AGRICULTURAL LAND CLASSIFICATION INCORPORATING SOIL PHYSICAL CHARACTERISTICS

CLIFFORD HILL QUARRY, GREAT HOUGHTON, NORTHANTS

1.0 BACKGROUND

1.1 The site is the subject of an application by Pioneer Aggregates Limited for the extension of existing sand and gravel workings and infilling with inert waste. ADAS Resource Planning Team surveyed the site in September 1992 to assess the agricultural land quality and soil physical characteristics. Nineteen soil inspections were made using a hand held 120 cm Dutch soil auger, and a soil inspection pit dug to assess subsoil conditions.

2.0 SITE PHYSICAL CHARACTERISTICS

Climate

2.1 Site specific climate data has been interpreted from information contained in 5 km grid dataset compiled by the Meteorological Office (Met Office 1989). This shows average annual rainfall (AAR) to be 602 mm (24.4"). This data also indicates that soils are at field capacity for 127 days and moisture deficits are 115 mm for wheat and 108 mm for potatoes. The accumulated temperature above 0°C January to June (ATO) is 1421 day°C. These climatic characteristics do not impose any climatic limitation to agricultural land quality.

Altitude and Relief

2.2 The site comprises a very gently sloping field in the valley floor, which lies at an altitude of approximately 55 m AOD. An extensive ridge and furrow pattern is found across the whole site. There is a small area in the eastern part of the site where this microrelief feature is a limiting factor to the ALC grading. As a result this area is limited to 3a.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 On the Ministry's published 1:63,360 scale provisional ALC map, sheet 133 (MAFF, 1974). The whole of the site is shown as grade 3. This map is of a reconnaissance nature designed primarily for strategic planning purposes and does not always delineate accurately areas of less than 80 ha (200 acres).

3.2 In 1984, the northern part of the site and adjacent land was surveyed for the Northamptonshire Sand and Gravel Topic Paper. The results indicated the presence of subgrade 3a and 3b and some grade 2. The current field survey was undertaken to provide detailed information on land quality using the revised guidelines (MAFF, 1988).

3.3 A precise breakdown of the ALC grades in hectares and % terms is provided below. The definitions of the ALC grades 2 and 3a are included in Appendix 2.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
2	8.4	43.7
3a	10.8	56.3
TOTAL	19.2	100.0

Grade 2

3.4 The grade 2 land occurs on the slighly higher southern half of the site. Soils are fine loamy with slowly permeable clayey lower subsoils. A slight drainage impediment limits these soils to wetness class II (Figure 8 p. 39. MAFF, 1988) this slight wetness/workability limitation restricts the land to grade 2. Furthermore these soils also have a slight droughtiness limitation.

Subgrade 3a

3.5 The 3a land is found in the slightly lower northern part of the site which borders Hardingstone Dyke. Soils have similar topsoil textures to the land graded 2. However, variably the upper subsoils are gleyed. Profile wetness has been assessed as wetness class III (Figure 7, p 38 MAFF 1992) thus restricting this land to subgrade 3a (good quality agricultural land). There is an area in the north west corner of the site where the microtopography limits the land to subgrade 3a.

4. SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The geology of the area has been mapped at a scale of 1:50,000 (Geological Survey of England and Wales, 1980). This map (No. 185) shows the majority of the area as Pleistocene first terrace river gravel deposits. In the southeast corner there is a small area of Jurassic Upper Lias Clay and in the northeast corner a small area of alluvium.

4.2 The published 1:250,000 reconnaissance scale soil map (Soil Survey of England and Wales, 1983) shows the whole site to comprise the Wickham 2 Association*. However, the current detailed site inspection indicates that lighter textured soils occur with minor variations in drainage status.

* Wickham 2 slowly permeable seasonally waterlogged fine loamy over clayey, fine silty over clayey, and clayey soils. There are some small areas of slowly permeable calcareous clayey soil.

4.3 The soils which cover the whole of the site typically comprise non calcareous medium clay loam or occasionally medium silty clay loam topsoils over heavy clay loam or sandy clay loam (occasionally clay) upper subsoils. The lower subsoils consist of sandy clays or clays with some profiles having sandy loam or sandy clay loam pockets at depth. The lower subsoils increase in stone content from slightly stony (10% Limestones) at 50 cm to gravelly (very stony: approximately 70% flint and Limestones) below 80 cms.

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SOIL PHYSICAL CHARACTERISTICS

CLIFFORD HILL QUARRY EXTENSION, GREAT HOUGHTON, NORTHANTS

Topsoil	Texture	:	medium clay loam or medium silty clay loam
	$CaCO_3$	:	non-calcareous
	Colour	:	dark yellowish brown (10YR34)
	Stone	:	negligible stones
	Structure	:	cultivation zone - not applicable
	Boundary	:	clear smooth
	Roots	:	many fine and very fine
	Depth	:	27 cm
Upper Subsoil	Texture	:	heavy clay loam or sandy clay loam (occ. clay)
	$CaCO_3$	:	variably calcareous
	Colour	:	dark yellowish brown (10YR44) and yellowish brown (10YR54) where slightly gleyed.
	Stone	:	negligible stones
	Structure	:	moderately developed coarse subangular blocky/ where gleyed weakly developed course subangular blocky.
	Boundary	:	gradual smooth
	Roots	:	common fine and very fine
	Depth	:	variable in the range 45/50 cm
Lower Subsoil	Texture	:	sandy clay or clay with sandy loam lenses
	$CaCO_3$	:	calcareous
	Colour	:	yellowish brown (10YR54) where slightly gleyed, and dark yellowish brown (10YR46).
	Stone	:	slightly stony, 10% Limestone fragments and flints.
	Structure	:	weakly developed coarse subangular blocky
	Roots	:	common fine and very fine
	Depth	:	80 cm
			below 80 cm gravelly material

Appendix 2

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 will affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. When more demanding crops and 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 cereal 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.

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1980). Solid and drift edition sheet 185 Northampton, 50,000 scale.

MAFF (1974). Agricultural Land Classification Map sheet 133 Provisional 1:63360 scale.

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

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

SOIL SURVEY OF ENGLAND AND WALES (1983). Sheet 4, Soils of Eastern England 1:250,000 scale.