2709-021-91

STATEMENT OF PHYSICAL CHARACTERISTICS

Holloway Close, Harmondsworth,
London Borough of Hillingdon

Ministry of Agriculture Fisheries and Food

PR

STATEMENT OF PHYSICAL CHARACTERISTICS

HOLLOWAY CLOSE, HARMONDSWORTH, LONDON BOROUGH OF HILLINGDON

1. BACKGROUND

1.1 37 ha of land was surveyed at Harmondsworth, West London on the 23-24 January 1992 in connection with proposals for gravel extraction under the 1981 Minerals Act. The site is situated to the north of Harmondsworth and is dissected by the M4 motorway. The site is bounded to the north by the M4 motorway to the east by Holloway Close, to the south by a fenceline comprising hedgerow and trees, and to the west by the River Colne. In addition to this, a small area north of the M4 was also included in the survey. Its boundaries are formed by a school playing field to the north, housing to the east, the M4 motorway to the south and the River Colne to the west.

1.2 The site was surveyed using 1.2 m Dutch soil augers with samples being taken at approximately 100 m intervals across the site on a grid basis. Three soil inspection pits were examined in order to obtain more detailed soil information.

Land Use

1.3 At the time of survey about half the site was under winter cereals. The lower slopes adjacent to the River Colne, south of the M4 motorway had recently been ploughed. The remaining area, north of the M4 motorway was under permanent pasture, grazed by horses.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies at 24-28 m A.O.D. It is adjacent to the River Colne along its western boundary, and correspondence with the National River Authority, (Thames Region), indicates that the lower lying parts of the site may be prone to occasional flooding. This would have an important influence on the agricultural land quality of any areas thus affected. Land quality on the site is not influenced by either gradient or altitude.

Climate

2.2 Estimates of climatic variables, for a representative location in the survey area, were obtained by interpolation from grid point datasets (Met. Office, 1989) and adjusted for altitude.

Climate Variables

Grid Reference	SU 052 783	SU 060 783
Altitude (m A.O.D.)	24	28
Accumulated Temperature (°days, Jan-June)	1509	1504
Average Annual Rainfall (mm)	726	729
Field Capacity Days	163	164
Moisture Deficit Wheat (mm)	110	109
Moisture Deficit Potatoes (mm)	102	101

2.3 The important parameters in assessing an overall climatic limitation of agricultural land quality, are, average annual rainfall, (a measure of the degree of wetness) and accumulated temperature (a measure of the relative warmth of a locality). At this locality an overall climatic limitation does not exist. Climatic factors however do interact with soil factors to influence land quality, principally by way of soil wetness and droughtiness limitation.

Geology and Soils

2.4 British Geological Survey, Sheet 269 Windsor (1981), indicates the presence of a number of geological deposits which outcrop at this locality. Across much of the site towards the east, deposits of Taplow age Brickearths have been mapped. A small area towards the middle of the site comprises Taplow Gravels. The remainder of the site principally towards the west is underlain by deposits of Alluvium.

2.5 Soil Survey of England and Wales, Sheet 6, Soils of South East England, (1983) maps three associations in the vicinity. The Fladbury 3 Association is shown to occur in conjunction with the floodplain of the River Colne. Fladbury soils are described as "pelo-alluvial gley soils, which are clayey throughout and prominently mottled directly below the topsoil" (SSEW 1984). Their occurrence on floodplains results in these soils being affected by groundwater at shallow depths. The Waterstock Association often occurs adjacent to floodplains and typically comprises "fine loamy gleyic argillic brown earths, with ochreous mottling in the subsoil" (SSEW 1984). The Hamble 1 Association occurs in conjunction with the underlying geology of Brickearth deposits mapped towards the east of the site. Hamble soils are described as "stoneless well drained silty soils, typically argillic brown earths" (SSEW 1984). The soils are permeable and naturally well drained.

2.6 Detailed field examination of the soils indicates the presence of two soil groups.

2.7 The first soil group is relatively localised and comprises clayey alluvial soils which are mapped in association with the floodplain. These soils are poorly drained and may be affected by groundwater, and possibly flooding. They typically rest over gravelly horizons between about 42 and 90 cm.

2.8 The second soil group occurs towards the east of the site, in association with brickearth deposits. Soils typically comprise fine sandy silt loam topsoils over medium and heavy silty clay loam subsoils. Profiles are generally well drained and do not become impenetrable over gravelly horizons.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of this site is primarily determined by interactions between soil and climatic factors namely soil wetness and droughtiness. In addition however, the risk of occasional flooding resulting from the proximity of the River Colne exerts an influence on the land quality of the site. ALC grades 1, 2, 3a and 3b have been mapped at this locality and the area and extent is given below. A small area towards the west of the site was not surveyed as this was under landfill.

Grade	Area ha	% of total agricultural land
1	11.2	37
2	5.34	18
3a	1.55	5
3b	11.92	40
Total agricultural area	30.03	100
Not surveyed	4.54	
Urban area	0.42	
Total Area of the site	34.99	

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

Grade 1

3.3 Land of this quality occurs on the upper slopes towards the east. Profiles typically comprise non calcareous fine sandy silt loam or silt loam topsoils overlying medium silty clay loam or heavy clay loam occasionally overlying lower subsoils of clay or silty clay between about 70 and 80 cm. Profiles were found to have slight drainage imperfections as evidenced by gleying below 47 cm, but were not found to be slowly permeable. Drainage status is however affected by groundwater; wetness class I was therefore assigned to such profiles.

Although these profiles have slight drainage imperfections they have good reserves of available water and are easily worked. No significant limitations affects this land, which is capable of supporting a wide range of agricultural crops at high yields.

