

AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

EXTENSION TO IVONBROOK QUARRY, DERBYSHIRE

1.0 BACKGROUND

- 1.1 A site of 13 ha in extent approximately 6 km to the west of the village of Matlock Bath in Derbyshire is the subject of a planning application to extend the existing quarry.
- 1.2 The site consists of a large northern block, centred on grid reference SK 236 586, and a smaller southern block centred on grid reference SK 236 582. At the time of this survey the land consisted of permanent grassland.
- 1.3 On the published 1:63 360 scale Agricultural Land Classification (ALC) map (MAFF, 1973) the site as a whole is mapped as Grade 3. This map is only of a reconnaissance nature and hence the current detailed survey was carried out to provide site specific ALC and soils information.
- 1.4 The site was surveyed on a 100 m grid basis using a dutch auger to a depth of 1.2 m wherever possible. In addition two soil pits were dug to assess subsoil structure in more detail.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

- 2.1 Climatic criteria are considered when classifying land as these may have an overriding limitation in terms of the agricultural use of the land. The main parameters used in the assessment of the overall climatic limitation are

average annual rainfall, as a measure of overall wetness, and accumulated temperature (day °C Jan-June), as a measure of the relative warmth of an area.

- 2.2 A detailed assessment of the prevailing climate for the site has been made by interpolation from the 5 km grid dataset produced by the Meteorological Office (Met. Office, 1989). The details are given in Table 1 and these show that there is an overall climatic limitation to Subgrade 3b affecting the site.

Table 1. Climatic Data

	Northern block		Southern block
	SK236 586	SK237 585	SK237 582
Grid Reference	SK236 586	SK237 585	SK237 582
Altitude (m, AOD)	317	300	290
Accumulated Temperature Day °C, Jan-June	1091	1110	1145
Average Annual Rainfall (mm)	967	956	938
Moisture Deficit, Wheat (mm)	54	57	61
Moisture Deficit, Potatoes (mm)	29	32	37
Field Capacity Days	228	227	224
Overall Climatic Grade	3b	3b	3b

Altitude and Relief

- 2.3 The northern block of the site lies at the top of a hill with a maximum altitude of 318 m AOD. The land slopes from this high point to approximately 300 m AOD with generally moderate slopes. However, a small area in the north of this block has slopes which are up to steeply sloping with rocky outcrops. Hence, this small area is restricted to Grade 4 on relief.
- 2.4 The smaller southern block of land lies at a maximum altitude of approximately 300 m AOD with moderate slopes to the south to an altitude of approximately 285 m AOD. However, a small area in the south and east of this block has steep slopes with rocky outcrops thus limiting this area to Grade 4 on relief.

Geology and Soils .

- 2.5 The published 1:50 000 scale geology map (Geol. Survey, 1978) shows the northern block of the site to consist of Monsal Dale Limestone. The southern block of the site is shown as comprising Lower Matlock Lava.
- 2.6 The reconnaissance (1:250 000 scale) soil survey map for the area (Soil Survey, 1983) shows the site to comprise soils of the Malham 2 association*.
- 2.7 The present detailed survey of the site shows the presence of a single soil type across the site. The physical characteristics of this soil type are given in Appendix 1.
- 2.8 This soil type consists of a stoneless or very slightly stony medium silty clay loam textured topsoil overlying a stoneless or very slightly stony silty clay loam textured upper subsoil. This upper subsoil in turn overlay a very slightly to *slightly stony silty clay loam textured lower subsoil*. The upper subsoil generally had a moderately developed angular block structure with common earthworm channels and biopores. The lower subsoil was weakly developed with few biopores and could constitute a slowly permeable layer, however, no evidence of gleying or mottling was evident within the soil profile. These soil horizons overlay rock or fragmented rocky material at variable depth across the site.

* Malham 2 association: well drained often stoneless silty soils over limestone, shallow in places especially on crests and steep slopes. Bare rock locally. Formed in Aeolian silty drift over Carboniferous limestone and Triassic limestone breccia.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The breakdown of the various Agricultural Land Classification (ALC) grades within the site are shown in Table 2. The definition of the ALC grades is given in Appendix 2.

Table 2. Distribution of grades and subgrades

AGRICULTURAL LAND CLASSIFICATION		
Grade	Area (ha)	% of site
3b	11.7	90
4	1.3	10
TOTAL	<hr/> 13.0	<hr/> 100

Subgrade 3b

3.2 The majority of the land within the site is of Subgrade 3b quality limited principally by climatic constraints. However, very occasionally a sample point was equally limited to Subgrade 3b due to wetness and workability constraints.

Grade 4

3.3 Land of this quality occurs in the northern and southern blocks of the site and is limited by slope and the occurrence of rocky outcrops within relatively small areas.

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REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN (ENGLAND AND WALES),
1978. Sheet 111, Buxton, 1 50 000 scale.

MAFF, 1973. Agricultural Land Classification Map. Provisional. Scale 1:63 360
Sheet 111.

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

METEOROLOGICAL OFFICE, 1989. Climatological Data for Agricultural Land
Classification. Bracknell.

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

Appendix 1

Topsoil	Texture	:	medium silty clay loam
	Colour	:	dark greyish brown (10YR4/2)
	Stone	:	stoneless/very slightly stony
	Boundary	:	smooth, abrupt
	Roots	:	many, fine
	Depth	:	22 cm
	Upper Subsoil	Texture	:
Matrix colour		:	dark brown (7.5YR4/4)
Mottles		:	none
Stone		:	stoneless/very slightly stony
Structure		:	moderately developed medium/coarse angular blocky.
Consistence		:	friable
Porosity		:	2% biopores
Boundary		:	smooth, abrupt
Roots		:	many, fine
Depth		:	49 cm
Lower Subsoil		Texture	:
	Matrix colour	:	brown (7.5YR5/4)
	Mottles	:	none
	Stone	:	very slightly/slightly stony (5-10%)
	Structure	:	weakly developed coarse angular blocky
	Porosity	:	<0.5% biopores
	Roots	:	common, fine
	Depth	:	80 cm

Appendix 2

DEFINITIONS OF ALC GRADES

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 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 levels of yields. It is mainly suited to grass with occasional arable crops (e.g. 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.