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AGRICULTURAL DEVELOPMENT AND ADVISORY SERVICE

Agricultural Land Classification
Appleby Barn, Hardwick
Northamptonshire

AGRICULTURAL LAND CLASSIFICATION

LAND AT APPLEBY BARN, HARDWICK

1.0 INTRODUCTION

1.1 The Agricultural Land Classification provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can operate in one or more of four principal ways: they may affect the range of crops which can be grown, the level of yield, the consistency of yield and the cost of obtaining it. The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.

1.2 The principal physical factors influencing agricultural production are climate, site and soil. The main climatic factors which are taken into account are temperature and rainfall, although account is also taken of exposure, aspect and frost risk. The site factors used in the classification system are gradient, micro relief and flood risk. Soil characteristics of particular importance are texture, structure, depth and stoniness. In some situations chemical properties may also influence the long term potential of land and are taken into account.

1.3 These factors result in varying degrees of constraint on agricultural production. They can act either separately or in combination, the most important interactive limitations being soil wetness and droughtiness. The grade or subgrade of land is determined by the most limiting factor present. Five grades of land are recognised ranging from Grade 1 land of excellent quality to Grade 5 land of very poor quality. Grade 3, which constitutes about half of the agricultural land in England and Wales is divided into two subgrades designated 3a and 3b.

1.4 Details of the Agricultural Land Classification (ALC) System are contained in MAFF's Revised guidelines and criteria for grading the quality of agricultural land. Descriptions of the ALC grades and subgrades are provided in Appendix I.

2.0 BACKGROUND TO THE SITE

2.1 On the published 1:63,360 scale provisional ALC map (sheet number 133) (MAFF, 1974) the site is graded 2. However these maps are inappropriate for detailed site-specific appraisals, as they are essentially reconnaissance in nature and do not always show smaller areas of individual ALC grades (ie less than approximately 80 ha).

2.2 A detailed survey of this 27 ha site was consequently carried out on 8th February 1990, to provide site specific information on land quality.

2.3 The site comprises several enclosures, which are now farmed as one unit. At the time of survey the land was in arable use, typical crops including wheat and oilseed rape.

2.4 A total of 29 soil inspections were made over the site on a 100m grid basis, superimposed onto the national grid. Soils were sampled to a depth of 120 cms using a hand held Dutch soil auger and data collected were supplemented by observations from two soil profile pits.

3.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

3.1 Site specific climate data has been obtained by interpolating information contained in the 5 km grid agro climatic data set produced by the Meteorological Office (Met Office, 1989).

- 3.2 This shows that the average annual rainfall for the site is approximately 618 mm (25.2 inches) which is relatively low by national standards. Soils are likely to be at field capacity for a period of 128 days extending from early April to the end of November (MAFF, 1984). During this time the workability of the land is likely to be slightly impaired due to the relatively heavy nature of the topsoil in conjunction with reduced permeability within the clayey subsoils.
- 3.3 The accumulated temperature of this area is approximately 1352 degrees Celsius. This parameter indicates the cumulative build up of warmth available for crop growth, and influences the development of soil moisture deficits (SMD)* and susceptibility to drought. Moisture balance calculations undertaken for the soils occurring on site indicate that droughtiness does not constitute an overriding limitation to land quality.
- 3.4 The site is neither particularly exposed nor frost prone.
- 3.5 There is no overall climatic limitation to the agricultural use of this land.

Relief and Drainage

- 3.6 The site lies between altitudes of 115m and 119m AOD in a watershed location within a gently rolling landscape. Relatively level ground occurs in the plateau top area south of the farm track, whilst gentle (1-2°) gradients were recorded to the north of this point and west of Appleby Barn. Slightly steeper (3-4°) gradients were recorded into the valley feature bordering the western and north-western boundary of the site. Neither altitude or gradient constitute a limitation to agricultural land quality.

* SMD represents the balance between rainfall and potential evapotranspiration occurring during the growing season. For ALC purposes the soil moisture deficits developing under a winter wheat and maincrop potato cover are considered. These 'reference' crops have been selected because they are widely grown, and in terms of their susceptibility to drought, are representative of a wide range of crops.

