3303 035-89

STATEMENT OF PHYSICAL CHARACTERISTICS

OAKLEY WOOD, EWELME, OXFORDSHIRE

MAFF Ministry of Agriculture Fisheries and Food

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1 BACKGROUND

1 1 The 11 84 ha site is situated to the east of Wallingford and to the north of the A423 Maidenhead to Oxford trunk road just south of Ewelme It is bounded to the west by Icknield Way and to the east by a treeline which is an extension of Oakley Wood A refuse tip marks the southern boundary of the site whilst the north is bounded by a hedgerow

1 2 The site was surveyed during late February/early March 1990 in connection with proposals for minerals extraction 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 two soil inspection pits

Land-Use

1 3 At the time of survey most of the site was under spring cereals with the exception of a small area towards the south-east which remained in cereal stubble

2 PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2 1 The site lies at approximately 90-105 m A O D with the lowest land occurring to the north west and the highest to the south and east A small valley feature running east-west was noted towards the north of the site Although slopes of 4-5 were recorded on the north facing side of this valley gradient is not significant in terms of land quality at this locality

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 46411894
Altitude (m)	95
Accumulated Temperature (days Jan-June)	1409
Average Annual Rainfall (mm)	628
Field Capacity Days	137
Moisture Deficit wheat (mm)	110
Moisture Deficit potatoes (mm)	101

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 low in both regional and national terms 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 254 Henley-on-Thames (1980) shows the site to be underlain by older Coombe deposits (Wallingford Fan Gravel) These deposits are shown to overlie Upper Cretaceous Middle Chalk The geological boundary between the Coombe deposits and the Middle Chalk is mapped as occurring towards the far north-west of the site

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 Marlow association These soils are described as typical paleo-argillic brown earths which are flinty fine loamy over reddish clayey sub-soils developed in Plateau and river terrace drift over chalk

2 6 Detailed field examination indicates the presence of two broad soil groups across the site

2 7 Firstly and most extensively are those soils which become impenetrable (to soil auger) over gravel at variable depths Profiles typically comprise slightly stony to moderately stony (ie c 8-25% v/v of angular flints >2 cm) medium sandy loam sandy silt loam or sandy clay loam topsoils Underlying subsoils have similar textures and are also typically slightly to moderately stony (ie between c 5 and 20% v/v of flints >2 cm) Profiles become impenetrable (to soil auger) over gravel at depths ranging from 50 cm to 115 cm but commonly within 100 cm These soils are thought to be well drained since there is no evidence of wetness problems and are thereby assigned to wetness class I

2 8 The second soil group is very limited in extent occurring towards the north west of the site in association with the geological boundary between Coombe deposits and Middle Chalk (see Section 2 4) Profiles typically comprise slightly stony (c 8-10% v/v of flints > 2 cm), sandy clay loam topsoils overlying medium silty clay loam in the upper subsoil These soils become progressively more chalky with depth being almost pure soft white chalk from about 50 cm and becoming impenetrable (to soil auger) at about 70 cm The soils in this group are well drained and are thus placed in wetness Class I

3 AGRICULTURAL LAND CLASSIFICATION

3 1 The ALC grading of the survey area is partially determined by interactions between climate and soil factors particularly droughtiness In addition topsoil stoniness is significant in affecting land quality on the site ALC grades 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
3a	5 72	48
3b	6 12	52
Total agricultural area	11 84	

3 2 Appendix 1 gives a general description of the sub-grades identified in this survey

3 3 Grade 3a

Land of this quality occurs as two mapping units across the site - along the northern boundary and in an area towards the south-east

Profiles are typically slightly stony (8-15% v/v of flints >2 cm) to moderately stony (15-20% v/v of flints >2 cm) throughout and comprise medium sandy loam sandy silt loam or sandy clay loam topsoils overlying similar textures in the subsoil Commonly soils become impenetrable (to soil auger) over gravel (or very occasionally chalk) at depths between 50 and 115 cm

Relatively shallow depth over gravel (or chalk) and moderate stoniness combine to impose a droughtiness limitation on most of these soils In addition moderate topsoil stone contents of 8-15% v/v of flints >2 cm cause these soils to have workability limitations

