MANOR FARM
GREAT DODDINGTON
NORTHAMPTONSHIRE
Agricultural Land Classification
& Site Physical Characteristics
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ADAS Cambridge

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AGRICULTURAL LAND CLASSIFICATION REPORT

MANOR FARM, GREAT DODDIGTON
NORTHAMPTONSHIRE

Introduction

1. This report presents the findings of a detailed, Agricultural Land Classification (ALC) survey of 87.9 ha of land at Manor Farm, Great Doddington, Northamptonshire. The survey was carried out during July and August 1996.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Cambridge in connection with a planning application for a Retail Village and Leisure Facilities.

3. The work was conducted by members of the Resource Planning Team in the Huntingdon Statutory Group in ADAS. 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 winter wheat and oil seed rape. The area under cereals was surveyed in July, and that under oil seed rape was surveyed in August after harvest.

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: Areas of grades and other land

Grade/Other land	Area (hectares)	% surveyed
3a	59.7	67.9
3b	24.2	27.6
Other land	4.0	4.5
Total agricultural land	83.9	95.5
Total survey area	87.9	100.0

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 86 borings and 6 soil pits were described.

8. Approximately three quarters of the land is of good agricultural quality (subgrade 3a) having a moderate wetness and workability limitation (q.v. Appendix II) due to a combination of topsoil texture and slowly permeable subsoils. The remainder of the land is of moderate agricultural quality (subgrade 3b), due to a moderately severe droughtiness limitation. There is a small area of non-agricultural land on the eastern boundary of the site.

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 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Parameter	Value
Grid reference	SP872652
Altitude (m, AOD)	100
Accumulated Temperature (day °C, Jan.–June)	1365
Average Annual Rainfall (mm)	602
Field Capacity Days	124
Moisture Deficit, Wheat (mm)	109
Moisture Deficit, Potatoes (mm)	100
Overall Climatic 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 there are no overriding climatic limitations, and therefore the climatic grade 1 is assigned.

Site

14. The site is bounded on the south east by the embankment to the A45(T), and the north east by the A509 road. The north western boundary constitutes a stream, and all other boundaries open to arable land. From a high point of approximately 100m AOD on the south eastern boundary, the land slopes in a north westerly direction falling to a height of approximately 60m AOD. Neither altitude nor relief impose any limitation on agricultural land quality.

Geology and soils

15. The published 1:50 000 scale geology map (Geol.Survey, 1974) shows a complex geological pattern across the site. The pattern is banded, with Boulder Clay on the south east boundary and then successively in a north easterly direction, Clay (Great Oolite), Lower Estaurine Series (Inferior Oolite) and finally Northampton Sand with Ironstone.

16. The 1:250 000 reconnaissance soil survey map for the area (SSEW, 1983) shows the site to comprise soils of the Banbury, Moreton and Stretham Associations. Soils of the Banbury Association are briefly described as well drained brashy fine and coarse loamy over limestone with occasional deep fine loamy over clayey soils with slowly permeable subsoils. Those of the Moreton Association as well drained calcareous clayey and fine loamy soils over limestone, in places shallow and brashy, and those of the Stretham Association as deep well drained calcareous clayey soils associated with similar but slowly permeable soils.

17. During the current detailed survey two soil types were encountered and are shown on the soil resources map as Types I and II.

Soil Type I

18. Soil Type I occurs in all but the northern part of the site and a small area on the western boundary.Soils typically comprise very slightly stony, calcareous, heavy clay loam or clay topsoil, over slightly stony calcareous, slowly permeable clay subsoil with chalky boulder clay at depth. Gleying occurs typically at 35/40cm and soils are assessed as Wetness Class III (q.v. Appendix II). A few profiles, typically those with a heavy clay loam topsoil, are underlain with a heavy clay loam upper subsoil over slowly permeable clay lower subsoil with gleying occuring at 45/50cm. These soils are assessed as Wetness Class II.

Soil Type II

19. Soil Type II occurs in the northern part of the site and in a small area on the western boundary. Profiles typically comprise slightly stony, non-calcareous medium clay loam topsoil (occasionally heavy clay loam), over moderately/very stony non-calcareous heavy clay loam subsoil. These soils are well drained and are assessed as Wetness Class I. Due to the extremely stony nature of the subsoil, rooting was not observed beyond 70/80cm.

Agricultural Land Classification

20. 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.

