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STATEMENT OF PHYSICAL CHARACTERISTICS

SUTTON WICK ABINGDON OXFORDSHIRE

Ministry of Agriculture Fisheries and Food

STATEMENT OF PHYSICAL CHARACTERISTICS

LAND AT SUTTON WICK, ABINGDON, OXFORDSHIRE

1 BACKGROUND

1 1 The 26 9 ha site which comprises two separate blocks of land was surveyed during May 1989 in connection with mineral extraction proposals 33 auger boring tests were made at approximately 100 m intervals over the site with supplementary information from 4 soil inspection pits

1 2 At the time of survey the smaller area (to the west of the main site) was in grass whilst the larger area was in grass and barley

2 PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2 1 The land lies at an altitude of approximately 50 m A O D in the Thames Valley The land is level or gently sloping Information supplied by the Thames Water Authority (Pers Comm 1989) indicates that the site is within the Thames floodplain and parts of the site may be subject to flooding However local information suggests that this is not a very regular occurrence

Climate

2 2 The annual average rainfall for the area (Met Office 1989) is 594 mm/annum and the accumulated temperature above 0 degrees C from January to June is 1462 degree days Moisture deficits calculated for the area are 117 mm/annum adjusted for wheat and potatoes respectively The field capacity day period is 125 days (Met Office 1989)

Geology and Soils

2 3 British Geological Survey Sheet 253 - Abingdon (1971) shows the majority of both sites to be underlain by alluvium However First Terrace gravels are shown at the western and southern edge of the most eastern site (adjacent to the Culham Reach of the River Thames) Soils of South East England published by Soil Survey of England and Wales (Sheet 6 1983) shows stoneless calcareous clayey Thames Association soils in the areas dominated by alluvium These are described as soils affected by ground water and may be at risk from flooding (SSEW 1983) In a few areas Sutton 1 Association soils are mapped These are described as well drained loamy soils over limestone gravel and are likely to be found in association with the First Terrace gravels (SSEW 1983) Soils identified on the site during detailed survey work broadly conform to these descriptions

3 AGRICULTURAL LAND CLASSIFICATION

3 1 Appendix 1 gives a brief description of the grades used in this classification

Areas of the grades	ha	% of agricultural area
Total areas of site	26 9	29
Grade 3a	7 7	71
Grade 3b	18 9	
Non-agricultural land	0 3	
Total agricultural area	26 6	

Grade 3a

3 2 This grade is found only on the larger of the two sites It is made up of two groups of soils those limited by drought and those limited by wetness

3 3 Soils limited by drought are typically composed of calcareous medium clay loam or silty clay loam topsoils over heavy clay loam or clay subsoils gleyed and often slowly permeable within 40 cm (wetness class III) The subsoil horizons contain varying amounts of limestone gravel frequently becoming impenetrable within 70 cm The large amounts of gravel in the subsoil make these soils likely to suffer from drought

3 4 Those limited by wetness typically comprise stoneless slightly calcareous to calcareous heavy clay loam topsoils over slowly permeable clay These are allocated to wetness class III which in combination with the field capacity days for the area results in their being graded as 3a

Some profiles are limited equally by wetness and drought These soils are similar to those described above but become very gravelly within 80 cm

Grade 3b

3 5 The majority of the profiles in this grade are composed of non-calcareous heavy clay loam topsoils over slowly permeable clays A few become sandier with depth and profiles often contain some limestone gravel The range of field capacity days for the area puts these profiles into wetness class III Consequently land of this type is limited by wetness and workability constraints reducing the flexibility of agricultural use

3 6 Soils limited by droughtiness in this grade are composed of calcareous medium clay loam over gleyed gravelly heavy clay loam being impenetrable within 35 cm due to limestone gravel Occasional profiles are limited both by drought and wetness consisting of heavy clay loam topsoils over slowly permeable clay subsoils reaching impenetrable limestone gravel within 50 cm The large amounts of gravel in the subsoil reduce the available water capacity and makes these soils likely to suffer from drought

4 SOIL RESOURCES

4 1 The accompanying soil unit map illustrates the pattern of soil resources on the site It should be emphasized that this is not a soil stripping map but merely a illustration of soil resources available for restoration on the site When considering these details it is important to remember that the soils were only sampled to a maximum depth of 120 cm during survey work In some cases soil resources may extend below this depth 3 units were identified on the site

Unit 1

4 2 Unit 1 is mapped over the majority of the site accounting for 14 7 ha Typically 20 cm of dark greyish brown (10 YR 4/2) heavy clay loam topsoil overlies grey greyish brown or brown (10 YR 5/1 to 5/3) clay with ochreous and grey mottles within 40 cm The lower subsoil is also clay and colours range from grey (10 YR 5/1 and N6/) to light brownish grey (2 5 Y 6/2) with ochreous and grey mottles Profiles may become sandier with depth Few profiles contain limestone pieces at depth

The subsoil has strongly developed firm coarse angular blocky peds This gives it a poor structure and as there are <0 5% biopores the clay is slowly permeable (MAFF 1988)

Unit 2

4 3 This unit is mapped over 8 8 ha of the site Typically 24 cm of dark greyish brown (10 YR 4/2 or 3/2) variably calcareous medium to heavy clay loam topsoil overlies gleyed clay The matrix colour of the clay varies widely between profiles but remains within the groups of colours defined as grey or pale (MAFF 1988) The subsoil is mottled with ochreous and grey colours within 40 cm A lower subsoil similar to the immediate subsoil but containing as much as 50% limestone gravel occurs in most profiles at depths below 40 cm

4 4 The structure is poor moderately to strongly developed coarse angular blocky peds with <0 5% biopores so that these soils have a slowly permeable subsoil It is difficult to assess the structure of the lower subsoil due to the high volume of limestone gravel

Unit 3

4 5 This unit occupies two small areas on the larger site amounting to 3 4 ha Soils are typically composed of 25 cm dark brown or very dark greyish brown (10 YR 4/3 and 10 YR 3/2) variably calcareous medium clay loam or silty clay loam This overlies brown (10 YR 5/3) heavy clay loam or medium clay gleyed and often very gravelly At depths below 25 cm the profiles become difficult to auger due to limestone and flint gravel in a coarse loamy sand matrix

4 6 The subsoils have moderately good structures being composed of moderately well developed coarse subangular blocky peds of friable consistence Biopores are common in all horizons indicating that these soils are relatively permeable

4 7 Soils in this unit are generally lighter textured than those described in units 1 and 2

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REFERENCES

British Geological Survey (1971)
Drift Sheet 253 - Abingdon

MAFF (1988)
Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land

Meteorological Office (1989)
Climatological Data for Agricultural Land Classification

Soil Survey of England and Wales (1983)
Sheet 6 - Soils of South East England

Thames Water (Rivers Division) Reading (1989)
Flooding Information (Personal Communication)

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

APPENDIX 2

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

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