The combination of droughtiness and/or topsoil stone content restricts the agricultural potential of these soils and they are assigned to this grade accordingly

3 4 Grade 3b

Land of this quality occurs across 52% of the total agricultural land on the site Soils are of a similar type to those described for grade 3a Profiles typically comprise medium sandy loam or sandy silt loam topsoils overlying similar textures in the subsoil and becoming impenetrable (to soil auger) over gravel between 50 and 100 cm depth

These soils differ from those described in section 3 3 in that they are generally more stony both in the topsoil and throughout Topsoils commonly have between 15 and 25% v/v of flints >2 cm and subsoil stoniness ranges from 5-40% v/v of flints >2 cm Although these soils are moderately droughty as a result of relatively shallow depth over gravel and stoniness in the profile the most limiting factor in terms of agricultural land quality is topsoil stoniness thus restricting the workability of the soils

4 SOIL RESOURCES

Soil Units Consideration for Restoration

4 1 Overlays accompanying the ALC plan indicate the broad distribution of soil resources on the site It is emphasised that this is not a soil stripping plan but is an illustration of the soil resources which are available for restoration Soils were sampled to a maximum depth of 100-120 cm useful soil forming materials may extend below this depth

4 2 Topsoil units

Two topsoil units were identified

4 2 1 Unit 1

The unit comprises 30 cm of yellowish-brown dark yellowish brown or brown (10 YR 5/4 3/4 and 4/3) sandy clay loam The soil is typically slightly calcareous to very calcareous and contains between 8 and 15% v/v of medium and large angular flints >2 cm

4 2 2 Unit 2

This unit comprises an average 29 6 cm (with a range of 25-40 cm) of brown or dark brown (10 YR 4/3 and 3/3) medium sandy loam or sandy silt loam Topsoils are commonly slightly stony to moderately stony having between 8 and 25% vv of angular flints >2 cm in addition to 1-5% v/v of angular flints <2 cm Soils are typically non-calcareous to slightly calcareous

Broadly speaking unit 2 topsoils are slightly lighter in texture but have higher stone contents than unit 1

4 3 Subsoil units

Three subsoil units were identified

4 3 1 Unit 1

This unit is very limited in extent across the site occurring towards the far north-west in association with the Middle Chalk (See Section 2 8) It typically comprises approximately 20 cm of yellowish brown (10 YR 5/4) medium silty clay loam which contains between 40 and 50% brashy chalk Below this the subsoil passes into yellowish white chalk which tends to be fairly soft initially but then becomes harder and impenetrable (to soil auger) with depth

4 3 2 Unit 2

This unit comprises an average 50 cm (with a range of 25-90 cm) of brown yellowish brown or strong brown (10 YR 4/4 4/3 and 4/6 or 7 5 YR 5/6 and 5/8) sandy clay loam or occasionally medium sandy loam These subsoils are variably stony typically containing between 8 and 20% v/v of angular flints >2 cm throughout and generally becoming more stony with depth Profiles become impenetrable (to soil auger) over gravel at variable depth but commonly between 55 and 70 cm Occasional profiles are deeper and less stony being impenetrable (to soil auger) over gravel from 1 m and below and containing approximately 2 5% v/v of angular flints >2 cm throughout Although occasional profiles exhibit mottling they are not slowly permeable and are generally well-drained

These soils have moderately good structure being composed of weakly developed medium to coarse sub-angular blocky peds of friable consistence They have good porosity having >0 5% biopores >0 5 mm

4 3 3 Unit 3

This unit comprises between 20 and 65 cm (with an average 35 cm) of brown or dark yellowish brown (10 YR 4/3 and 10 YR 4/4) medium sandy loam or occasionally sandy silt loam These subsoils are typically slightly stony to moderately stony containing between 5 and 20% v/v of angular flints > 2 cm throughout Profiles become impenetrable (to soil auger) over gravel at depths between 50 and 95 cm

These soils have good structure being composed of weakly developed coarse angular blocky peds of friable consistence They have good porosity (>0 5% biopores >0 5 mm) and are well drained

August 1990
Ref 3303/035/89

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Reading R 0

RESOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1980) Sheet 254 Henley-on-Thames

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 wider 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

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