0301-009-92

AGRICULTURAL LAND CLASSIFICATION

Dinton Hall, Dinton,
Buckinghamshire.

Ministry of
Agriculture
Fisheries
and Food

PR

AGRICULTURAL LAND CLASSIFICATION
DINTON HALL, DINTON, AYLESBURY

1. BACKGROUND

1.1 Land at this 65.8 hectare site was inspected on the 23rd-31st June 1991 in connection with a proposal for a sport and leisure complex development. At the time of survey the land was predominantly under pasture, except for a small area towards the south west of the site, that was under barley.

1.2 The survey was carried out using 1.2 m Dutch soil augers with sampling densities of approximately 100 m intervals on a regular sampling grid. In addition three soil pits were inspected to enable more detailed soil examination.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies between 74 and 86 m A.O.D. Land is highest towards the centre and north of the site, with land falling away towards the north, east, and west. Gradient is not a limitation in terms of land quality at this location.

Climate

2.2 Estimates of climatic variables were obtained by interpolation from a 5 km grid database (Met. Office, 1989) for a representative location in the survey area.

Climatic interpolation

Grid Reference	SP 700 050
Altitude m (A.O.D.)	74-86
Accumulated temperature (° day Jan-June)	1420-1407
Annual average rainfall (mm)	624-630
Field Capacity Days	133-132
Moisture deficit, wheat (mm)	111-108
Moisture deficit, potatoes (mm)	104-100

2.3 The important parameters in assessing an overall climatic limitation are average annual rainfall (a measure of overall wetness) and accumulated temperature (a measure of the relative warmth of a locality). Although average annual rainfall is relatively low in a national context, there is no overall climatic limitation affecting the land quality of this site. However climatic factors do affect interactive limitations between soil and climate namely, soil wetness and droughtiness

Geology and Soils

2.4 British Geological Survey Sheet 46 SW (1834) shows much of the site to be underlain by Kimmeridge Clay, although across the lower slopes, adjacent to the village of Dinton, deposits of Portland stone and sand occur.

2.5 Soil Survey of England and Wales, Sheet 6 Soils of South East England (1983) shows the site to comprise soils of the Evesham II Association. These soils fall into two categories. "Calcareous Pelosols" whose brownish upper horizons are calcareous and well structured, and those which are termed "Pelo Stagnogleys" with non calcareous, often poorly structured greyish upper horizons with ochreous mottles (SSEW 1984).

2.6 Detailed field examination of the soils, indicates that there are three soil types present.

2.7 The first group of soils are those which occurs most extensively throughout the site, found predominantly on the lower-mid slopes. Profiles typically comprise medium or heavy clay loam topsoils, which may be calcareous or non calcareous. These rest over heavy clay loams in the upper subsoil and pass to clay between about 25 and 55 cm. Evidence of imperfect drainage in the form of distinctive mottling occurs between the surface and 55 cm. Occasional profiles were found to comprise medium or heavy clay loam topsoils over fine sandy clay loam or heavy clay loam subsoils which were found to be mottled and gleyed between 25 and 80 cm. Although these soils are imperfectly drained, the subsoils were not found to be slowly permeable.

2.8 The second group of soils comprise very calcareous medium or heavy clay loam topsoils, with c. 1-10% v/v small to medium calcareous mudstone fragments, over similar textures, with c. 10-20% v/v calcareous mudstone fragments in the subsoil, and becoming impenetrable, (to soil auger) due to the underlying geology of calcareous mudstone. Occasional profiles were found to comprise calcareous medium clay loam topsoils, over similar textures, with c. 2% v/v calcareous mudstone fragments, over fine sandy clay loam or heavy clay loam, becoming lighter in texture with depth, or becoming impenetrable (to soil auger) due to the underlying geology.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading at this location is primarily determined by interactions between climate and soil factors, namely wetness and droughtiness.

Grade 3a

3.3 Land of this quality occupies approximately 33.6% (21.5 ha) of the total agricultural land of the survey areas, and occurs in two situations.

Grade 3a soils found on the mid slopes towards the centre, and to the east of the site, comprise calcareous heavy clay loam topsoils, with 1-3% v/v calcareous mudstone fragments, over similar textures, with c. 5-20% v/v calcareous mudstone fragments, becoming impenetrable (to soil auger) due to the underlying geology of calcareous mudstone, between about 50 and 60 cm. Occasional profiles were deeper over calcareous mudstone (i.e. 55-110 cm) and thus of a slightly higher quality. However the extent of such profiles were not sufficient to warrant delineating as a separate mapping unit.

These soils are well drained, wetness class I, but are restricted by droughtiness which is the main limitation to this land.

The second group of soils occurs on the lower slopes of the site towards the north and north east. Profiles typically comprise non calcareous to slightly calcareous medium or heavy clay loam topsoils, over heavy clay loam in the subsoil, which is mottled and gleyed between about 19-32 cm. Profiles pass to slowly permeable clay between about 40-75 cm. The clay has a stone content of about 5-20% v/v calcareous mudstone.

These soils are assigned to wetness class II and III. They possess both a wetness and workability restriction in terms of agricultural land quality, thereby limiting the quality to grade 3a.

Grade 3b

3.4 Land of this quality occupies approximately 40.4% (25.8 ha) to the total agricultural land within the survey area and occurs in two situations.

Profiles typically comprise non calcareous medium or heavy clay loam topsoils, over heavy clay loam with evidence of gleying occurring between the surface and 35 cm. Profiles pass to slowly permeable clay between about 26-50 cm. These soils are limited by wetness, resulting from slowly permeable clay horizons, which gives rise to impeded drainage. They are assigned to wetness class II accordingly, and are limited in terms of their agricultural use, by poor drainage and workability restrictions.

The second group of 3b profiles, occur on the upper slopes along the southern boundary. Profiles typically comprise calcareous medium or heavy clay loam topsoils, with c. 2-10% v/v calcareous mudstone, over medium clay, with c. 2-20% v/v calcareous mudstone fragments. Profiles become impenetrable over mudstone between about 30 and 52 cm.

The soils are well drained and thus assigned to wetness class I, but are limited by droughtiness as a result of shallow depths over mudstone, which imposes a restriction in terms of agricultural land quality.

January 1992
Ref: 0301/012/91

N SHIRT/M LEEK
Resource Planning Group
Reading RO

SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1834) Sheet 46 SW.

MAFF (1988) Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

METEOROLOGICAL OFFICE (1989) Climatic datasets for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 6, Soils of South East England.

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and their use in South East England, Bulletin 15.

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.