21. The location of the auger borings and pits is shown on the attached sample location map and the details of the physical characteristics of the soil types identified are presented in Appendix III.

Subgrade 3a

22. Land classified as Subgrade 3a corresponds to the moderately well drained soils (Wetness Class III) described in paragraph 18, and is limited to this subgrade due to a moderate wetness and workability restriction. With clay or clay loam topsoils and slowly permeable subsoils care and timeliness with cultivations are required to avoid damage to soil structure. A few better drained profiles (Wetness Class II, Grade 2) were encountered, but these are not in discrete mapable areas.
The land on the western boundary with soils as described in paragraph 19 has also been mapped as Subgrade 3a. The subsoils are moderately stony and hence limit the available water within the profile causing a moderate droughtiness limitation.

Subgrade 3b

23. Land classified as Subgrade 3b corresponds to the well drained soils (Wetness Class I)described in paragraph 19. With very stony subsoils both rooting depth and available water are restricted causing a moderately severe droughtiness limitation.

Soil Resources

24. Two distinct soil types have been identified within the site and their distribution is shown on the accompanying soil resource map which is illustrative of the soil resources available within the site for restoration purposes but is not a soil stripping map for the site. A statement of the physical characteristics of these two soil types is given in Appendix III. The thicknesses and the volumes given in Table 3 below should be treated with some caution due to the variability of the soils, and also the profile stone content of Soil Type II.

Table 3: Soil Resources

		Area(ha)	Thickness(cm)	Volume(m^3)
Soil Type I	Topsoil	54.4	32	174080
	Upper Subsoil	54.4	8	43520
	Lower Subsoil	54.4	80	435200
Soil Type II	Topsoil	29.5	30	88500
	Subsoil	29.5	60	177000

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SOURCES OF REFERENCE

British Geological Survey (1974) *Sheet No. 186, Wellingborough,Solid and Drift* BGS: London. *Scale 1:50 000*

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* 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

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years.[2]
II	The soil profile is wet within 70 cm depth for 31-90 days in most years **or,** if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years **or,** if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or,** if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.
[2] 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE I

Topsoil	Texture	:	heavy clay loam/clay
	Colour	:	10YR4/2, 2.5Y4/2, 2.5Y4/4
	Mottles	:	--------
	Concretions	:	--------
	Stone	:	3-5% small and medium, round & angular
	Roots	:	many/common, fine & very fine
	$CaCO^3$	:	calcareous
	Depth	:	30/35cm
	Boundary	:	smooth/abrupt
Upper subsoil	Texture	:	clay
	Colour	:	10YR5/3
	Mottles	:	few DOM, 10YR5/6, 10YR6/6
	Concretions	:	few
	Stone	:	3-5% small & medium, round and angular
	Structure	:	moderate development, coarse and very coarse angular blocky
	Consistence	:	firm
	Structural condition	:	poor
	Pores	:	>0.5%
	Roots	:	common, fine and very fine
	$CaCO^3$	:	calcareous
	Depth	:	38/42cm
	Boundary	:	smooth/abrupt
Lower subsoil	Texture	:	clay
	Colour	:	10YR5/3, 2.5Y6/3
	Mottles	:	common, 10YR6/6, 10YR5/8
	Concretions	:	common
	Stone	:	8% small flints, 3-5% chalk stones
	Structure	:	weakly developed coarse and very coarse angular blocky
	Consistence	:	firm
	Structural condition	:	poor
	Pores	:	<0.5%
	Roots	:	few, fine and very fine
	$CaCO^3$	:	calcareous
	Depth	:	120cm
		:	
Wetness Class:		:	III

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE II

Topsoil	Texture	:	medium clay loam
	Colour	:	10YR4/3
	Mottles	:	------
	Concretions	:	------
	Stone	:	5-10%, small & medium, round & angular
	Roots	:	many, fine and very fine
	$CaCO^3$	:	non-calcareous
	Depth	:	27/32cm
	Boundary	:	smooth/gradual
Subsoil	Texture	:	heavy clay loam
	Colour	:	10YR6/8, 10YR5/6, 10YR5/8
	Mottles	:	-----
	Concretions	:	-----
	Stone	:	50-80%, ironstone and sandstone
	Structure	:	*too stony*
	Consistence	:	-----
	Structural condition	:	-----
	Pores	:	>0.5%
	Roots	:	few, fine and very fine. None observed below 80cm.
	$CaCO^3$	:	non-calcareous
	Depth	:	90cm
Wetness Class		:	I