Cambs 9/8/93

AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

BOLSOVER MOOR QUARRY, DERBYSHIRE

1.0 BACKGROUND

1.1 This site covering an area of 15.9 hectares is the subject of a planning application to extend an existing adjacent limestone quarry. ADAS Resource Planning Team surveyed the site in September 1993 to assess the agricultural land quality at an auger boring density of approximately 1 boring per hectare. These borings were supplemented by 2 soil inspection pits in order to assess subsoil conditions.

1.2 At the time of the survey the western part of the site comprised a grass ley with wheat growing on the remainder of the site.

1.3 The published Provisional 1:63,360 scale Agricultural Land Classification Map, sheet number 112 (MAFF, 1970) depicts the whole area as grade 2. Since this map is of a reconnaissance nature designed primarily for strategic planning purposes, the current survey was undertaken to provide more detailed information on land quality in the survey area.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climate data for the site was extrapolated from data in the published Agricultural Climatic Dataset (Meteorological Office 1989). This indicates that for an average site altitude of 150 m AOD the average annual rainfall for the site is 708 mm (28.3"). This data also indicates that the field capacity days are 159 with moisture deficits of 92 mm for wheat and 79 mm for potatoes. These characteristics impose a minor limitation on the ALC grade of the survey site, excluding the land from grade 1.

Altitude and Relief

2.2 The survey area lies on the brow of a hill and comprises a gentle south facing slope with a maximum altitude of 162 m AOD and a minimum altitude of 145 m. Neither gradient nor altitude impose a limitation to ALC grade.

Geology and Soils

2.3 The published 1:63,360 scale Solid and Drift edition geology map sheet 112, Chesterfield, (Geological Survey of England and Wales, 1971), shows the whole site to comprise Permo-Triassic Lower Magnesium Limestone.

2.4 No detailed soil map exists for this area. However, the Soil Survey of England and Wales have mapped this area at a reconnaissance scale of 1:250,000 (SSEW, 1983) and this map indicates the occurrence of soils of the Aberford Association*. The current more detailed survey also identified one soil type.

2.5 The site typically comprises very slightly stony (2-3%) medium or occasionally heavy clay loam topsoils, although in the east of the site stoniness is slightly higher (4-10%). These overlie free draining, slightly stony (2-3%) heavy clay loam upper subsoils, below which lower subsoils comprising 40% fragmented limestone rock surrounded by sandy clay loam occur at variable depths (25/85 cm). In areas where the soils are very shallow no upper subsoil exists. These soils are well drained (wetness class I) but are limited by droughtiness and reduced depth of soil.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The distribution of the Agricultural Land Classification (ALC) grades at the site is shown overleaf. The definitions of the ALC grades are included in Appendix 1.

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* Aberford Association - Shallow, locally brashy, well drained calcareous fine loamy soils over limestone. Some deeper calcareous soils in colluvium.

AGRICULTURAL LAND CLASSIFICATION

Grade	hectares	%
2	3.0	18.9
3a	9.2	57.8
3b	3.7	23.3
TOTAL	15.9	100.0

Grade 2

3.2 This occurs in the west of the site corresponding to the deeper profiles described in paragraph 2.5. The stoniness of lower subsoils produce a minor limiting effect on the water holding capacity of the soil. As a result there is a slight droughtiness limitation to land quality. Although individual profiles are sufficiently deep to overcome this limitation, climate characteristics (see paragraph 2.1) exclude this land from grade 1.

Subgrade 3a

3.3 The majority of the site has been mapped as subgrade 3a and is associated with shallower soils, having a depth to lower subsoil of between 30 to 45 cm. These limiting depths to fragmented rock which cannot be penetrated satisfactorily by cultivation implements restrict the land to subgrade 3a.

Subgrade 3b

3.4 Land graded 3b occurs in the centre and east of the site in areas of particularly shallow soils where fragmented rock occurs directly below the topsoil. This imposes a moderate limitation to land quality and excludes the land from a higher grade.

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REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN 1971. Solid and Drift Edition. Sheet 112, Chesterfield. Scale 1:63,360.

MAFF, 1970. Agricultural Land Classification Map, Sheet 112. Provisional. Scale 1:63,360.

MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of land). Alnwick.

METEOROLOGICAL OFFICE 1989. Published climatic data extracted from the agricultural dataset, compiled by the Meteorological Office.

SOIL SURVEY OF ENGLAND AND WALES 1983. Sheet 3, Soils of Midland and Western England. Scale 1:250,000.

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

BOLSOVER MOOR QUARRY, DERBYSHIRE

SOIL TYPE I

Topsoil	Texture	:	medium clay loam or occasionally heavy clay loam.
	Depth	:	25-30 cm
	Colour	:	10YR4/3 dark brown
	Stone	:	typically 2-3% small limestones, although in the east of the site can be as high as 10% small limestones.
	Structure	:	cultivation zone - not applicable
	Boundary	:	clear smooth
	Roots	:	common fine and very fine
Upper Subsoil*	Texture	:	heavy clay loam or medium clay loam
	Depth	:	variable, between 40-85 cm
	Colour	:	10YR5/4 yellowish brown and 7.5YR5/5 brown.
	Stone	:	typically 2-3% small limestones
	Structure	:	moderately developed, very coarse subangular blocky, breaking to coarse subangular blocky.
	Consistence	:	friable
	Porosity	:	greater than 0.5 biopores
	Boundary	:	clear smooth
	Roots	:	common fine and very fine
Mineral/Lower Subsoil	Texture	:	typically sandy clay loam
	Depth	:	variable, may occur below topsoil, between 25-85 cm.
	Colour	:	10YR6/6 brownish yellow and 7.5Y5/5 brown
	Stone	:	extremely stony (average 40%), coarse and very coarse limestones.
	Structure	:	too stony to assess
	Consistence	:	friable
	Porosity	:	greater than 0.5% biopores
	Roots	:	common fine and very fine

* this horizon is not always present within the profile.

Appendix 1

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 include 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 crops. The level of yields 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 winter 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 levels of yields. It is mainly suited to grass with occasional arable crops (eg. cereals and forage crops) the yield of which are variable. In most 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.