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AGRICULTURAL LAND CLASSIFICATION

ANDOVER AIRFIELD

ANDOVER, HAMPSHIRE

MAFF Ministry of Agriculture Fisheries and Food

AGRICULTURAL LAND CLASSIFICATION

ANDOVER AIRFIELD, ANDOVER, HANTS

1. BACKGROUND

1.1 The site, the location of a proposed business park, is to the west of Andover and south of the A303 in Hampshire and covers 71.8 ha. It is bounded to the north by the A303 road, to the southwest by Red Post Lane and to the south and east by a military base. An old airfield track bounds the site to the west.

1.2 The site was surveyed during October and November 1989 using 110 and 120 cm Dutch Soil Augers with samples being taken at approximately 100 m intervals across the site. A number of soil inspection pits were also dug.

Land Use

1.3 At the time of survey most of the site had been ploughed, although an area to the north was still under stubble. To the west of the site was an area of trial plots covering approximately 1-2 ha. The soils were not sampled within this area. The site was previously an RAF airfield.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The altitude of the site varies between approximately 75 m A.O.D. and 85 m A.O.D. with the highest land occurring towards the north and east and the lowest to the west. The site landform represents gently undulating chalkland with two small gently sloping dry valleys to the northwest and northeast. Gradients are relatively minor and do not constitute a limitation in terms of land quality.

Climate

2.2 The average annual rainfall for this area occurs within the range 783 mm to 787 mm (Met. Office, 1989). The median accumulated

temperature above 0°C between January and June, a measure of the relative warmth of a locality ranges between 1447 day degrees and 1458 day degrees, (Met. Office 1989). The site has approximately 170 field capacity days which provides a measure of the effect of climate on the soil water regime. Crop adjusted moisture deficits are 102 mm for wheat and 93 mm for potatoes at an altitude of 75 m A.O.D. and 101 mm for wheat and 91 mm for potatoes at 85 m A.O.D.

2.3 Climatic factors per se place no limitations as agricultural land quality, but do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

Geology and Soils

2.4 British Geological Survey Sheet 283, Andover (1978) shows the site to be underlain by Cretaceous Upper Chalk, a soft white chalk with many flinty nodules. The upper chalk is the most pure form of the three subdivisions of Cretaceous Chalk, with less than 5 percent clay, and is characterised by seams of tabular and nodular flints.

2.5 Soil Survey of England and Wales (1983), Sheet 6 - Soils of S.E. England show two soil mapping units across the site. The Andover 1 Association covers a large part of the site. These are described as shallow (c. 40 cm depth) Lithomorphic Brown Rendzinas lacking gleyic features which have variably flinty chalky silty clay loam topsoils over fragmented chalk with brown soil between chalk and flint fragments, eventually overlying chalk with flints. The Coombe Associaton is described as typical Brown Calcareous Earths lacking gleyic features with slightly stony calcareous silty clay loam topsoil, over similar subsoil becoming more stony passing into chalky rubbly drift. These latter soils are mapped on only a small proportion of the site and are found on footslopes and dry valley floors.

2.6 Detailed field survey confirms two broadly similar soil distributions to those described above. Firstly and most extensively are relatively shallow soils over chalk. These commonly comprise calcareous silt loam or medium silty clay loam topsoils which are usually very slightly stony (1-5% v/v >2 cm - mainly chalk stones and flints) with occasional

patches of up to 15%+ v/v. These overlie a slightly flinty horizon of about 50% chalk in a silt loam, medium silty clay loam or occasionally clay matrix. The chalk content increases with depth typically passing to soft white bedded or rubbly chalk within 35-60 cm. Harder bedded chalk (which may be impenetrable to soil augers) occurs at variable depths below this. Occasional profiles have topsoils resting more or less directly over the chalk. All soils are highly calcareous and well drained (wetness class I). Droughtiness is the main limitation in terms of agricultural land quality although substantial quantities of water are stored in chalk, provided it is well fissured and can be penetrated by roots. Localised patches of stonier soils may limit land quality at a few locations.

