Statement of

Physical Characteristics

Little Marlow
Buckinghamshire.

AGRICULTURAL LAND CLASSIFICATION

BUCKINGHAMSHIRE MINERALS PLAN AREA 6

LAND AT LITTLE MARLOW

1. BACKGROUND

1.1. The 25.17 hectare site lies just to the east of Marlow in Buckinghamshire. It is bounded to the north by the A4155 (Henley to Bourne End Road), and to the west by a small farm track which joins Westhorpe Farm with the main road. The southern boundary is marked by woodland. The eastern boundary does not coincide with any obvious physical features.

The site was inspected on the 24 January 1991 in connection with the Buckinghamshire Minerals Plan.

1.2. The site was surveyed using 120 cm Dutch soil augers with sampling densities of approximately 1 per 100 m intervals across the site on a grid basis. In addition two soil pits were examined.

Land Use

1.3. At the time of survey the land was under ley and permanent pasture. Part of the site towards the west was under woodland, and was therefore not surveyed.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1. The site lies at approximately 28-36m AOD, with the higher ground occurring towards the north. The ground slopes, south and south east towards the drainage ditch in the far south eastern part of the site. Nowhere on the site does gradient or altitude represent a significant limitation to agricultural land quality.

Climate

2.2. The average annual rainfall for this area is approximately 683mm (Met Office 1989), which is low in a national context. The median accumulated temperature above 0°C between January and June, a measure of the relative warmth of a locality is expected to be 1473 day degrees (Met Office 1989), this is relatively high in a national context. The site has approximately 146 field capacity days which provides a measure of the effect of climate on the soil water regime; crop adjusted moisture deficits are 108mm for wheat and 100mm for potatoes.

2.3. Climatic factors *per se* place no limitation on agricultural land quality, but do affect interactions between soil and climate, namely wetness and droughtiness.

GEOLOGY AND SOILS

2.4. Mineral Assessment Report 42 (Institute of Geological Sciences 1979), shows the site to be underlain by flood plain River Terrace Gravels overlying Middle Chalk.

2.5. Soil Survey of England and Wales, Sheet SU88 Marlow (1973), shows the site to comprise two soil mapping units. The Bockmer Series covers a large proportion of the site. These soils are described as "loamy gravelly", well drained, typical paleo argillic brown earths (SSEW 1984). The Hamble Series is less extensive and comprises stoneless silty soils which are described as "argillic brown earths" (SSEW 1984). They are permeable and well drained, wetness Class I.

2.6. Detailed field examination of the soils indicates that there are four soil groups present at this site.

The first group of soils are those which occur on the upper and lower slopes. These soils are extremely stony, and rest over gravels at various depths. They typically comprise fine sandy silt loams, silt loams, medium silty clay loams, and medium clay loam topsoils with c. 16-33% V/V of small angular flints within the soil matrix. These overlie fine sandy silt loams, medium silty clay loams and medium/heavy clay loams in the subsoil, with c. 15-50% V/V of small angular flints. Below this, is an impenetrable horizon (to soil augers) comprising flints and gravels (between 40-75cm).

These soils are well drained and are assigned to wetness Class I.

2.7. The second group of soils are those which were found to be deep and slightly stony (c. 2-10% V/V of small flints) and well drained. They typically comprise fine sandy silt loams or silt loam topsoils, overlying similar textures, or medium clay loams to silty clay loams in the upper subsoils. These pass to heavy silty clay loams, medium clay loams, silty clay or sandy clay loams in the lower subsoil, below 40-80cm.

Occasional profiles were found to be stony with c. 10-30% V/V of angular flints in the lower subsoil between 60-80cm, commonly becoming impenetrable (to soil augers) between 80 and 85cm.

2.8. The third group of soils, are very limited in extent on the site. They occur to the east of the site on the slopes above the drainage ditch. This group is similar to that described in section 2.1, except they are extremely calcareous. They typically comprise silt loam or medium clay loam topsoils, overlying medium/heavy silty clay loams or heavy clay loam subsoils, with c. 10-30% granular chalk within the soil matrix. The lower subsoil comprises sandy clay loams or medium clays, becoming less calcareous with depth.

Occasional profiles become impenetrable (to soil augers) at about 85cm over gravel.

2.9 The fourth group of soil are also very localised in extent, occurring in association with the drainage ditch, in the far south eastern corner. Profiles typically comprise organic silty loam topsoils

which overlie heavy silty clay loams and passes to silty clay within 30-40cm depth. The soil is imperfectly drained as evidenced by mottling and gleying from about 20cm, and are thus assigned to wetness Class IV.

3. AGRICULTURAL LAND CLASSIFICATION

3.1. The ALC grading at this location is primarily determined by interactions between climate and soil factors, namely wetness and droughtiness. However, areas limited by a high percentage of topsoils stones were also identified.

ALC grades 1, 2 and 3b have been mapped, and a breakdown of these grades in terms of area and extent is given below.

Grades	ha	% total agricultural land
1	7.07	35
2	3.85	19
3b	9.20	46
Woodland	4.50	
Non Agricultural	0.55	
Total Agricultural Area	20.12	
Total Area	25.17	

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

Grade 1

3.2. Land of this quality occupies approximately 35% (7.07 ha) of the total agricultural land within the survey area. Profiles typically comprise silt loam to fine sandy silt loam topsoils, overlying similar textures, or occasional medium silty clay loams in the upper subsoil. The lower subsoil comprises heavy silty clay loam, silty clay or medium clay, or occasional fine sandy clay loam to a depth of 120cm. Occasional profiles may be calcareous.

These soils are deep and have only a few stones (c. 2-5% V/V) in the topsoil. They are well drained wetness Class I. They have few limitations to agricultural use and are thus assigned to Grade 1.

