

STATEMENT OF PHYSICAL CHARACTERISTICS

OLDWICK FARM, WEST LAVANT,
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1. BACKGROUND

- 1.1 This 37.1 ha site was surveyed on 15 October 1991, in connection with proposals for sand and gravel extraction. The site lies to the north west of Chichester, south east of the settlement of West Stoke along a 'C' class road known as 'West Stoke Road'.

The area is bounded to the north by an ancient linear earthwork ("The Devils Ditch"), to the east by woodland, existing mineral workings and the West Stoke Road, to the south by agricultural land and to the west by woodland and an unmetalled track known as 'Chapel Lane'.

Part of the northern section of the site has previously been surveyed by MAFF for the West Sussex Minerals Plan (1985/6). This more recent survey draws on this existing data.

- 1.2 The area was assessed using 1.1m and 1.2m Dutch Soil Augers, samples being taken approximately every 100m on a grid basis. In addition 2 soil inspection pits were examined.

Land Use

- 1.3 At the time of the survey much of the land was under arable use. The field towards the south of the survey area had been ploughed and drilled, and to the north east had recently been planted with oilseed rape. Ley grass formed the remaining area.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

- 2.1 The altitude of the area varies between 30 and 35m AOD. The slightly higher land occurs to the north east, falling gently to the west and south. Gradient is not a limitation in terms of land quality at the site.

Climate

- 2.2 Estimates of climatic variables were obtained by interpolation from a 5 km grid database (Met. Office, 1989), for representative locations in the survey area:

Climatic Interpolation

Grid Reference	SU840079	SU844072	SU837077
Altitude (mAOD)	35	32	30
Accumulated Temperature days (°Days Jan - June)	1509	1513	1515
Average Annual Rainfall (mm)	846	825	836
Moisture Deficit (wheat - mm)	109	112	111
Moisture Deficit (potatoes - mm)	104	107	106
Field Capacity Days	177	171	175

- 2.3 Climatic factors per se place no limitation on agricultural land quality in this area, but they can affect the interaction of soil factors with the climate, namely wetness and droughtiness. The 175 field capacity day (FCD) isopleth runs through the site with land to the south generally having FCD values of 175 or less, and land to the north having values of 176 or more. This has an important influence on wetness assessment.

Geology and soils

- 2.4 The Institute of Geological Sciences (IGS), Sheet 317, Chichester (one inch series, 1972), shows the area to be underlain by Valley Gravels. These are described more fully in the 1983 mineral assessment, IGS report 138, as "an angular flinty gravel in a brown clayey matrix, overlying a basement of flinty soft Upper Chalk". The deposits are noted as being derived from periglacial solifluction processes and range in thickness from 1.0m approximately 500m west of the site (Bore 80NW131) to 6.3m approximately 600m to the north east of the site (Bore 80NW133). Superficial deposits of brickearth are mapped overlying these gravels on most of the southern part of the site.

The gravel content of the deposit can be as high as 65%, the average is 50%. The matrix consists of brown and grey chalky clay and silt (approximately 29%), sand making up the remainder of the deposit.

- 2.5 The soils of the area have been mapped in detail by the Soil Survey of England and Wales (SSEW, 1967). The 1:25000 scale map sheet covering SU70 and 80 shows the site as the Charity series soils, comprising two phases, namely "extremely flinty" (50% + flints) and "undifferentiated" (up to 50% flints but commonly around 20%). These soils are described by SSEW as comprising

well drained brown earths, developed in flinty silty head deposits, which only differ in their stone content. The boundary between the phases is stated as arbitrary and not well defined.

Detailed field examination suggests a single overall soil type. This comprises a very slightly stony to moderately stony (1-30% v/v >2mm; 0-23% >2cm) silt loam, occasionally sandy silt loam topsoil, over a very slightly stony to stony (up to 40%) silty clay loam or silt loam upper subsoil occasionally passing to a slightly stony (0-10%) sandy silt loam or silty clay loam or silty clay lower subsoil. Commonly the profiles become impenetrable due to stones in the profile (up to 50%) at depths between 26 and 80 cm. The deeper less stony profiles may become mottled and gleyed where a silty clay horizon occurs between 55 and 70 cm.

3. AGRICULTURAL LAND CLASSIFICATION (ALC)

3.1 The ALC grading of the survey is primarily determined by interactions between climate and soil factors, namely wetness and droughtiness together with high topsoil stone content. ALC grades of 2, 3a, and 3b were mapped on the site and a breakdown of these, in terms of area is given below:-

Grade	Area (ha)	% of total Agricultural land
2	6.01	16
3a	9.27	25
3b	21.83	59
Total Site Area (ha)	37.12	100

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

Grade 2

3.3 Grade 2 land occurs as approximately 16% (6.0 ha) of the total land on the site. It covers the south western portion of the site in two separate areas.

The profiles are well drained and typically comprise a non-calcareous very slightly stony to slightly stony (<10% v/v flints >2cm) silt loam topsoil, over either a silt loam or a medium silty clay loam upper subsoil. The lower subsoil is generally heavier. In many cases an impenetrable layer occurred between 60 and 80cm; this is due to the stone content increasing to around 50%. These borings are limited to grade 2 by droughtiness, since their water holding capacity is slightly impaired by stone content.

Grade 3a

- 3.4 Land of this grade covers 25% (9.3 ha) of the site in two areas. The first is in the north and central portion of the site adjacent to the West Stoke Road (western side). The second extends towards the southern edge of the site. Soil profiles in these areas are of a broadly similar type.

