4010/002/91

AGRICULTURAL LAND CLASSIFICATION

LAND AT EWHURST, NEAR CRANLEIGH, SURREY

AGRICULTURAL LAND CLASSIFICATION
LAND AT EWHURST, NEAR CRANLEIGH, SURREY

1.0 INTRODUCTION

1.1 A detailed Agricultural Land Classification (ALC) survey of 69.82 ha of land was undertaken from 28-31 January 1991 in connection with golf course development proposals. The survey was commissioned by John Schwerdt Associates, St Andrews Lane, Lewes.

1.2 The Agricultural Land Classification (ALC) system 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 4 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 the 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.

1.3 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 where chemical properties may influence the long term potential of land, these are taken into account.

1.4 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 2 subgrades designated 3a and 3b.

1.5 Details of the ALC System are contained in MAFF's Revised guidelines and criteria for grading the quality of agricultural land (MAFF 1988). Descriptions of the ALC grades and subgrades are provided in Appendix I.

2.0 BACKGROUND TO THE SITE

2.1 An ALC survey was carried out over 69.82 ha of land which is the subject of a proposed golf course development.

2.2 The site is located to the south east of Ewhurst Green, some 3 Km east of Cranleigh. It is bounded on the western side by a minor road and horse paddock, to the north by sporadic housing along another minor road, and to the south and east by woodland and a stream.

2.3 A total of 66 inspections were made over the site using a spade and dutch auger to assess the general soil characteristics. In addition 4 soil pits were dug to determine in more detail the subsoil structure and drainage conditions of the main soil types on the site.

2.4 At the time of survey the 2 fields at the eastern end of the site were under permanent grass and used for horse grazing while the remainder of the site was in stubble.

2.5 The site is shown as Grades 3 and 4 on Ministry of Agriculture's Agricultural Land Classification map Sheet 182 (MAFF, 1972). These maps were initially compiled at a reconnaissance level for strategic planning purposes and do not show smaller areas (ie less than 80 ha) of individual ALC grades.

3.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

3.1 Climatic information for the site has been interpolated from the 5 Km dataset produced by the Meteorological Office (Met Office 1989). The average annual rainfall for the site is 807 mm and the soils are likely to be at field capacity for a period of 171 days. Consequently the heavier textured soils may be susceptible to damage from agricultural operations during the late autumn and early spring.

3.2 The accumulated temperature for the area is 1449 degrees Celsius. This parameter indicates the cumulative build up of warmth available for crop growth and has an influence on the development of moisture deficits (MD)* and susceptibility to drought; the moisture deficits for wheat and potatoes are 101 mm and 93 mm respectively.

* MD 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.

3.3 Climate itself is not a limiting factor but its interaction with soil properties has a major bearing on the land quality of this site.

Relief

3.4 The site lies at an altitude ranging from 80 m in the east falling to 70 m in the south and west adjacent to the stream. The slopes are gentle throughout the site and nowhere form a limiting factor in terms of land quality.

Geology and Soils

3.5 The published 1:50,000 geology maps which cover the area (Geological Survey 1969 and 1972) indicate that the site is on Weald Clay, with superficial coverings of head and alluvium over parts of the site. Field observations support this general description, with soils developed directly on the Weald Clay at the eastern end of the site. Alluvial soils occur adjacent to the stream in the south west and the remainder of the site comprises soils developed in the drift and head deposits overlying the Weald Clay.

3.6 The published 1:250,000 soil map for the area (Soil Survey 1984) indicates that the site is occupied by soils of the Shabbington and Wickham 1 Associations and field observations correlate well with the soils included within these associations.

3.7 At the eastern end of the site where the soils are developed on the Weald Clays, a typical soil profile has a greyish brown clay topsoil with faint ochreous mottling overlying a grey clay subsoil. The subsoil is strongly mottled, stoneless and has a coarse prismatic structure, making water movement through these soils very slow.

