

PROOF OF EVIDENCE
AGRICULTURAL LAND CLASSIFICATION
DUXFORD



Town & Country Planning Act 1990

Cambridge Sub-Regional Shopping Centre
Public Inquiry

Proof of Evidence
by
Katherine A Jewson

on behalf of
Ministry of Agriculture, Fisheries & Food

in respect of land at

DUXFORD

MAFF

Resource Planning Group
CAMBRIDGE REGIONAL OFFICE

September 1991

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AGRICULTURAL LAND CLASSIFICATION MAP

1.0 INTRODUCTION

My name is Katherine Ann Jewson. I am a Senior Research Officer for the Eastern Region of the Ministry of Agriculture, Fisheries and Food. I have a BA (Honours) Degree in Geography and Economics awarded by the University of Lancaster. I have been employed by the Ministry of Agriculture for eight years and have worked at the Ministry's Regional Offices in Leeds and Cambridge. Throughout this time a large proportion of my work has been concerned with the classification of agricultural land for land use planning purposes.

2.0 PLANNING CONSULTATION

2.1 I am attending this inquiry at the request of my colleague Mr Alasdair Sellers to provide information on agricultural land quality at the Duxford site, which I surveyed in July 1989. The results of this survey are summarised as follows:

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 ALC	Ha	%
3a	23.8	35.4
3b	29.7	44.1
Non Agricultural	1.8	2.7
Urban	11.4	16.9
Unsurveyed	<u>0.6</u>	<u>0.9</u>
Total	<u>67.4</u>	<u>100.0</u>

3.2 Details of the MAFF Agricultural Land Classification system, the methodology used, and the chief limitations to agricultural land quality are provided in sections 4.0 to 7.0 of this proof.

4.0 THE MAFF AGRICULTURAL LAND CLASSIFICATION SYSTEM

- 4.1 The MAFF Agricultural Land Classification (ALC) system assesses land quality based on its long term physical potential. Land is assigned to an ALC grade according to the degree to which its inherent physical characteristics impose long term limitations on agricultural use.
- 4.2 The main physical factors which are taken into account in assessing ALC grade are climate, site and soil. These may act singly, or in combination to result in varying degrees of constraint on agricultural use. The ALC grade is determined by the most limiting factor present.
- 4.3 Five main grades of land are recognised ranging from grade 1 land of excellent quality to grade 5 land of very poor quality. Other issues, such as the location of farms, the standard of fixed equipment and the accessibility of land do not affect grading although they may influence land use decisions. The definitions of the five Agricultural Land Classification grades are included in Annex 1.

5.0 BACKGROUND TO THE DUXFORD SITE

- 5.1 Land on this 67 hectare site was inspected during July 1989 in connection with proposals to develop a sub-regional shopping centre and leisure development. A total of 70 soil inspections were made on site on a 100 metre grid basis and supplementary information was collected from four soil profile pits. At the time of survey the land was in arable use, typical crops including cereals, sugar beet and peas.

6.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

- 6.1 The site straddles a wide, gently sloping open valley feature. Altitude ranges from just over 34 metres close to the M11 roundabout in the west, to a little over 25 metres where the valley bottom crosses the eastern site boundary. Neither altitude nor relief constitute limiting factors to agricultural land quality.

Climate

- 6.2 Site specific climatic data was obtained from the 5 km grid agroclimatic dataset produced by the Meteorological Office (Met Office, 1989). This shows average annual rainfall to be approximately 582 mm (23.3 inches) which is low by national standards. Soils are likely to be at field capacity for a relatively short period of approximately 105 days.
- 6.3 The accumulated temperature for this area is approximately 1431 degrees celsius. This parameter indicates the cumulative build up of warmth available for crop growth and has an influence on the development of soil moisture deficits (SMD)*. Soil moisture deficits of 119 mm and 115 mm are recorded for wheat and potatoes respectively. In order to counter the effects of these deficits (in terms of drought stress in crops) it is necessary for soils to hold adequate reserves of plant available water.