They comprise a non-calcareous silt loam or a sandy silt loam topsoil, commonly very slightly stony to slightly stony (<15% v/v >2cm). This overlies a silt loam or medium silty clay loam subsoil containing a maximum of around 10% stones. These profiles become impenetrable (to soil auger) due to an increase in stone content to around 50% between 40 and 65cm depth. These well drained profiles are limited to this grade by droughtiness caused by a limitation in their water holding capacity, principally due to increasing stone content.

Occasional profiles in this grade do not become impenetrable over flint gravel. These have similar topsoils and upper subsoils, however as depth increases so the textures become heavier, ie heavy silty clay loam and silty clay. In the heavy silty clay loam horizon the profiles are often gleyed, becoming slowly permeable in the silty clay horizon below. This results in soils having a wetness limitation (Wetness Class III) such that this land is included in graded 3a.

Grade 3b

The remaining 59% (21.8 ha) of the site is of this quality, mapped in 4 separate areas. Soil profiles in this grade are broadly similar to those described for 3a but more stony. They comprise a moderately stony up to 16-35% v/v >2cm silt loam topsoil over a similarly stony silt loam, occasionally silty clay loam subsoil over an impenetrable (to soil auger) stony horizon between 26-50cm, with a stone (flint) content of approximately 50%. These well drained soils are limited to this grade by droughtiness due to high stone content restricting the available water capacity. These profiles are also limited by the stone content in the topsoil (15-35% > 2cm diameter) which affects production costs (tyre and implement wear), crop germination and the nutrient holding capacity of the soil, in addition to reducing the moisture reserves.

4. SOIL RESOURCES

- 4.1 The description of soil units given below provides an indication of the pattern of soil resources on the site. It should be emphasised that this information should not be viewed in the context of soil stripping, but as an illustration of the soil resources available for restoration on the site.

When considering these details, it is important to remember that soils were only sampled to a maximum depth of 120 cm during survey work. Actual sampling depth was frequently less at this site due to high stone contents. In some cases, therefore, soil resources may extend beyond this depth.

Topsoil

- 4.2 Two topsoil units were identified across the site. Most common (unit 1) was a non-calcareous dark yellowish brown and dark brown to brown and yellowish brown (10 YR 3/4 - 4/4 to 10 YR 4/3 - 5/4) silt loam, occasionally fine sandy silt loam. This has a variable stone content from 1 to 10% v/v, with maxima of 6% > 2 cm and 2% > 6 cm. The horizon has a mean depth of 27cm over a range 22 cm to 35 cm.

The less common unit (unit 2) comprises a non-calcareous dark brown to dark yellowish brown (10 YR 4/3 - 4/4) silt loam. The stone content is high and variable, ranging from 15% to 30% v/v with maxima of 20% > 2 cm and 5% > 6 cm. The horizon has a mean depth of 25 cm over a range 20 to 28 cm.

Subsoil

- 4.3 Two subsoil units were observed during field examination. The most common (unit 1) was a non-calcareous dark yellowish brown to strong brown (10 YR 5/4 - 4/6 - 4/4, 7.5 YR 5/4 - 5/6) silt loam or medium silty clay loam. This generally become heavier with depth, becoming a heavy silty clay loam where impenetrable layers were deeper (50 cm+). The total stone content was variable from < 5% up to 40% v/v, commonly in the range 16 to 35%. All these soils become impenetrable (to the soil auger) at depths between 26 and 65 cm due to high stone content. Where examined, the subsoil structure was difficult to determine due to the high stone content.

The second subsoil unit (unit 2) occurs where soils are less stony and the soil depth is greater. These soils commonly comprise a non-calcareous brown to strong brown or yellowish brown (7.5 YR 4/6 - 5/6, 10 YR 4/4 - 5/4) medium silty clay loam or silt loam commonly very slightly stony (1-5% v/v). As depth increases textures become generally heavier, namely heavy silty clay loam and silty clay loam, while retaining a similar matrix colour and stone content. Occasionally the lower subsoil is mottled and gleyed but is slowly permeable only where the texture was silty clay.

Where the structures were examined they were found to be moderately developed, friable, coarse sub angular blocky, with less than 0.5% biopores.

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REFERENCES

- INSTITUTE OF GEOLOGICAL SCIENCES (1972) : "Sheet 317, Chichester
One inch series"
- INSTITUTE OF GEOLOGICAL SCIENCES (1983) : "The sand and gravel resources of
the country around Chichester end north of Bognor
Regis, Sussex". Mineral Assessment Report 138.
- MAFF (1986) : "Agricultural Land Classification - West Sussex
Minerals, Local Plan, Site 7: Land south of Devil's
Ditch and east of Lye Lane, West Stoke".
Reference 4203/1191/86
- MAFF (1988) : "Agricultural Land Classification of England and Wales.
Revised guidelines and criteria for grading the quality
of agricultural land". HMSO.
- METEOROLOGICAL OFFICE (1989) : "Climatological data sets for Agricultural
and classification".
- SOIL SURVEY OF ENGLAND AND WALES (1967) : "Bulletin 3 - Soils of the West
Sussex Coastal Plan." Harpenden.
- SOIL SURVEY OF ENGLAND AND WALES (1984) : "Bulletin 15 - Soils and their use
in South East England." Harpenden.

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.