

# Agricultural Land Classification

Bow Brickhill, Bletchley, Bucks.

Reconnaissance Survey.



## AGRICULTURAL LAND CLASSIFICATION

### BOWBRICKHILL, BLETCHLEY, BUCKINGHAMSHIRE

#### 1. BACKGROUND

- 1.1 The 57 ha site occupies most of the triangle formed by the Bletchley/Bedford Railway, the A5 (T), and the B557, just south of Bowbrickhill Station, to the east of Bletchley, Buckinghamshire.
- 1.2 The site was surveyed at a reconnaissance level, using 120 cm Dutch soil augers with samples taken at 200 m intervals across the site. Additional soil details were obtained by the examination of a soil inspection pit.
- 1.3 The site was surveyed in connection with the proposed scheme for residential and industrial development, the Crossroads Neighbourhood Plan. A small area was not surveyed as the consent of the owner to enter the land was withheld.
- 1.4 At the time of survey, the land to the north of Crossroads Farm was under cereals, with the land south of the farm, being under permanent grassland.

#### 2. PHYSICAL FACTORS AFFECTING LAND QUALITY

##### Relief

- 2.1 The site lies between approximately 67 and 78 metres, the land falling gently from the northeast of the site, westwards and southwards. Gradient is not a significant limitation in terms of land quality at this location.

##### Climate

- 2.2 The average annual rainfall for this area is approximately 631 mm (Met. Office, 1989), this being dry in a national context. The median accumulated temperature above 0°C between January and June, a measure of the relative warmth of the locality, is expected to be 1412 day degrees, (Met. Office 1989). The site has approximately 133 field capacity days, which provides a measure of the effect of climate on the soil water regime. Crop adjusted moisture deficits are 109 mm for wheat and 101 mm for potatoes. The site is unlikely to be especially frost prone or exposed.
- 2.3 Although average annual rainfall at this locality is relatively low climatic factors per se place no limitation on agricultural land quality. However interactive limitations between soil and climate namely soil wetness and droughtiness are affected by the climatic regime.

##### Geology and Soils

- 2.4 Geological Survey, Sheet 46 N.W. (Old Series - Solid) (1864), one inch to one mile, shows the site to be underlain by valley gravels, except for a small area to the south of Crossroads Farm, which is underlain by Oxford Clay.

- 2.5 Soil Survey of England and Wales, Sheet 6, Soils of South East England (1983), shows the Oxpasture Association; "fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging" (Stagnogleyic argillic brown earths), (SSEW, 1984) covering most of the site. At the extreme west of the site, soils of the Bishampton 2 association are mapped. These are described as "fine loamy slightly stony and occasionally waterlogged soils" (SSEW, 1984).
- 2.6 Field examination of the soils, indicates the presence of three soil types, across the site.
- 2.7 Firstly and most extensively are those soils found over almost all but the extreme west of the site. Typically this soil type consists of very slightly stony, (<2% hard ferrillitic sandstone), medium or heavy clay loam topsoils, over progressively heavier, mottled and gleyed clay subsoils, which are slowly permeable. The soils are placed in wetness Class IV.
- 2.8 Secondly, covering a small area to the extreme west of the site, are soils comprising stoneless sandy clay loam topsoils, over mottled and gleyed sandy clay loam and sandy loam subsoils, over impenetrable gravel in a sandy loam matrix at depth. The soils are placed in wetness class II.
- 2.9 Thirdly, covering the field immediately west of Crossroads Farm, is a small area of disturbed soils. The soil consists of a medium clay loam topsoil, over a grey clay, which is gleyed, slowly permeable and anaerobic. Soil is placed in wetness class IV.

### 3. AGRICULTURAL LAND CLASSIFICATION

- 3.1 The ALC grading of the survey area is primarily determined by the interactions between climate and soil factors, namely wetness and droughtiness. A small area of land has been graded on the basis of disturbance and poor drainage. ALC grades 2, 3b and 4 have been mapped, and a breakdown of these grades in terms of area and extent is given below.

<u>Grade</u>	<u>Area (ha)</u>	<u>% of total agricultural land</u>
2	3.15	7.46
3b	37.53	88.91
4	1.53	3.63
Total Agricultural area	42.21	100
Not Surveyed	12.93	
Non-Agricultural	1.2	
Total Area of site	56.34	

- 3.2 Appendix 1 gives a general description of the grades and subgrades identified in this survey.

#### 3.3 Grade 2

Land of this quality occupies approximately 7% of the total agricultural area of the site, occurring in its extreme western corner.

Associated with this grade are the soils described in Section 2.8. These soils are notably sandier than those over the rest of the site.

Topsoils consist of stoneless, non-calcareous sandy clay loams, over similar textures but slightly stony (5% flints), mottled and gleyed upper subsoils. These overlie increasingly sandy, gleyed lower subsoils, which become medium sandy loam in texture at approximately 65 cm and are wet. Gravel in a sandy loam matrix, which is impenetrable to soil auger, occurs at about 90 cm.

Both soil wetness and droughtiness slightly affect the soil. Evidence of soil wetness is found below the topsoil, where the soil becomes mottled and gleyed. The soil is wet in the lower subsoil at about 70-80 cm. Thus these soils are assigned to wetness class II.

The soils are also restricted to a maximum of grade 2 by droughtiness. This slight restriction is caused partially by the rather coarse nature of the subsoils, and the presence of an impenetrable layer of gravel in the lower subsoil at about 90 cm. Both these factors slightly reduce the water available to the plant, resulting in this slight droughtiness limitation.

#### 3.4 Grade 3b

Land of this quality occupies approximately 89% of the total agricultural area of the site. Slowly permeable clayey soils are associated with land of this quality.

Topsoils consist of non calcareous slightly stony (<2% flints), medium or heavy clay loam over heavier, gleyed subsoils. Upper subsoils are generally of medium clay texture (with medium sand), of poor structural condition, and slowly permeable. Mottling and gleying is evident. Below about 40 cm, the lower subsoil consists of a stoneless gleyed heavy clay (not sandy), which is again of poor structure and slowly permeable. Slightly sandy textures or gravel may be found at the bottom of profile from about 80 cm.

Soil wetness and workability are the chief limiting factors in these soils. The presence of gleyed and slowly permeable soil high in the profile, places the soil into wetness class IV, which in combination with the topsoil textures on the site, restricts the soils to a maximum of grade 3b.

#### 3.5 Grade 4

Land of this quality occupies approximately 4% of the total agricultural land area of the site. It occurs in the field immediately to the west of Crossroads Farm, where the level of land was raised in 1990 by the removal of the topsoil and the placement of additional soil forming materials. Topsoil has subsequently been replaced.

Soils comprise non calcareous medium clay loam topsoils, over a grey plastic clay at 25 cm. The clay is gleyed, slowly permeable and anaerobic and apparently of extremely poor structure.

Wetness and workability are therefore the chief limiting factors, the soils being assigned to wetness class IV. However, due to the disturbed nature of the soils, with the poorly developed soil structure, the land has been assigned to grade 4.

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W FEARNEHOUGH  
M LEEK  
Resource Planning Group  
Reading RO

SOURCES OF REFERENCE

GEOLOGICAL SURVEY OF GREAT BRITAIN, (1864), SHEET 45 S.E. (1846) Old Series (Solid).

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.

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

## APPENDIX I

### 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 <sup>1</sup>
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years <sup>2</sup> .
II	The soil profile is wet within 70 cm depth for 31-90 days in most years <i>or</i> , 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 <i>or</i> , 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 <i>or</i> , 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.

<sup>1</sup> The number of days specified is not necessarily a continuous period.

<sup>2</sup> '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.