# AGRICULTURAL LAND CLASSIFICATION

# WITNEY LOCAL PLAN

# OXFORDSHIRE

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## 1. SUMMARY

1.1 A total of approximately 138 ha of land to the north and north-east of Witney in Oxfordshire was inspected in April 1992 in connection with local plan proposals.

An Agricultural Land Classification (ALC) survey was carried out in accordance with the guidelines and criteria outlined in the MAFF publication 'Agricultural Land Classification of England and Wales', (MAFF, 1988). These guidelines provide a framework for classifying land according to the degree to which its physical and chemical characteristics impose long term limitations on agricultural use.

1.2 123 auger boring samples were examined on the basis of a 100 m grid. Further information was obtained from four soil inspection pits.

At the time of survey, the land was in a variety of uses. The northern site was mainly under winter cereals, peas or had been recently cultivated. A few fields were in permanent pasture being grazed by horses. Across the southern site a mixture of horticulture, (mainly soft fruit), cereals and permanent pasture was observed.

1.3 The results of the survey are presented on the accompanying coloured plans at a scale of 1:10,000. The plans are accurate only at this scale and any enlargement would be misleading. Grades 3a and 3b have been mapped, the areas and extent are given below.

a) Northern Site

| | Area (ha) | % total agricultural area |
|---|---|---|
| Grade 3a | 23.02 | 34 |
| 3b | 43.78 | 66 |
| Total agricultural area | 66.80 | |
| Woodland | 0.1 | |
| Non-agricultural | 2.3 | |
| Urban | 3.2 | |
| Agricultural buildings | 0.8 | |
| Not Surveyed | 2.0 | |
| Total area of site | 75.2 | |

b) North-eastern site

| | Area (ha) | % total agricultural area |
|---|---|---|
| Grade 3a | 8.46 | 15 |
| 3b | 49.28 | 85 |
| Total agricultural area | 57.74 | |
| Non-agricultural | 4.63 | |
| Urban | 0.5 | |
| Agricultural buildings | 0.86 | |
| Total area of site | 63.73 | |

1.4 A general description of the grades and sub-grades identified in this survey is attached at Appendix 1.

1.5 Two broad soil types were identified across both sites. Most extensively, shallow and brashy soils resting over limestone were observed. Typically they comprise heavy clay loam or clay topsoils passing to clay in the subsoil and becoming impenetrable, (to soil auger) over brashy limestone at variable depths. These soils are subject to a droughtiness limitation due to reduced reserves of available water. Land is graded 3a or 3b depending on the relative depths over limestone and thus severity of the drought limitation. Although the majority of these soils are well drained, they have a workability limitation as a result of relatively heavy topsoil textures. This will have the effect of imposing restrictions on cultivations and grazing by livestock.

The other soil type identified during this survey comprises deep clayey soils which tend to be poorly drained. Clay loam or clay topsoils overlie clay in the subsoil which is commonly gleyed and slowly permeable. These soils suffer from a wetness and workability limitation and are assigned to grade 3a or 3b depending on relative depths to gleyed and slowly permeable horizons.

## 2. PHYSICAL FACTORS AFFECTING LAND QUALITY

### Climate

2.1 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

| | Northern Site | North-eastern Site |
|---|---|---|
| Grid Reference | SP 361 113 | SP 370 103 |
| Altitude (m, AOD) | 91 | 91 |
| Accumulated Temperature (°days, Jan-June) | 1411 | 1411 |
| Average Annual Rainfall (mm) | 709 | 707 |
| Field Capacity Days | 156 | 155 |
| Moisture deficit, wheat (mm) | 101 | 101 |
| Moisture deficit, potatoes (mm) | 92 | 92 |

2.2 Climatic factors place no limitation on agricultural land quality at this locality. They do, however, influence the interaction between soil and climatic factors which affects the interactive limitations of soil wetness and droughtiness.

### Geology and Soils

2.3 The published geological survey map for the site, (Sheet 236, Witney, Institute of Geological Sciences, 1982), shows a series of middle Jurassic deposits of Bathonian age, including Kellaways sand and clay, Cornbrash, Forest Marble and White Limestone. The youngest deposits of Kellaways sand and clay have been mapped across the south of the site and the deposits become progressively older passing to White Limestone towards the north-west.

2.4 Soil Survey of England and Wales, Sheet 6 (1983) indicates the presence of three soil associations across the sites. The Elmton 1 association has been mapped across the north-eastern site and part of the north site. These soils are described as 'fine loamy or clayey and variably stony' (SSEW, 1984) having developed over Jurassic limestone and clay beds. Similar Elmton 3 association soils are shown across much of the north site. This association comprises 'shallow loamy and clayey soils over Jurassic limestone and deeper slowly permeable soils on clay', (SSEW, 1984), such as the Denchworth series, a small unit of which is shown to the south and south-west of Merryfield Farm.

2.5 Detailed field examination of the soils on the two sites north and north-east of Witney, broadly confirms the presence of soils derived from interbedded Jurassic limestone and clay deposits.

## 3. AGRICULTURAL LAND CLASSIFICATION

### 3.1 Grade 3a

Land graded 3a comprises stoneless to slightly stony (ie. 0-12% v/v limestone fragments >2 cm) heavy clay loam or clay topsoils which overlie similarly textured upper subsoils. Stone contents tend to increase below the topsoil up to about 30% v/v limestone brash. It is common for profiles to become impenetrable (to soil auger) over more brashy horizons containing about 30-65% v/v limestone fragments at variable depths between about 30 and 60 cm. All profiles are freely draining, wetness class I.

The principal limitation to the quality of land graded 3a is that of droughtiness. Due to the shallow and brashy nature of the soils, they have reduced reserves of water available for plant growth and thereby suffer from a moderate drought risk. In addition, some land may also be limited by topsoil stone contents between 10 and 15% v/v >2 cm and/or workability due to relatively heavy topsoil textures.

### 3.2 Grade 3b

Land of this quality occurs in two situations across the sites.

- Much of the land graded 3b is similar to that described above for Grade 3a land, but profiles are more stony and/or shallower over very stony horizons containing 30-65% v/v brashy limestone. Such profiles have lower reserves of available water than those described in Section 3.1, and are thus prone to severe drought risk. As with Grade 3a land, droughtiness is the main limitation acting where profiles are shallow and brashy over limestone deposits. However land may also be subject to a limitation of topsoil stone contents in the range 15-35% v/v 2 cm and/or workability as a result of heavy clay loam or clay topsoil textures.

- Some of the land assigned to this grade, particularly that towards the south of the north-east site, comprises deep, poorly drained soils that are limited by wetness and workability. Heavy clay loam or clay topsoils typically rest over gleyed and slowly permeable clay in the subsoil. Profiles are poorly drained, wetness class III or more usually IV. Occasional profiles become impenetrable (to soil auger), over very brashy horizons at variable depths.

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SOURCES OF REFERENCE


- INSTITUTE OF GEOLOGICAL SCIENCES, (1982), Sheet 236, Witney.

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

- METEOROLOGICAL OFFICE (1989) Climatological datasets for Agricultural Land Classification.

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

- SSEW (1984) Bulletin 15, 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: 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.