

**LAND AT SUTTON'S FARM
HATFIELD, HERTFORDSHIRE**

**Agricultural Land Classification
& Statement of Site Physical Characteristics
July 1996**

**Resource Planning Team
Huntingdon Statutory Group
ADAS Cambridge**

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AGRICULTURAL LAND CLASSIFICATION & STATEMENT OF SITE PHYSICAL CHARACTERISTICS

LAND AT SUTTON'S FARM, HATFIELD, HERTFORDSHIRE

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 53.6 ha of land at Sutton's Farm, near Hatfield. The survey was carried out during June 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 to extract sand and gravel on this land. This survey supersedes previous ALC surveys on this land.
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 on the site was under barley and winter beans. There is a small area of woodland and a large pond with rough grass near Sutton Farm Bungalows. To the south of Sutton's Farm there is a small area of hard standing and rough land, likely to have been associated with old buildings.

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
2	19.3	36.0
3a	28.8	53.7
3b	3.3	6.2
Other land	2.2	4.1
Total agricultural land	51.4	95.9
Total survey area	53.6	100.0

7. The fieldwork was conducted at an average density of one boring per hectare. A total of 56 borings and six soil pits were described. Topsoils were riddled at various locations to ascertain stone content, both total stone content by volume, and stone content >2cm.

8. At the time of the survey the soils were extremely hard to auger, due to the dry nature and stoniness of the soils. Frequently the depth achieved by augering was less than 50 cm. As a result, assumptions have been made from nearby pits as to the type of subsoil likely to be encountered. Thus grading on the site relies on the interpolation of information gained at the time of the survey but at all locations sufficient information was obtained to accurately assess land quality. Most of the site comprises best and most versatile land. Grade 2 land (very good quality agricultural land) is mapped largely to the north east of Sutton's Farm and in a narrow band running north west / south east to the south of Sutton's Farm. Subgrade 3a (good quality agricultural land) is mapped over the remainder of the site, except along the southern boundary where a small area of subgrade 3b (moderate quality agricultural land) is found. The main limiting factors affecting the agricultural land quality are droughtiness, wetness (see Appendix II for definitions of Wetness Class) and topsoil stoniness. Often the final grading is the result of a combination of two or more of these factors.

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

Parameter	Value
Grid reference	TL194 101
Altitude (m, AOD)	87
Accumulated Temperature (day °C, Jan.–June)	1397
Average Annual Rainfall (mm)	673
Field Capacity Days	136
Moisture Deficit, Wheat (mm)	108
Moisture Deficit, Potatoes (mm)	101
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 is no overall climatic limitation to agricultural land quality.

Site

14. The land generally slopes very gently in a south easterly direction. The highest land, approximately 101m AOD is found in the north west corner of the site. The land along Coopers Green Lane on the south eastern boundary is typically 80m AOD. To the west of Sutton's Farm there is a shallow dry valley, but nowhere on the site do slopes exceed 3°. Therefore neither gradient nor altitude impose any limitations to the quality of the agricultural land.

Geology and soils

15. The published 1:50 000 scale geology map, sheet 239 (Geological Survey of England and Wales, 1978) shows the site to be underlain by Cretaceous Middle and Upper Chalk. This is covered by drift deposits of boulder clay to the north of the minor road dissecting the site, and by glacial gravel (with Bunter Pebbles) to the south. The chalk is shown to outcrop along the shallow dry valley to the west of Sutton's Farm.

16. The 1:63 360 scale published soils map, sheet 147, Bedford and Luton (Soil Survey of England & Wales, 1968), shows the northern two thirds of the site and reflects the drift geology pattern. To the north of the minor road, Oak association soils are mapped. To the south, the St. Albans association is shown. The former is briefly described as non-calcareous gley soil, of boulder clay origin which has imperfect or poor drainage. The latter is described as brown earth, derived from fluvio-glacial sands and gravels, which locally are overlain by thin loamy or clayey drift deposits. The reconnaissance scale (1:250 000) soil map for the whole area shows a different pattern. The north western half of the site is mapped as the Hornbeam 2 Association. These soils are deep fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging. The south eastern half of the site is shown as Hamble 2 association which comprise deep stoneless well drained silty soils and similar soils affected by groundwater, locally over gravel. The current detailed survey has identified three soil types.

17. Because of the problems of the stone content and dry nature of the subsoils at the time of the ALC survey, the boundaries of the soil types map should be viewed as preliminary rather than definitive. A full description of each soil type is given in Appendix III and the distribution is shown on the attached map.

