AGRICULTURAL LAND CLASSIFICATION

LAND AT NORTH TOTTON, HAMPSHIRE

MAFF Ministry of Agriculture Fisheries and Food

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1. BACKGROUND

1.1 The 56.0 ha site is situated to the west of Southampton, immediately south of the M27 motorway. It is bounded to the north by the motorway and to the south by the A36, Salisbury Road. The east is bounded by Hill Street and by Green Lane. The western boundary is partially defined by junction 2 of the M27 and extends southwards from it.

1.2 The site was surveyed during October 1989 in connection with proposals for a business park development. 100 cm and 120 cm Dutch soil augers were used with samples being taken at approximately 100 m intervals across the site. Additional information was obtained by the examination of five soil inspection pits. The site was previously surveyed in 1985/6 in connection with the North Totton Local Plan. The soil data from the earlier work was used to assist in the delineation of grades for the current survey.

Land-Use

1.3 At the time of survey most of the site was under permanent pasture being grazed by sheep and horses. Towards the southeast of the site a number of fields had been wholly or partially stripped of turf.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies at approximately 10-30 m A.O.D. with the highest land occurring towards Brookes Hill. Land across the site falls gently towards the north and southeast with the lowest land at

the northwest and southeast corners of the site. Gradient is is not a significant limitation in terms of 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.

Table 1: Climatic Interpolation

Grid Ref.	SU 335 159
Altitude (m)	20
Accumulated Temperature (° days, Jan-June)	1534
Average Annual Rainfall (mm)	847
Field Capacity Days	177
Moisture Deficit, wheat (mm)	107
Moisture Deficit, potatoes (mm)	102

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). There is no overall climatic limitation affecting the land quality of the 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 315, Southampton (1978) shows the majority of the site to be underlain by Bracklesham Beds, (glauconitic sand and clay). The north-western part of the site, north of Wade Hill Drove, has been mapped as Valley gravel.

2.5 Soil Survey of England and Wales, Sheet 6, Soils of South-East England (1983) shows the site to comprise one mapping unit, the Wickham 3 association. These soils are described as being 'developed in fine loamy or fine silty drift over clay' and being

'seasonally waterlogged with slowly permeable clayey subsoils' (SSEW, 1983).

2.6 Detailed field examination of soils on the site broadly confirms this description with predominantly non-calcareous fine sandy loam, medium sandy loam or sandy silt loam topsoils and upper subsoils passing to sandy clay loams, clays and sandy clays with depth. The lower clayey horizons are slowly permeable and, as a consequence, wetness class is dependent upon the depth to these slowly permeable layers. This ranges from 25 cm to 80-120 cm+. Where clayey lower horizons are absent within 80-120 cm groundwater may rise into the soil profile giving rise to ochreous mottling and grey/pale colouration indicative of seasonal waterlogging.

2.7 Stone content across the site is variable both vertically and laterally. The loamy upper soil horizons vary from very slightly to moderately stony. The clayey lower horizons are typically significantly less stony, although gravelly lenses are believed to occur.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of the survey area is primarily determined by interactions between climate and soil factors, namely wetness and droughtiness. In addition, however, topsoil stoniness imposes a significant limitation in terms of land quality at some locations on the site. ALC grades 2, 3a and 3b have been mapped and a breakdown of these grades in terms of area and extent is given below:-

Grade	ha	% of total agricultural land
2	6.4	13.3
3a	28.39	58.8
3b	13.5	27.9
Non-agricultural	5.17	
Urban	0.22	
Woodland	0.90	
Agricultural buildings	1.42	
Total agricultural area	48.29	100
Total area of site	56.00	

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

3.3 Grade 2

Land of this quality is not extensive across the site and it occurs at three distinct mapping units.
Profiles are typically slightly stony, (ie, between 2 and 5-10% v/v of flints >2 cm), in the topsoil and throughout. Topsoils comprise non-calcareous fine sandy loams and fine sandy silt loams. These overlie similar textures in the subsoil to depth, or occasionally pass to sandy clay loam below about 70 cm.

Although some profiles exhibit evidence of drainage imperfections in the form of mottling and gleying at variable depths, the soils are not generally slowly permeable within 80 cm. These soils are therefore assigned to wetness class I and II. Slight wetness problems impose a minor limitation to the quality of some of the soils in grade 2, but overall these soils are limited by topsoil stoniness. The topsoils typically contain between 5 and 10% v/v of flints >2 cm which impose a mechanical limitation on the land quality. For example, such stones act as an impediment to cultivation, harvesting and crop growth.

3.4 Grade 3a

The majority of the site has been mapped as this grade, with land of this quality occurring mainly across the mid-slopes. Profiles typically comprise slightly stony (ie. 5-10% v/v of flints >2 cm) sandy loam or sandy silt loam topsoils, overlying similar textures in the upper subsoil. Subsoils are also slightly stony to moderately stony containing between about 5 and 20% v/v of medium angular flints. Subsoils typically pass to slightly heavier textures such as sandy clay loam, sandy clay or medium clay below about 45-50 cm depth. Mottling and gleying is evident from variable depths, this being associated with impeded drainage through the profile due to the presence of slowly permeable clayey horizons below 50 cm. These soils are thus assigned to wetness class III. Soils mapped as grade 3a are thus mainly limited by a combination of soil and climatic factors namely soil wetness.

3.5 Grade 3b

Land of this quality occurs in three situations across the site.

- On Brooke's Hill land quality is limited by stone content. Profiles are typically stony throughout (ie, containing about 25% flints v/v (>2 cm) in the topsoil and 50% flints v/v in the upper subsoils), and comprise sandy loam textures passing to sandy clay loam and sandy clay textures below about 40 cm. These heavier textured lower subsoils are significantly less stony, typically containing only about 5% flints v/v. The high stone content of the soils, particularly in the topsoil, limits the agricultural quality as described in section 3.3 above.

- The unit of grade 3b land which has been mapped across the middle and some lower slopes of the site is limited by a combination of soil wetness and stoniness, although soil wetness is the most significant factor. Profiles are similar to those described in Section 3.4 above with heavier textures,

such as sandy clay loam, sandy clay or medium clay occurring higher in the soil profiles, ie, from about 25-45 cm depth. These soils are assigned to wetness class IV due to the occurrence of slowly permeable horizons and evidence of drainage impedance. Occasional profiles have stony topsoils, (ie, c. 15-20% v/v of flints [>2 cm]), in addition to being limited by drainage imperfections.

- A small area of grade 3b land at the north of the site, adjacent to the M27 motorway has probably been disturbed and has been graded as 3b on this basis due to very poor drainage and the occurrence of anaerobic (oxygen less) conditions at depth in the subsoil.

October 1990
Ref: 1508/031/89

Resource Planning Group
ADAS, Reading RO

SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1978) Sheet 315, Southampton.

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.

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: 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[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.