2.7 The second main soil type occurs in association with dry valley floors and lower lying areas and slopes to the west of the site. Soils typically comprise slightly calcareous to calcareous medium silty clay loam and silt loam topsoils overlying similar textures in the upper subsoil which may contain "funnels" of darker clayey material. An abrupt boundary to the lower subsoil occurs at 40 cm or more. Below this is a chalky drift comprising many (c. 50%) very small rounded (granular) chalk fragments in a pale calcareous silty clay loam matrix. The drift may continue to depths in excess of 90-100 cm but more commonly passes into chalk at variable depths or become impenetrable due to flinty bands. Flints are present throughout the profile comprising approximately 1-10% (v/v) of medium and large stones. In common with all soils on the site droughtiness in the main limitation to agricultural use. However at some locations heavy silty clay loam topsoils also impose a minor workability constraint.

2.8 Very small areas of disturbed soils occurred in small patches in the south-west presumably associated with the past airfield use of the site.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of the survey area is primarily determined by interactions between climate and soil factors, namely droughtiness.

ALC grades 2 and 3a have been mapped and a breakdown of these grades in terms of area and extent is given below:

Grade	ha	% of total agricultural land
2	41.5	59
3a	28.8	41
Total agricultural Area	70.3	
Total Area	71.8	

Appendix 1 gives a generalised description of the grades and subgrades identified in this survey.

Grade 2

3.2 Land of this quality occupies approximately 59% (41.5 ha) of the total agricultural land on the site. Profiles typically comprise slightly calcareous to calcareous medium silty clay loam and silt loam topsoils overlying similar textures in the upper subsoil. The lower subsoil comprises chalky drift passing into chalk at variable depths below about 45-50 cm. These soil profiles do not exhibit any drainage imperfections and are thereby allocated to wetness class I. However, climatic factors, soil textural conditions and chalk and flint stones at this locality combine to render the soils prone to slight droughtiness. These soils are easy to work and capable of growing a range of crops.

Grade 3a

3.3 Land of this quality occupies approximately 41% (28.8 ha), of the total agricultural land at the site and occurs in 3 situations to the

north, and south in a band across the centre of the site and a circular area to the east. In general these soils are similar to those graded 2 but are shallower and/or have a higher chalk or flint stone content.

3.4 The largest area of Grade 3a land occurs to the centre and north of the site. Soils are characteristically shallow over chalk. Topsoils are typically silt loam or medium silty clay loam over a subsoil comprising a mixture of soft white chalk and soil, reaching harder bedded, rubbly chalk generally within 45-50 cm where the profile may become impenetrable (to soil auguer).

3.5 The remaining soils are characteristically silt loam topsoil overlying a shallow medium silty clay loam upper subsoil with an abrupt change to chalky drift, pale in colour and calcareous. This overlies soft chalk at shallow depth (within c. 45-50 cm) becoming impenetrable over hard bedded chalk.

3.6 All the above soils are well drained and fall into wetness class I. Droughtiness due to shallow depth over chalk, and at some locations topsoil stone contents of up to 15% v/v (>2 cm of flints) which may hinder cultivations and increase tyre and implement wear, are the main determinants of land quality. At some limited locations total topsoil stone contents are in excess of 15% v/v, however, these volumes invariably comprise a high proportion of soft chalk stones for which the general stoniness criteria are relaxed (MAFF, 1988).

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REFERENCES

British Geological Survey (1978) Sheet 283, ANDOVER.

Soil Survey of England and Wales (1983) Sheet 6, Soils of S.E. England.

Meteorological Office (1988) Climatological Data Sets for Agricultural Land Classification.

Soil Survey of England and Wales (1984) Bulletin No. 15, Soils and their use in South East England.

MAFF (1988) Agricultural Land Classification Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.

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. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and 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 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 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.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: golf courses, private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

Agricultural buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg polythene tunnels erected for lambing) may be ignored.

Open water

Includes lakes, ponds and rivers as map scale permits.

Land not surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above land cover types, eg buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.

APPENDIX

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six revised soil wetness classes (Hodgson, in preparation) are identified and are defined in Table 11.

Table 11 Definition of Soil Wetness Classes

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 not wet within 40 cm depth for more than 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 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 and 90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years *or*, if there is no slowly permeable layer 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.

[1] The number of days specified is not necessarily a continuous period.

[2] 'In most years' is defined as more than 10 out of 20 years.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.