Geology and Soil

- 3.7 The published 1:50 000 scale solid and drift edition geology map (Geol. Surv of GB; 1974) (Sheet 186) maps the geology of the area as Oolitic Limestone overlain by glacial boulder clay drift. Field observations support this description confirming the existence of boulder clay drift over the whole survey area.
- 3.8 No detailed soils map exists for this area. However, the very generalised 1:250,000 scale soils map "Soils of Eastern England" (Soil Survey of England and Wales; 1983) shows the Hanslope Soil Association* to be present on site.
- 3.9 The more detailed current survey confirms the existence of Hanslope Soils over the majority of the survey area. In general terms the soils identified on site comprise medium clay or heavy clay loam topsoils overlying an upper subsoil of clay which in turn overlies chalky boulder clay below 40-65 cms depth. In a few isolated locations, topsoils immediately overlie chalky boulder clay drift.
- 3.10 Typically soils are calcareous throughout the profile, although in two small areas, profiles were noted which were decalcified in the upper horizons. These occur on the highest part of the plateau immediately north-east of Cheesecake Spinney and in the vicinity of the gentle valley feature in the north-west of the site.
- 3.11 Over the majority of the site, profiles were gleyed above 40 cms depth. Soil pit observations confirm that a slowly permeable layer typically exists within the upper 60 cms of the soil profile thus effectively placing soils in wetness class III.

* Hanslope Soil Association: Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils.

4.0 AGRICULTURAL LAND CLASSIFICATION

4.1 Land on this site is graded 3a and 3b. A breakdown of ALC grades in ha and % terms is provided below:

ALC	ha	%
3a	22.9	84.2
3b	4.2	15.4
non-agricultural	0.1	0.4
Total	27.2	100.0

A description of the type of land occurring in each grade is given below:

4.2 Subgrade 3a

The majority of the site is graded 3a. The chief limitation to agricultural use is seasonal wetness and workability imperfections, associated with reduced subsoil permeability in conjunction with the relatively heavy topsoil textures. This effectively curtails periods in which the land can be satisfactorily cultivated, and reduces the opportunities for lifting late harvested root crops. The wetness and workability limitations associated with soils of this type are mitigated to some extent by their strongly calcareous nature. This promotes the development of a more stable soil structure and facilitates the more speedy regeneration of structure damaged by trafficking or working the land when wet.

4.3 Sub-grade 3b

Two small areas of decalcified soils have been graded 3b. These are located immediately to the north-east of Cheesecake Spinney on the highest part of the plateau, and in the north west of the site in the gentle valley feature.

Soils in these areas are slightly more prone to structural damage than their more calcareous counterparts and good soil structure is likely to take longer to re-establish once impaired by badly timed cultivations. These factors contribute to a slightly more significant seasonal wetness and workability imperfection, effectively restricting these two small areas to sub grade 3b.

5.0 NON-AGRICULTURAL

Appleby Barn and its associated fold yard have been mapped as non-agricultural.

RESOURCE PLANNING GROUP
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DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. The grades are defined by reference to soil and site physical characteristics. The most productive and flexible land falls into Grades 1 and 2, and Subgrade 3a land collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

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 valuable 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 which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where 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 level of yields. It is mainly suited to grass with occasional arable crops (eg 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 very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

SOURCES OF REFERENCE

- MAFF (1988) Agricultural Land Classification in England and
Wales: Revised guidelines and criteria for grading
the quality of agricultural land.
- MAFF (1974) 1:63,360 scale Agricultural Land Classification Map
sheet no 133 (Provisional)
- METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land
Classification.
- MAFF (1974) The Agricultural Climate of England and Wales.
- GEOLOGICAL SURVEY OF GREAT BRITAIN (1974) 1:50 000 scale solid and drift
edition geology map; sheet 186 "Stamford".
- SOIL SURVEY OF ENGLAND AND WALES (1983) 1:250 000 scale "Soils of Eastern
England" Sheet 4.