Geology

- 6.4 The geology of this area is shown on the 1:63,360 scale geology map, sheet number 205 (Geol. Surv, 1952). This shows the site is comprised of Cretaceous Middle Chalk, which is overlain in a small area flanking the Moorfield Road in the east by the river valley gravels, and, in a narrow strip bordering the A505 (Royston Road) by glacial gravels. Elsewhere the Chalk is shown as being exposed.

* 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.

Soils

- 6.5 Published soil map indicate that the site is mainly comprised of soils of the Swaffham Prior soil association, with smaller areas of mainly Milton and Moulton soil associations occurring along the eastern and northern boundaries (SSEW 1968 & SSEW 1984). Detailed field survey observations broadly confirm this description but indicate that the two minor soil associations are rather smaller in extent than indicated on the published maps.
- 6.6 In very general terms soils occurring on site are free draining (wetness class I) and comprise medium loamy (sandy clay loam, medium clay loam, sandy loam and sandy silt loam) textures overlying poorly structured rubbly chalky drift**, which in turn overlies hard chalk at depth.
- 6.7 Occasionally, on the valley sides, sandy clay loam textures directly overlie chalk at variable depths. Soil pit observations on site indicate that in most locations the chalk and rubbly chalky drift substrates are fairly hard, have relatively few fissures and shows only limited penetration by plant roots. (In many instances a dense root mat was observed at the surface of the underlying chalk, indicative of a root penetration problem.) In general terms soils were only very slightly stony at the surface (comprising mainly medium and small rounded chalk pebbles and subangular flints) - often becoming slightly or occasionally moderately stony at depth.
- 6.8 Some soil disturbance was evident in the vicinity of the reservoir. This is believed to be associated with the removal of runway lights previously required for the Duxford airfield.

** Rubbly chalky drift: chalk stones in a matrix of finely divided chalk mixed with sand, having a dense laminar/platy structure.

7.0 AGRICULTURAL LAND CLASSIFICATION

7.1 This site is covered by a current irrigation license, which at present is unused. If utilised this modest irrigation facility would make feasible the production of a small area of more demanding crops (eg potatoes) or very slightly enhanced yields of crops currently produced without the benefit of irrigation (eg. sugar beet and peas). However the abstraction levels permitted under this license are inadequate to permit any overall upgrading of land quality across the site. Therefore ALC grading presented on the accompanying map refers to the long term agricultural potential of the site in an unirrigated state.

Grade 3a

7.2 This is mapped extensively on gently sloping land on the mid valley sides. Profiles are typically stoneless or very slightly stony and comprise moderately deep profiles of sandy loam sandy clay loam and clay loam textures typically overlying chalk or poorly structured rubbly chalky drift below 60 cm. The land is limited by droughtiness imperfections which often derive from the inability of crop roots to deeply penetrate the underlying chalk, or rubbly chalky drift, and fully exploit the reserves of plant available water it holds.

Grade 3b

7.3 This occurs extensively on site where shallower, variably stony medium loamy soils overlies rubbly chalky drift between 35-60 cm, which subsequently overlies chalk at depth. This land is limited by slightly more severe droughtiness constraints arising from the reduced depth of medium loamy soil material over poorly structured rubbly chalky drift or chalk.

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GEOLOGICAL SURVEY 1952). 1:63,360 scale drift edition geological sheet number 205.

MAFF (1988). Revised guideline and criteria for grading the quality of agricultural land.

METEOROLOGICAL OFFICE (1989). Climatological data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND & WALES (1968). 1:63,360 scale soil map sheet number 148.

SOIL SURVEY OF ENGLAND & WALES (1984). 1:250,000 scale soil map of Eastern England (Sheet 4), and accompanying Bulletin 13.

ANNEX 1

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 will affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. When 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, 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 yield of which are variable. In most 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.