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STATEMENT OF PHYSICAL CHARACTERISTICS

MOORBRIDGE FARM, LONGFORD
LONDON BOROUGH OF HILLINGDON

ADAS Ref: 2709/87/92
MAFF Ref: EL 27/00031

Resource Planning Team
ADAS Reading

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1. INTRODUCTION

1.1 This site of approximately 10 ha was surveyed in September 1992 in connection with proposals for sand and gravel extraction under the 1981 Minerals Act. The site is situated immediately to the west of Heathrow Airport. ADAS was commissioned by MAFF to determine the land quality and site physical characteristics of the land affected by the proposals.

1.2 The survey was carried out at a detailed level, with soil auger samples being taken at 100 m intervals across the site. A total of 9 borings/inspection pits were described in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988).

Land-Use

1.3 At the time of survey the land was in permanent pasture. A small area to the north of the site has been mapped as non-agricultural.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies at an altitude of approximately 22m A.O.D, being flat or very gently undulating in places. Nowhere on the site does gradient or altitude represent a limitation to agricultural land quality.

The site is adjacent to the River Colne. Although the land may be partially protected from flooding by an embankment which runs along the western edge of the site, between it and the river, agricultural land quality may be affected by flood risk.

Climate

2.2 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5 km grid database (Met Office, 1989) for a representative location in the survey area.

Climatic Interpolation

Grid Reference	TQ 045763
Altitude, (m, AOD)	22
Average Annual Rainfall (mm)	651
Accumulated Temperature (° days, Jan - June)	1489
Field Capacity Days	133
Moisture Deficit, wheat (mm)	118
Moisture Deficit, potatoes (mm)	114

2.3 There is no overall climatic limitation affecting the land quality at this locality. It is important to note, however, that field capacity days are relatively low and crop adjusted moisture deficits relatively high, in a regional context. Such a comparatively warm, dry climatic regime will have implications for the way in which soil and climatic factors interact to affect soil wetness and droughtiness limitations.

Geology and Soils

2.4 British Geological Survey, Sheet 269, Windsor (1981) shows the entire site to be underlain by River Alluvium.

2.5 Soil Survey of England and Wales, Sheet 6, Soils of South-East England, (1983) indicates the presence of two soil associations across the site. Adjacent to the River Colne, The Fladbury 3 association has been mapped, these soils being described as 'grey clayey pelo-alluvial gley soils' (SSEW, 1984). Across the remainder of the site, soils of the Waterstock association have been mapped, these being described as 'fine loamy gleyic argillic brown earths', (SSEW, 1984).

2.6 Detailed field examination of the soils on the site indicates the presence of soils consistent with the description of the Fladbury 3 association. These alluvial soils comprise clay loam topsoils, which may be organic, over variable depths of gleyed and slowly permeable clay, resting on gravel between 40 and 65 cm depth.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of the site is determined by the interactions between soil and climatic factors giving rise to soil wetness and droughtiness limitations.

The distribution of ALC grades is shown on the attached ALC map and the area and extent is given in the table below. The map has been drawn at a scale of 1:5000. It is accurate at this scale but any enlargement may be misleading.

Distribution of Grades

	Area (ha)	% total agricultural land
Grade 3b	8.95	100
Total agricultural area	8.95	100
Non-agricultural	1.10	
Total area of site	10.05 ha	

3.2 Appendix 1 gives a general description of the grades and land use categories identified in this survey.

3.3 Grade 3b

The entire site has been graded 3b. This moderate quality land is limited by soil wetness/workability and/or droughtiness. Soils have developed from alluvial deposits over gravel. Profiles comprise non-calcareous clay loam (or occasionally silty clay) topsoils which may be organic and/or very slightly stony ie, 2% flints >2cm by volume. These overlie variable depths of gleyed and slowly permeable clay or silty clay passing to gravel between 40 and 65 cm. Profiles may pass to sandy loam or sandy silt loam horizons immediately above the gravel. In addition, subsoils occasionally contain between 5 and 50% flints by volume. Slowly permeable clay or silty clay typically occurs directly below the topsoil; wetness class IV is therefore appropriate and land is severely limited by wetness and workability. The land is also limited by a significant drought risk arising from relatively shallow soil depth over gravel, subsoil textural and structural conditions, and the interaction between these soil factors and a warm dry climate.

4. SOIL RESOURCES

Soil Units: Consideration for Restoration

4.1 The following section describes the soil resources available on the site. Topsoils were generally uniform across the site but subsoils were found to vary as illustrated by the subsoil overlay which accompanies the ALC map. It should be emphasised that this map is not a soil stripping map, but merely an illustration of soil resources which may be available for restoration.

4.2 Topsoils

One topsoil unit was identified. It comprises an average 24 cm of dark grey or very dark grey, (10YR 3/1 or 10YR 4/1) medium or heavy clay loam, or very occasionally silty clay. These topsoils are typically non-calcareous and in fact may be of organic mineral texture. Occasionally topsoils were found to be very slightly stony having about 2% flints by volume and/or gleyed to the surface.

4.3 Subsoils

Two subsoil units were identified.

Unit 1

This unit is limited in depth, typically comprising an average 18 cm of very dark grey (10YR 3/1 and 2.5Y 3/0) or very dark greyish brown (10YR 3/2) clay or silty clay resting over gravel between 40 and 45 cm from the surface. These subsoils are non-calcareous and may be variably stony having between 5 and 50% flints by volume. Occasionally subsoils pass to sandy loam or sandy silt loam horizons immediately above the gravel. These predominantly dark grey subsoils are only faintly mottled, (with 7.5 YR 5/8 or 6/8 ochreous mottles) indicating that they are rarely aerated and are subject to almost permanent waterlogging and anaerobic conditions.

This subsoil unit is poorly structured being composed of weakly developed coarse subangular blocky peds of firm consistence. Porosity is low (ie <0.5% biopores >0.5 mm) and soils are thereby considered to be slowly permeable.

Unit 2

This unit is similar to unit 1 but generally extends to a greater depth over gravel. It comprises an average 36 cm of grey, dark grey or very dark grey, (10YR 6/1, 10YR 4/1 or 7.5YR 3/0) clay or silty clay resting over gravel from 60-65 cm depth. Horizons of sandy loam may occur in the lower subsoil, immediately above the gravel. Subsoils are non-calcareous and generally stoneless, although occasional profiles may be moderately stony containing up to 25% flints by volume. As with subsoil unit 1, the predominance of dark grey colours and the limited extent of ochreous mottling suggests anaerobic subsoil conditions.

The subsoils of this unit have poor structures being composed of weakly developed coarse sub angular blocky peds of friable consistence. This unit is slowly permeable, having <0.5% biopores >0.5 mm.

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SOURCES OF REFERENCE

- BRITISH GEOLOGICAL SURVEY (1981) Sheet 269, Windsor.

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

- METEOROLOGICAL OFFICE (1988) 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 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: 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.