Grade 2

3.3 Land of this quality occupies approximately 19% (3.85 ha) of the total agricultural land of the survey area. Grade 2 land occurs in two situations. The main areas of grade 2 land occurs across the mid slopes. Profiles typically comprise silt loams or fine sandy silt loam topsoils with 2-9% V/V flints. The upper subsoil comprises medium/heavy silty clay loams, and medium/heavy clay loams with c. 1-2% flints throughout. The lower subsoil comprises heavy clay loams

and heavy silty clay loams, or occasional medium clay which pass into an impenetrable (to soil augers) flinty horizon, between 60-80cm.

Grade 2 land also occurs on the lower slopes along the southern boundary. Profiles typically comprise medium clay loam topsoils, overlying heavy clay loams, overlying sandy clay loams with c. 30% granular chalk within the soil matrix. An abrupt boundary occurs at 85cm, due to an impenetrable (to soil augers) horizon, comprising flints and gravels.

These soil profiles are well drained - wetness Class I. However, topsoil stoniness and slight droughtiness resulting from the presence of an impenetrable gravel horizon cause these soils to be allocated to grade 2.

Grade 3b

3.4. Land of this quality occupies approximately 46% (9.20 ha) of the total agricultural land of the survey area, and occurs in two situations.

Land graded 3b occupies the upper and lower slopes. Profiles typically comprise silty loams or medium silty clay loam topsoil, with c. 16-33% V/V angular flints. Occasional profiles have fine sandy silt loam, and medium clay loam topsoils. The subsoil comprises similar textures or medium/heavy clay loams with c. 10-50% flints, overlying an abrupt impenetrable (to soil augers) horizon of flints, between 42-80cm.

These profiles are well drained, wetness Class I. However, topsoil stones and droughtiness, restrict the nature and flexibility of cultivation and cropping, and soils are thus allocated to grade 3b.

Grade 3b is also assigned to the area of land adjacent to the drainage ditch. Profiles comprise organic silt loam topsoils, overlying heavy silty clay loams, overlying silty clays. They are prominently mottled and gleyed from 20cm.

These soils are assigned to wetness Class IV, with wetness and workability restrictions causing limitations to agricultural use.

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4. SOIL RESOURCES

Soil Units Consideration for Restoration

4.1 Overlays accompanying the ALC map illustrate the pattern of topsoil and subsoil resources on 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.

Three topsoil units were identified.

4.2 Unit 1

This unit occurs in association with the upper slopes towards the north of the site. This unit typically comprises about 24 cm of brown and dark greyish brown (10YR 4/3, 10YR 4/2) non calcareous silt loam and medium silty clay loam. These topsoils are stony (c. 9-25% v/v flints > 2 cm).

4.3 Unit 2

This unit occurs in association with the mid to lower slops extending through the middle of the site. Topsoils typically comprise 29 cm of brown and dark yellowish brown (10YR 4/3, 10YR 4/4) non calcareous silt loam and medium clay loam. These topsoils are very slightly stony (c. 1-2% v/v flints > 2 cm).

4.4 Unit 3

This unit occurs towards the south west of the site. Topsoils typically comprise 30 cm of brown and dark brown (10YR 4/3, 10YR 3/3) non calcareous fine sandy silt loam. These topsoils are slight to moderately stony (5-22% v/v flints > 2 cm).

Three subsoil units were identified.

4.5 Unit 1

This unit occurs towards the north of the site. It typically comprise between 13-15 cm of dark yellowish brown, (10YR 4/4) heavy clay loam with occasional deeper subsoil. These soils are relatively shallow over gravel between about 42 and 45 cm, with occasional profiles slightly deeper over gravelly horizons (ie 80 cm).

Subsoils in this unit were found to be too stony and shallow over gravelly horizons to assess the structural condition with any certainty.

4.6 Unit 2

This unit occurs towards the north and south of the site. It typically comprise approximately 24-46 cm of dark yellowish brown and yellowish brown (10YR 4/4, 10YR 5/4, 10YR 5/6) sandy clay loam, medium silty clay loam and medium clay loam. These soils were found to be of variable depths over gravelly horizons.

Where described subsoils of sandy clay loam, medium silty clay loam and clay loam have moderately good structures. They typically comprise moderate to well developed coarse angular blocky peds of friable consistence with biopores greater than 0.5% worm channels were evident.

4.7 Unit 3

This unit occurs throughout the middle of the site. It typically comprise approximately 30 cm of dark yellowish brown (10YR 4/4) medium silty clay loam, and medium clay loam, overlying approximately 22 cm of dark yellowish brown and yellowish brown (10YR 4/4, 10YR 4/6) heavy silty clay loam and heavy clay loam, overlying silty clay or clay between 60-110 cm. Occasional profiles within this unit have ochreous mottling within 35 cm. Generally these soils are stoneless and well drained.

Where described the upper subsoils of medium silty clay loam, medium clay loam, heavy silty clay loam and heavy clay loam have moderate structures. They typically comprise well developed coarse to very coarse angular blocky peds of friable to firm consistence with biopores >0.5%. The lower subsoils of silty clay or clay have poor structures, comprising strongly developed very coarse angular blocky to coarse platy peds of firm consistence with biopores >0.5%.

SOURCE OF REFERENCE

Institute of Geological Sciences (1979) Minerals Assessment Report 42, Maidenhead and Marlow - Sand and Gravel Resources.

MAFF (1988) Agricultural Land Classification of England and Wales; Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.

Meteorological Office (1988) Climatological Data Sets for Agricultural Land Classification.

Soil Survey of England and Wales (1973) Sheet SU88 Marlow 1:25000.

Soil Survey of England and Wales (1984) Soils and their Use in South East England, Bulletin 15.

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.