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AGRICULTURAL LAND CLASSIFICATION

Lower Spring Grove Farm
Mursley,Buckinghamshire.

Ministry of
Agriculture
Fisheries
and Food

AGRICULTURAL LAND CLASSIFICATION
SPRING GROVE FARM, MURSLEY, BUCKINGHAMSHIRE

1. BACKGROUND

1.1 The 61.4 hectare site lies to the south east of Buckingham near the village of Mursley. The area is bounded to the north and west by a railway line and the south by 'Station Road'. The eastern boundary is marked by hedgerow and fencing.

1.2 The area was surveyed on 23rd and 24th April 1991 using 120 cm Dutch soil augers with samples being taken at approximately 100 m intervals across the site. In addition four soil pits were examined to enable more detailed soil descriptions.

Land Use

1.3 At the time of survey most of the area was under winter cereals. The remaining fields which follow the eastern boundary were in Set Aside.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The altitude of the site varies between approximately 125-145 m AOD with the highest land occurring towards the south. The land falls gently in all directions from the south towards the north and west. Nowhere on the site does gradient or altitude represent a significant limitation to agricultural land quality.

Climate

2.2 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

Grid Ref	SP4812 2294
Altitude (m AOD)	125 - 145
Accumulated temperature (°day Jan-June)	1331 - 1353
Annual average rainfall (mm)	661 - 664
Field capacity days	140 - 141
Moisture deficits wheat (mm)	99 - 101
Moisture deficits potatoes (mm)	88 - 91

2.3 The important parameters in assessing an overall climatic limitation are average annual rainfall (a measure of overall wetness) and accumulated temperature (a measure of the relative warmth of a locality). Although average annual rainfall is relatively low in a national context, there is no overall climatic limitation affecting the land quality of this site. However climatic factors do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

Geology and Soils

2.4 British Geological Survey Sheet 46 NW (1864), Buckinghamshire shows the area to be underlain by Oxford Clay, although Boulder Clay is mapped towards the north of the site.

2.5 Soil Survey of England and Wales Sheet 6 shows the site to be comprised of the Hanslope Series. These soils are described as "typical calcareous pelosols". They have a slightly calcareous brownish surface horizon that passes to a dense mottled substrate containing many chalk stones (SSEW 1984).

2.6 Detailed field examination of the soils indicates that there are three broad soil types, which occur in this area.

2.7 One of the most extensive soil groups observed, occurs throughout most of the site.

Profiles typically comprise heavy clay loam topsoils with occasional profiles of heavy silty clay loam over slowly permeable clay between 15-55 cm. All profiles were found to be mottled and gleyed between 15-38 cm.

2.8 The second group of soils were found to occur in an isolated pocket towards the southern half of the site. Profiles typically comprise heavy clay loam topsoils with about 2-6% v/v angular flints and sandstone overlying similar textures or medium clay with c. 20-50% v/v angular flits. These soils were found to be impenetrable (to a soil auger) between 45-65 cm due to the high stone content of the subsoil.

Occasional profiles were found to comprise sandy clay loam topsoil with c. 12% v/v angular flints over similar textures or sandy loams with c. 20% v/v angular flints and sandstone over clay becoming impenetrable (to soil auger) at about 90 cm.

2.9 The third group of soils were found to occur in a small cluster towards the north of the site. Profiles typically comprise sandy clay loam to medium clay loam topsoils overlying sandy loams and loamy sands, resting over similar textures or medium to fine sand at depth.

Occasional profiles were found to be impenetrable (to soil auger) due to gravel at about 75 cm.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of this site is primarily determined by interactions between soil and climatic factors namely wetness and droughtiness. Occasionally other factors such as topsoil stone content impose a limitation on the agricultural land quality at this locality.

ALC grades 2, 3a and 3b have been mapped on the site, and a breakdown of the grades in terms of area and extent is given.

Grade	Area (ha)	% of total agricultural land
2	15.1	24.6
3a	4.5	7.3
3b	41.8	68.1
Total Agricultural Area	61.4	
Not Surveyed	2.7	
Non Agricultural	1.6	
Total Area of Site	65.7	

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

Grade 2

3.3 Land of this quality represents 24.6% of the total agricultural land on the site, and occurs in two situations.

Firstly are those profiles which comprise sandy loam, sandy clay loam or medium/heavy clay loam topsoils overlying sandy clay loams, sandy loams or loamy sands with occasional profiles becoming impenetrable (to soil auger) due to flints between 75 and 85 cm. Due to these textural characteristics the soils are freely draining but have slightly reduced reserves of available water. These soils are therefore limited by droughtiness.

The second group of soils were found to be slightly heavier. Profiles typically comprise sandy clay loam or medium/heavy clay loam topsoils overlying sandy clay loam or heavy clay loam passing into sandy clay or medium clay between 55 and 65 cm. The soils are prone to slight drainage imperfections as evidenced by mottling and gleying between 53 and 55 cm. Wetness class II is assigned to these profiles according to drainage status as assessed through depth to slowly permeable horizon and depth of gleying.
Land of this quality has only a minor limitation to agricultural use and is downgraded as a result of both wetness and drought limitations.

Grade 3a

3.4 Land of this quality represents 7.3% of the total agricultural land quality of the site and occurs as one mapping unit towards the south eastern part of the site.

Profiles typically comprise heavy clay loam topsoils with c. 3-12% v/v angular flints over similar textures or sandy clay loam with c. 20-50% v/v angular flints, passing to medium clay in the lower subsoil and becoming impenetrable (to soil auger) due to flints between 45-90 cm. These soils are limited by droughtiness and topsoil stones. However occasional profiles were found to be mottled and gleyed between 50-55 cm, this being due to impeded drainage. Profiles are thus assigned to wetness class II and the land is also limited by wetness. Overall, this land is limited by a combination of droughtiness, topsoil stones, wetness and workability restrictions but is capable of supporting moderate yields from a range of crops.

Grade 3b

3.5 Land of this quality occupies 68.1% of the agricultural land surveyed.

Profiles typically comprise medium or heavy clay loam topsoils which rest over slowly permeable clay from 15-45 cm. These soils are limited by wetness resulting from slowly permeable clay giving rise to impeded drainage, which is evidenced by mottling and gleying from 15 cm. They are assigned to wetness class IV accordingly, and are limited in terms of their agricultural use, by poor drainage and workability restrictions.

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SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1864) Sheet 46 NW, Buckinghamshire.

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 (1984) Sheet 6, Soils of South East England.

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

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

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.