STATEMENT OF PHYSICAL CHARACTERISTICS

WHITEHILL QUARRY, BURFORD, OXFORDSHIRE

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1. BACKGROUND

1.1 This 27.12 hectare site was surveyed on 6 and 7 May 1992 in connection with mineral extraction proposals. It lies approximately 1 mile to south east of the town of Burford. The site is bounded to the east, south west and west by field walls and to the north by existing mineral workings.

1.2 26 auger samples being taken approximately 100 m apart on a grid basis. In addition 2 soil pits were examined.

Land Use

1.3 At the time of the survey, the majority of the site was under spring sown oilseed rape. The exception was one field to the north west under linseed.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The altitude varies between 125 and 132 m AOD, the higher land towards the north, falling very gently to the east. Gradient is not a limitation in terms of land quality at this 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	SP269102	SP270105
Altitude (m AOD)	125	132
Accumulated Temperature Days (°days Jan-June)	1374	1366
Average Annual Rainfall (mm)	754	755
Moisture Deficit (wheat - mm)	95	94
Moisture Deficit (potatoes - mm)	84	83
Field Capacity Days	165	165

2.3 Climatic factors per se place no limitation on agricultural land quality in this area, but can affect the interaction of soil factors with the climate, namely wetness and droughtiness.

Geology and Soils

2.4 The British Geological Survey (B.G.S.), Sheet 236, Witney (1:50000 Series, 1982), shows the majority of the area to be underlain by middle Jurassic (Bathonian) Forest Marble Clays with limestone. The remaining area is underlain by White Limestone with Fimbriata - Walton beds. These are described by B.G.S. (1982) as a mudstone and limestone mix

with lateral and vertical variation, and micritic limestones or black mudstones with lignite and caliche type nodules respectively.

2.5 The soils of the area have been mapped by the Soil Survey of England and Wales (SSEW) as part of Bulletin 15 (1984), Soils of South East England. The map accompanying the publication shows the site to be underlain by Elmton 3 Association, described as a shallow loamy and clayey soil over Jurassic limestone and deeper slowly permeable soil over clay.

2.6 Detailed field examination indicates that soils comprise calcareous heavy silty clay loam or clay topsoils containing varying amounts of limestone brash over similar textured subsoils, again containing weathered limestone. Soil depth over the limestone parent material is variable ranging from 40 to over 100 cm.

3. AGRICULTURAL LAND CLASSIFICATION (ALC)

3.1 ALC grades of 3a, 3b and 4 were mapped at this site, a breakdown of these in terms of area is given below:-

Grade	Area (ha)	% of total agricultural land
3a	13.65	50
3b	11.92	44
4	1.55	6

Non Agricultural Area = 0.6 (track)

Total Site Area = 27.72

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

Grade 3a

3.3 Land of this quality is typically associated with either shallow soils over limestone brash having topsoils with less than 15% v/v limestone brash >2 cm or deeper well drained soils passing to weathered limestone at a greater depth. Such land is typically limited by drought caused by shallow depths over a weathered limestone parent material in combination with topsoil stone contents in the range 1-15% v/v of limestone >2 cm. Where deeper, soils frequently have a topsoil workability limitation since well drained (Wetness Class I) silty clay or clay topsoils cannot be graded higher than 3a in this climatic regime (ie. 165 field capacity days).

Grade 3b

3.4 Grade 3b land occurs in two situations. Firstly are shallow stony soils over limestone which have between 15-35% v/v of limestone brash in the topsoil >2 cm in size. Such land occurs towards the south of the site and is so graded due to the increase in production costs due to extra wear and tear to implements and types caused by stones. Crop quality and establishment may also be impaired. Droughtiness may be an additional factor which also limits such soils to grade 3b.

3.5 The second type of land graded 3b is associated with deeper clayey soils on the site. These are typically only slightly stony in the upper soil profile but pass to gleyed, slowly permeable horizons between 20 and 70 cm, placing land in wetness classes II to IV depending upon the depth to gleying. Due to the heavy topsoil textures (clays and silty clays) and the wetness restrictions these soils can be graded no higher than 3b.

3.6 Grade 4

A small area of the site falls into this grade in the north west corner of the site. Soils in this area are limited by stone content in the topsoil being both more than 35% >2 cm and 20% >6 cm. These soils are severely limited due to the high stone content, and are thus limited to this grade.

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. Although sampling depth was frequently less at this site due to high stone contents, in some cases soil resources may extend beyond this depth.

Topsoil

4.2 Two topsoil units were identified across the site distinguished by stone (brash) content. The most extensive (Unit 1) comprises a calcareous brown to dark yellowish brown (10YR 4/3-4/4). slightly stony, up to 15% v/v limestone >2 cm, heavy silty loam, silty clay or clay, having an average depth of 25.8 cm over a range of 20 to 32 cm.

4.3 The second unit is similar to that shown above in terms of colour and textural characteristics. It however contains more than 15% limestone >2 cm, up to a maximum of 45% overall. This has a mean depth of 24.5 cm over range 23 to 28 cm.

Subsoil

4.4 Two subsoil units were observed during field examination. Unit 1 is a calcareous dark to light yellowish brown (10YR 4/4-6/4) heavy silty clay loam, silty clay or clay passing to a similarly textured though highly stony (up to 70% limestone) lower subsoil, impenetrable to the soil auger. The structure of this unit was difficult to determine due to the high stone (brash) contents.

4.5 The second subsoil unit (Unit 2) comprises a clay or silty clay, occasionally passing to sandy clay at depth. It is typically light yellowish brown or brown (2.5Y 6/4 to 10YR 5/3) in colour and gleyed with both yellowish brown (10YR 5/6 - 5/8) and grey (2.5Y 6/2) mottling. Soils have a slight to moderate content (0-30%) of limestone brash, allowing auger penetration to at least 60 cm and frequently to

120 cm. Where described, subsoil structures in this unit were, in the upper subsoil, moderately developed fine to medium angular blocky become coarser with depth as gleying intensifies. In the lower subsoil beyond 60 cm the structure was found to be massive.

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M LARKIN
J HOLLOWAY
Resource Planning Team
ADAS Reading

REFERENCES

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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 datasets for Agricultural Land Classification".

SOIL SURVEY OF ENGLAND AND WALES (1984): "Soils and their Use in South East England". Bulletin 15. Harpenden [and map (SSEW, 1983)].

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.