Camb 16/90

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS
COVENBROOK HALL FARM, ESSEX

1. BACKGROUND

1.1 The site, an area of 35.9 hectares, is the subject of an application, by the Kingsway Group, for the extraction of sand and gravel at Covenbrook Hall Farm, Essex. MAFF surveyed the site in April 1990 to assess the agricultural land quality and soil physical characteristics.

2. SITE PHYSICAL CHARACTERISTICS

2.1 Climate

Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that for the site's mid range altitude of 62m AOD the annual average rainfall is 595 mm (23.4"). This data also indicates that field capacity days are 108 and moisture deficits are 118 mm for wheat and 113 mm for potatoes.

2.2 Altitude and Relief

The land comprises a gently sloping plateau which ranges in altitude from 57m to 68m AOD. Gradient and altitude do not consitute limitations to the ALC grade.

3. AGRICULTURAL LAND CLASSIFICATION (refer to ALC map)

3.1 The land was graded using the criteria set out in the revised Agricultural Land Classification document (MAFF, 1988).

3.2 The table below shows the ALC grades for the survey area.

	AGRICULTURAL LAND CLASSIFICATION	
Grade	ha	%
2	10.3	29
3a	24.7	69
Non Agricultural	0.9	2
TOTAL	35.9	100

3.3 Grade 2

Land in the vicinity of Jenkin's Farm has been mapped as grade 2. The soils are slightly droughty variants of the soils mapped as Soil Type A (refer to Soil Types map and Appendix 1). The soils are generally freely draining (wetness class I) and typically comprise fine loams to depth over gravelly material or occasionally clay*. Profiles are often very slightly or slightly stony in the upper subsoil. The occurrence of flints, in varying densities throughout the profiles, and the fine textures have a slight limiting effect on the water holding capacity of this soil. As a result minor droughtiness is the major limitation to the ALC grade.

3.4 Subgrade 3a

The majority of the survey area (approx 70%) has been graded 3a. Three main situations occur.

3.4.1 Firstly, the majority of the subgrade 3a land lies in association with Soil Type B (refer to Soil Type Map and Appendix 1). The soils are fine textured, decalcified to depth and slowly permeable at depth (ie wetness class II). As a result moderate wetness and workability imperfections restrict this land to subgrade 3a.

3.4.2 Secondly, adjacent to the western edge of the site the calcareous soils of Soil Type C have been graded 3a (refer to Soil Types Map and Appendix 1). Topsoil textures are heavy, profiles are calcareous and slowly permeable 35cm^{+} (ie. wetness class III). These factors combine to impose a moderate limitation on the agricultural potential of this land. Thus the land is excluded from grade 2.

* Where profiles overlie clay at depth the wetness class was assessed as II. As a result these profiles are excluded from grade 1 by the over-riding slight droughtiness, drainage and workability limitations.

3.4.3 Thirdly, occurring in small pockets, in association with the more droughty variants of the soils mapped as Soil Type A land has been graded 3a (refer to Soil Types Map and Appendix 1). The occurrence of subsoil flints and moderate depth over gravelly material has a moderate limiting effect as the available moisture capacity of this soil. As a result the droughtiness limitation excludes the land from a higher grade.

4. SOIL PHYSICAL CHARACTERISTICS

4.1 Geology

The published 1:50,000 solid and drift edition geology sheet 223 and the 1:25,000 Mineral Assessment Report 16 show the site to comprise mainly boulder clay overburden with a smaller area of exposed sand and gravel along the northern edge of the site.

4.2 Soils

During the current survey a detailed inspection of the soils identified three main types.

4.2.1 Soil Type A (refer to Soil Types Map and Appendix 1)

These soils cover the northern part of the site in association with the sand and gravel deposits. They typically comprise (sandy) medium clay loam or occasionally sandy loam topsoils over sandy clay loam or (sandy) medium clay loam subsoils which merge into gravelly material or occasionally clay. Subsoils are very slightly or slightly stony, depth to and percentage of stones within the stony bands varies with location. Medium sandy loam lenses may also be present in the subsoil.

4.2.2 Soil Type B (refer to Soil Type Map and Appendix 1)

These soils overlie the majority of the boulder clay deposits. They typically comprise heavy clay loam or occasionally clay topsoils over clay subsoils which occasionally become calcareous at depth (95 cm^{+}). Upper subsoils often contain slightly stony bands.

4.2.3 Soil Type C (refer to Soil Types Map and Appendix 1)

These calcareous soils outcrop along the western edge of the site. They typically comprise heavy clay loam or occasionally clay topsoils over clay subsoils which become chalky 40/50 cm^{+}. Profiles are calcareous throughout.

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Appendix 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE A

Topsoil	Texture	:	(sandy) medium clay loam or occasionally sandy loam
	depth	:	30/35 cm
Upper Subsoil	Texture	:	sandy clay loam or (sandy) medium clay loam with occasional bands of sandy loam lenses
	stones	:	5-15% small flints.. Depth to and percentage of stone varies with location.
	structure	:	moderately to weakly developed coarse subangular blocky
	consistence	:	firm/friable
	depth	:	60/95 cm**
Lower Subsoil (where it exists)	Texture	:	Clay
	structure	:	moderately developed coarse angular blocky tending towards medium prisms at depth
	consistence	:	Very firm/firm
	Gleying	:	Yes
	depth	:	120 cm

** Gravelly material (60/95 cm^{+}) comprises 50% flints in a sand and clay loam matrix.

SOIL TYPE B

Topsoil	Texture	:	heavy clay loam or occasionally clay
	calcareous	:	No
	depth	:	30 cm
Upper Subsoil	Texture	:	clay
	stones	:	bands of 10-15% flints are common
	calcareous	:	No
	structure	:	weakly developed coarse subangular blocky becoming moderately developed coarse angular blocks where profile is gleyed
	consistence:	:	firm
	depth	:	95 cm
Lower Subsoil	Texture	:	clay
	calcareous	:	*occasionally yes*
	structure	:	as above for gleyed clay
	consistence	:	very firm
	depth	:	120 cm

SOIL TYPE C

Topsoil	Texture	:	heavy clay loam or occasionally clay
	calcareous	:	Yes
	depth	:	30/35 cm
Subsoil	Texture	:	clay
	calcareous	:	*Yes, often chalky 40/50 cm*$^{+}$
	structure	:	moderately developed medium prisms
	consistence	:	Very firm
	Gleying	:	Yes
	depth	:	120 cm

Appendix 2

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 and horticultural crops can usually be grown but on some land in the 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.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations with affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. When more demanding crops and 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 level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yield of which are variable. In most 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 very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

References

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