Grade 2

3.4 Land of this quality occurs towards the middle of the site in conjunction with the mid slopes above the floodplain, and a small pocket towards the south east corner of the site. Profiles typically comprise non calcareous silt loam or medium clay loam, over medium silty clay loam, heavy clay loam or heavy clay passing to silty clay or clay in the lower subsoils. Profiles exhibit impeded drainage, as evidenced by gleying between 37 and 68 cm and were found to rest over slowly permeable clay below 65 cm; these profiles are assigned to wetness class II.

Land is principally limited by minor wetness limitations. Land of this quality is capable of supporting a wide range of agricultural and horticultural crops.

Grade 3a

3.5 Land graded 3a occurs in a single mapping unit above the floodplain. Profiles typically comprise non calcareous medium clay loam topsoils overlying heavy clay loam, over lower subsoils of clay. Mottling and gleying below 35 cm provides evidence of imperfect drainage, these profiles are slowly permeable within 56 cm and are thus assigned to wetness class III.

As a result of slowly permeable horizons within the profile. These soils are prone to wetness and workability restrictions. Cropping flexibility is reduced, and the land is capable of producing moderate to high yields of a narrow range of arable crops.

Grade 3b

3.6 Land graded 3b occurs in association with the floodplain. The land is principally limited by wetness and workability, although it is also influenced by high ground water, a risk of occasional flooding, and moderate droughtiness. Profiles typically comprise calcareous, medium or heavy clay loam topsoils over clay subsoils which are commonly gleyed in the upper subsoil and slowly permeable. Wetness class IV has been assigned to these soils. In addition to wetness and workability restrictions, the occurrence of gravelly horizons below about 42 cm imparts a moderate droughtiness limitation. The combination of poor structural conditions in the subsoil and shallow depths over gravel results in reduced reserves of available water for plant growth. In addition the risk of occasional flooding and the influence of a high ground water table also restricts the potential of this land.

4. SOIL RESOURCES

Soil Units Consideration for Restoration

4.1 Overlay accompanying the ALC map illustrate the pattern of topsoil and subsoil resources of the site. It should be emphasised that this is not a soil stripping map, but merely an illustration of soil resources available for restoration on the site. When considering these details it is important to remember that soils were sampled to a maximum depth of 100-120 cm during survey work. In some cases the soil resource will extend below this depth.

Two topsoil unit were identified.

4.2 Unit 1

This unit occurs in association with the lowerlying parts of the site, and has been mapped across the west of the site. This unit typically comprises about 32 cm of dark brown and dark greyish brown (10YR 3/3, 10YR 4/2) non calcareous silt loam, medium silty clay loam, medium clay loam and occasional topsoil textures of heavy clay loam. These topsoils are stoneless.

4.3 Unit 2

This unit occurs on the upper slopes towards the east of the site. Topsoils typically comprise about 33 cm of dark greyish brown (10YR 4/2) fine sandy silt loam. These topsoils are stoneless.

Three subsoil units were identified.

4.4 Unit 1

In broad terms this subsoil unit occurs in relation to those topsoils described in section 4.2; ie across the lower lying parts of the site. It typically comprises a shallow upper subsoil of 12-35 cm of brown or dark grey (10YR 5/3, 10YR 4/1 N4) medium clay. All profiles within this unit have ochreous mottling and are gleyed within 42 cm. The upper subsoil is typically slightly to moderately stony, but stone content increases as the gravel substratum is approached. These soils are relatively shallow over gravel between about 42-58 cm with occasional profiles slightly deeper over gravelly horizons (at 90 cm depth).

Where described upper subsoil of medium clay exists the structure is poorly developed, comprising small to medium weakly developed angular blocky structures of firm consistence with less than 0.5% biopores. As the stone content increase with depth profiles become too stony to assess the structural condition with any certainty.

4.5 Unit 2

This unit occurs through the middle of the site. It typically comprises about 33-52 cm upper subsoils of (7.5YR 5/4) medium silty clay loam or heavy clay loam, yellowish brown, brown and (10 YR 5/4, 10YR 5/3, 11) heavy clay loam overlying 40-64 cm of

brown (7.5YR 5/4, 10YR 5/3, 10YR 5/4) and pale brown (10YR 6/3) medium clay or silty clay. Most profiles within this unit are gleyed within 68 cm. These soils are non stony.

Where described the upper subsoils of medium silty clay loam heavy silty clay loam and heavy clay loam have moderately good structures. They typically comprise moderately well developed coarse subangular block to angular block peds of friable to very friable consistence with biopores greater than 0.5%. The medium clay lower subsoils have poor structures, comprising moderately well developed to coarse angular block peds of firm consistence with less than 0.5% biopores.

4.6 Unit 3

Subsoil unit 3 corresponds to those soils described in paragraph 2.8 of the ALC section. It typically comprises approximately 13-28 cm dark greyish brown or brown (10YR 4/2, 10YR 4/3, 10YR 5/3) fine sandy silt loam, overlying 60-91 cm brown (10YR 5/3, 7.5YR 5/4) medium silty clay loam or heavy silt clay loam. Occasional profiles within this unit have ochreous mottling within 78 cm. These soils generally have a lower clay content than elsewhere, and are thus well drained and permeable, but are affected by groundwater.

Where described upper subsoil structures are well developed coarse subanglar blocky peds of very friable consistence with biopores greater than 0.5%. Lower subsoil structures tend to be well developed very coarse subangular blocky tending to angular blocky peds of friable consistence with many worm channels and biopores greater than 0.5%.

March 1992
Ref: 2709/021/91

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SOURCE 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 (1989) Climatic 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: 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 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.