Soil Type I (29.3ha)

18. This soil type typically comprises slightly stony medium clay loam topsoil, over slightly to moderately stony heavy clay loam (occasionally clay) upper subsoil. The lower subsoil is typically clay with variable amounts of stone.

Soil Type II (11.1ha)

19. The second soil type comprises slightly to moderately stony fine sandy silt loam (occasionally medium (silty) clay loam) topsoils, over medium clay loam or similar textured material to those found in the topsoil. The upper subsoil also has a similar stone content to the topsoil. Lower subsoils are slightly heavier textured, comprising slightly stony heavy silty clay loam (occasionally clay or medium silty clay loam).

Soil Type III (11.0ha)

20. The final soil type comprises slightly to moderately stony medium clay loam or sandy clay loam topsoils, over moderately or very stony sandy clay loam upper subsoils. Only limited information is available on the lower subsoils which are likely to comprise very stony loamy medium sand.

Agricultural Land Classification

21. 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.

22. 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 III.

Grade 2

23. Land of this quality is associated with the better drained variant of Soil Type I and Soil Type II. The areas of Soil Type I assessed as Grade 2 quality are typically slowly permeable below 65cm and have been assessed as Wetness Class II (see Appendix II for the definitions of Wetness Classes). Thus slight wetness and workability constraints limit this land to grade 2. Also in some instances topsoil stone content and slight droughtiness restrictions will equally limit the land to this grade. Topsoil stone content has been riddled and measured at various locations to be 7 - 9% greater than 2cm. This will result in an impediment to cultivation, harvesting and crop growth and thus exclude this land from a higher grade. The combination of profile textures, stone content and subsoil structures also slightly limit the available water capacity of the soil which may restrict crop yields in drier years.

24. Almost all the land mapped as Soil Type II is graded 2. This land is free draining and typically assessed as Wetness Class I. This land is limited to this grade by topsoil stone content and/or slight droughtiness limitations. Topsoil stone content is similar to the measurements mentioned in paragraph 23. Again the combination of soil properties and climatic factors result in a slight droughtiness limitation.

Subgrade 3a

25. Land graded 3a is found in conjunction with all three soil types and is mapped in four locations on the site. In the north west, north east and south west subgrade 3a land is mapped

in conjunction with the poorer drained variant of Soil Type I. These soils are typically slowly permeable at less than 50cm and have been assessed as Wetness Class III. Under the prevailing climatic conditions and combining with medium clay loam topsoil textures, result in a moderate wetness and workability constraint on this land.

26. A small area of Soil Type II near Sutton Farm Bungalows is mapped as subgrade 3a. Topsoil stone greater than 2cm has been riddled in this vicinity and measured at 11-13% of soil volume. This excludes the land from a higher grade.

27. Much of Soil Type III is also graded 3a. These soils have the lightest textures on the site and have higher subsoil stone contents. As a results moderate droughtiness is the main limitation on this land. In a few sporadic locations topsoil stone is also an equal limitation.

Subgrade 3b

28. A small area of subgrade 3b land is mapped in the south of the site. This largely relates to the stoniest variant of Soil Type III. Topsoil stone content greater than 2cm has been measured at 16 - 18% of soil volume, which will have a moderately severe impact on the success of crops and is likely to increase the wear and tear on farm machinery.

29. Other land

A small woodland , a pond and an area of hard standing are mapped as other land.

Soil Resources

30. Three 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 three soil types is given in Appendix III. The thicknesses and volumes given in Table 3 below should be treated with some caution due to the variability of the soils and also that soils were very difficult to auger to 120cm due to the dry conditions and profile stone content.

Table 3 Soil resources

	Area (ha)	Thickness (m)	Volume(m ³)
Soil type I			
Topsoil	29.3	32	93760
Upper subsoil	29.3	30	87900
Lower subsoil	29.3	58	169940
Soil type II			
Topsoil	11.1	32	35520
Upper subsoil	11.1	43	47730
Lower subsoil	11.1	45	49950
Soil type III			
Topsoil	11.0	32	35200

Upper subsoil	11.0	43	47300
Lower subsoil	11.0	45	49500

Resource Planning Team
Huntingdon Statutory Group
ADAS Cambridge

SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet No. 239, Hertford Drift Edition*, 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 (1968) *Sheet 147, Bedford and Luton*, 1:63 360
SSEW: Harpenden.

