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Agricultural Land Classification

Bedford Road,

Cople.

## AGRICULTURAL LAND CLASSIFICATION

### LAND AT BEDFORD RD, COPLE, BEDFORDSHIRE

#### 1. INTRODUCTION

- 1.1 A detailed Agricultural Land Classification (ALC) of this 1.2 hectare site was made during September 1989.
- 1.2 The Agricultural Land Classification 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 four 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 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 chemical properties may also influence the long term potential of land and 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 two subgrades designated 3a and 3b.
- 1.5 Details of the Agricultural Land Classification (ALC) System are contained in MAFF's Technical Report "Revised guidelines and criteria

for grading the quality of agricultural land". Descriptions of the ALC grades and subgrades are provided in Appendix 1.

## 2. BACKGROUND TO THE SITE

2.1 On the Ministry's published 1:63360 scale provisional ALC map (Sheet No 147) (MAFF, 1969) the site is mapped as grade 1. For detailed site-specific appraisals however, these maps are inappropriate as they were initially surveyed at a reconnaissance level, for strategic planning purposes, and often do not show smaller areas (ie, less than 80 hectares) of individual ALC grades.

2.2 The site comprises one enclosure and is currently not tenanted.

2.3 A total of 8 soil inspections were made over the site using a hand held 125 cm Dutch soil auger. These inspections were supplemented by observations from 2 soil pits.

## 3. PHYSICAL FACTORS AFFECTING LAND QUALITY

### Climate

3.1 Site specific climatic data has been obtained by interpolating information contained in the 5 km grid dataset produced by the Meteorological Office, (Met Office, 1989).

3.2 The annual average rainfall is approximately 570 mm (22.4") which is low by national standards. Soils are likely to be at field capacity for a relatively short period of approximately 97 days. During this time the workability of the land is not likely to be impaired because of the relatively free draining nature of the subsoils.

3.3 The accumulated temperature for this area is approximately 1452 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)\* and susceptibility to drought; the soil

\* 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.

moisture deficits for potatoes and wheat are 115 mm and 120 mm respectively.

- 3.4 The site is neither particularly exposed nor frost prone.
- 3.5 The climatic characteristics described in paragraphs 3.2-3.4 above do not impose any climatic limitation to the ALC grading of the survey site.

#### Altitude and Relief

- 3.6 The land lies fairly level across the site at an altitude of 25 m AOD. Gradient and altitude do not constitute limitations to the ALC grade.

#### Geology and Soils

- 3.7 The published small scale (1:250,000) geology map sheet 52 (Institute of Geological Sciences, 1983) shows the site to comprise Oxford Clay. (Jurassic Period). The Soil Survey of England and Wales Technical Bulletin No 13 (1984, 1:250,000 scale) indicates that terrace gravel drift overlies this clay in the vicinity of Cople.
- 3.8 The Soil Survey of England and Wales have mapped the soils in the Cople area on two occasions; In 1965 at 1:63360 scale and more recently in 1983, at a reconnaissance scale of 1:250,000. These maps show the occurrence of soils derived from terrace gravel deposits, namely the Biggleswade (\*1) and Efford 1 (\*2) Associations respectively. During this survey a more detailed inspection of the soils was carried out. Two main soil types occur over the site.
- 3.8.1 The majority of the site is covered by soils which typically comprise moderately droughty, (sandy) medium clay loam (or occasionally sandy loam) topsoils over moderately stony (or occasionally slightly stony) sandy clay loams which often contain bands of moderately stony medium sand at depth. Below 60/70 cm+ subsoils may comprise moderately stony

(\*1) Biggleswade Association: Gleyed brown earth derived from river gravels.

(\*2) Efford 1 Association: Well drained fine loamy soils often over gravel, associated with similar permeable soils variably affected by ground water.

medium sand or very slightly to moderately stony clay loams. Topsoil stone ranges from 5-10% small and medium subangular flints.

3.8.2 Running north-south through the centre of the site a narrow band of more droughty soils (than those described in paragraph 3.8.1) occur. They generally comprise very slightly stony medium clay loam topsoils over moderately stony sands which may contain lenses of moderately stony clay loam at depth.

3.8.3 Soil profile pit observations indicate that soils are significantly or moderately droughty and relatively free draining. (Wetness Class I or II).

#### 4. AGRICULTURAL LAND CLASSIFICATION (refer to Map 1)

4.1 A breakdown of the ALC grades in hectares and % terms is provided below.

| Agricultural Land Classification |       |       |
|----------------------------------|-------|-------|
| Grade                            | ha    | %     |
| 3a                               | 0.84  | 70    |
| 3b                               | 0.25  | 21    |
| Farm Buildings                   | 0.11  | 9     |
|                                  | <hr/> | <hr/> |
| Total                            | 1.20  | 100   |

Note: The ALC grading in this report and on the accompanying map relates to the long term potential of the land without irrigation.

4.2 The principal limitation to land quality is droughtiness. This was assessed using the Revised Guidelines and criteria for grading agricultural land (MAFF 1989). Crop adjusted available water capacity (AP)\*\* values were calculated for each sample profile, using maincrop potatoes and winter wheat as reference crops, characteristic of a broad range of arable and horticultural crops. These AP values were then offset against the crop adjusted soil moisture deficit values described

\*\* AP is a measure of the quantity of water held in the soil profile which can be taken up by a specific crop. The water storage capacity of soil is influenced by texture, structure, organic matter content and stone content. Where rooting is impeded for chemical or physical reasons, this is also taken into account.

in paragraph 3.3 to obtain moisture balance figures for wheat and potatoes. These moisture balance figures indicate the relative degree of the droughtiness limitation and relate directly to ALC grade. A description of the type of land occurring in each grade is provided below :

#### 4.3 Subgrade 3a

The majority of the survey site has been graded 3a. The land is associated with the soil type described in paragraph 3.8.1. The soils are moderately droughty and are relatively freely draining (wetness Class I or II\*\*\*). The occurrence of many flints in the subsoils has a moderate limiting affect on the available moisture capacity of these soils. As a result moderate droughtiness limitations exclude this land from grade 2. Flexibility of cropping remains high, but yields are generally lower, and also likely to be more variable than land graded 2.

#### 4.4 Subgrade 3b

The remaining land has been graded 3b (moderate quality land). This land is associated with the significantly droughty soils described in paragraphs 3.8.2. The combination of coarse textured subsoils and presence of many flints throughout these subsoils has a significant effect on the water holding capacity of these soils. As a result droughtiness is the major limitation to the ALC grade.

Resource Planning Group  
Cambridge RO

September 1989

\*\*\* At a few locations the wetness class was assessed as wetness class II, this occurred where profiles were wet (70/80 cm+) and/or gleyed at depth (60/70 cm+).

## Appendix 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 which 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, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

#### **Subgrade 3a - 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 most climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable crop.

**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.

References

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