	:	10YR5/1 + 5/2 + 5/3
	Mottles	:	common distinct ochreous 10YR5/8 + 6/6
	Concretions	:	few, manganese
	Stone	:	<1%, flints
	Structure	:	moderate development, coarse angular blocky
	Consistence	:	firm
	Structural condition	:	poor
	Pores	:	<0.5%
	Roots	:	common, fine and very fine
	CaCO ₃	:	calcareous
	Depth	:	90 cm ⁺
	Wetness	Class	:

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE IVa and IVb

Soil Types IVa and IVb are too variable to give an overall description.