Soil Survey of England and Wales (1983) *Sheet 4, Soils and their Use in South East 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	:	medium clay loam (occ medium silty clay loam)
	Colour	:	10YR4/3 & 10YR4/2 predominate
	Stone	:	total stone 5-15%, >2cm 4-9%
	Roots	:	many fine and very fine
	CaCO ³	:	typically non calcareous
	Depth	:	30/35cm
	Boundary	:	abrupt, smooth
Upper subsoil	Texture	:	heavy clay loam (occ clay)
	Colour	:	10YR5/4, 5/6, 4/6 (occ 10YR5/3)
	Mottles	:	few/common
	Concretions	:	none
	Stone	:	typically 15-30% flints (occ <5% in clay)
	Structure	:	weakly developed coarse and very coarse sub angular blocky
	Consistence	:	firm
	Structural condition	:	moderate
	Pores	:	>0.5%
	Roots	:	many/common fine and very fine roots
	CaCO ³	:	typically non calcareous
	Depth	:	45cm 55/70 cm
	Boundary	:	smooth, clear
Lower subsoil	Texture	:	clay
	Colour	:	10YR5/3, 5/4 and 6/4
	Mottles	:	common
	Concretions	:	none
	Stone	:	typically <5%, occ remains 20%+
	Structure	:	weakly developed medium and coarse angular blocky
	Consistence	:	firm
	Structural condition	:	poor
	Pores	:	<0.5%
	Roots	:	common fine and very fine
	CaCO ³	:	typically non calcareous
	Depth	:	120cm+
Wetness Class:			II/III (occ IV)
Comments		:	typically non calcareous except in small area in the north west
		:	often impenetrable to auger below 30/55cm

SOIL TYPE II

Topsoil	Texture	:	typically fine sandy silt loam (occ medium clay loam, medium silty clay loam, or sandy clay loam)
	Colour	:	10YR4/3
	Stone	:	total stone 5-20%, >2cm 5-9% (occ >13%)
	Roots	:	common fine and very fine
	CaCO ³	:	typically non calcareous
	Depth	:	30/35cm
	Boundary	:	abrupt/smooth
Upper subsoil	Texture	:	typically medium clay loam(occ. medium silty clay loam, fine sandy silt loam or sandy clay loam)
	Colour	:	10YR5/4, 10YR5/6
	Mottles	:	none
	Concretions	:	none
	Stone	:	range 10-25% flints
	Structure	:	weak to moderate medium and coarse sub angular blocky
	Consistence	:	friable
	Structural condition	:	good/moderate
	Pores	:	>0.5%
	Roots	:	common fine and very fine
	CaCO ³	:	typically non calcareous
	Depth	:	70/80cm
	Boundary	:	abrupt, smooth
Lower subsoil	Texture	:	heavy silty clay loam (occ medium silty clay loam or clay)
	Colour	:	10YR5/4, 6/4, 5/6
	Mottles	:	none
	Concretions	:	none
	Stone	:	5-15% flints
	Structure	:	weakly developed coarse sub angular blocky
	Consistence	:	friable/firm
	Structural condition	:	moderate
	Pores	:	typically >0.5%
	Roots	:	few fine and very fine
	CaCO ³	:	typically non calcareous
	Depth	:	100cm+
Wetness Class:		:	I
Comments		:	often impenetrable to auger from 40/65cm

SOIL TYPE III

Topsoil	Texture	:	medium clay loam or sandy clay loam	
	Colour	:	10YR4/2, 7.5YR4/2	
	Stone	:	total stone 5-25%, typically 11-20%, >2cm 8-17%, occ <5%	
	Roots	:	many fine	
	CaCO ³	:	typically non calcareous	
	Depth	:	30/35cm	
	Boundary	:	abrupt/smooth	
	Upper subsoil	Texture	:	sandy clay loam (occ medium clay loam)
Colour		:	10YR4/4, 5/4 and 4/6	
Mottles		:	none	
Concretions		:	none	
Stone		:	typically 20-40% flints	
Structure		:	weakly developed coarse and very coarse sub angular blocky	
Consistence		:	friable	
Structural condition		:	moderate	
Pores		:	>0.5%	
Roots		:	common fine and very fine	
CaCO ³		:	typically non calcareous	
Depth		:	75cm*	
Boundary		:	abrupt, smooth	
				* very limited information on lower subsoils as profiles typically impenetrable from 30/70cm. Only information on lower subsoils is from pit description given below.
Lower subsoil		Texture	:	loamy medium sand
	Colour	:	10YR4/6	
	Mottles	:	none	
	Concretions	:	none	
	Stone	:	40% flints	
	Structure	:	single grain	
	Consistence	:	loose	
	Structural condition	:	moderate	
	Pores	:	>0.5%	
	Roots	:	few fine and very fine	
	CaCO ³	:	non calcareous	
Depth	:	100cm+		

Wetness Class: I