3.8 Occurring in a narrow band adjacent to the stream on the lowlying land at the south west of the site are soils developed in alluvium. These soils have a clay topsoil which is stoneless, overlying a similar textured mottled clay subsoil. Beneath this at depth the soils occasionally became browner and had a silty clay loam texture. Due to the lowlying nature of the land these soils are susceptible to a fluctuating groundwater table as well as slow permeability due to the heavy soil textures.

3.9 Over the remainder of the site, soils developed in head deposits overlying the Weald Clays were found. Two distinct soil types were evident differing mainly in the topsoil texture. Over the western side of the site the soils had a heavy clay loam or occasionally clay textured topsoil which was generally stoneless overlying a strongly mottled heavy clay loam or clay upper subsoil. Beneath this the

texture was invariably clay. Soil structure was generally coarse or very coarse blocky and a few highly weathered tabular sandstones were found at depth.

3.10 In the middle of the site the second soil type, developed on the head deposits, was mapped. These soils were generally slightly browner having a medium clay loam friable topsoil over a porous greyish brown friable heavy clay loam upper subsoil which showed distinct ochreous mottling. Beneath about 50 cm depth the soils became greyer and generally slightly sandy having textures ranging from sandy clay loam to clay. Bands of blackish highly weathered sandstone fragments were found overlying the Weald Clay in many profiles, giving rise to darker colours in the soil matrix.

Drainage

3.11 All the soils on the site were strongly gleyed and mottled, indicative of both slow permeability and shallow groundwater tables in the lower areas of the site. All the land appeared to be tile drained with some outfalls evident, although no details were available at the time of survey.

3.12 The proposed use as a golf course would require a comprehensive drainage system to enable the land to be playable all year. Due to the heavy textured soils and the slow permeability of the subsoil horizons, any drainage system would require gravel backfill over all the lateral drains to remove excess water from the topsoil.

3.13 While adequate falls existed over the majority of the site the lowlying land adjacent to the stream at the south west of the site might cause problems during periods of high rainfall. A rise in groundwater table levels together with a rise in stream levels might result in drain outfalls being below water and hence the backing up of drains. However the network of ditches on the site mean that this problem should be restricted to the alluvial soils in the south west.

4.0 AGRICULTURAL LAND CLASSIFICATION

4.1 The site has been graded using the revised guidelines of the ALC system (MAFF 1988). A breakdown of the grades in hectares and percentage terms is given below.

ALC Grade	Hectares	%
3a	13.76	20
3b	56.06	80
TOTAL	69.82	100

Grade 3a

4.2 Three areas of Grade 3a were mapped, two small ones at the north west of the site and a larger area in the middle. These areas correspond to the soils developed on the head deposits overlying the Weald Clays which have medium clay loam topsoils. These soils are imperfectly drained (wetness class III). The major limitation therefore on this land is due to soil wetness and the attendant workability restrictions. The moderately high number of field capacity days (ie the period when rainfall exceeds evapotranspiration and excess water must be removed by drainage) effectively limit the periods when these soils can be trafficked and worked without causing structural damage thus reducing the versatility of the land.

Grade 3b

4.3 The remainder of the site has been classified as Grade 3b on account of the heavier textures of the topsoil. All the soils have either a heavy clay loam or clay topsoil and have been assessed as wetness class III or IV and so the problems of wetness and workability referred to above are more intense. Consequently the range of cropping is reduced and the soils are more susceptible to structural damage which means the land is best kept mainly under grass or winter cereals.

REFERENCES

Geological Survey of Great Britain (1969)	Solid and Drift Edition Geology Map Sheet 301, Haslemere
Geological Survey of Great Britain (1972)	Solid and Drift Edition Geology Map Sheet 302, Horsham
MAFF (1972)	Agricultural Land Classification Map, Sheep No 182
MAFF (1988)	Agricultural Land Classification of England and Wales
Meteorological Office (1989)	Climatological Data for Agricultural Land Classification.
Soil Survey of England and Wales (1984)	Soils and their Use in South East England

APPENDIX 1

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 II

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.