AGRICULTURAL LAND CLASSIFICATION INCORPORATING SOIL PHYSICAL CHARACTERISTICS

MILTON QUARRY EXTENSION, KISLINGBURY, NORTHANTS

1.0 BACKGROUND

1.1 The site is the subject of an application by Pioneer Aggregates Limited for the extension of existing sand workings and infilling with inert waste. ADAS Resource Planning Team surveyed the site in July 1992 to assess the agricultural land quality and soil physical characteristics. Fifteen 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 the 5 km grid dataset compiled by the Meteorological Office. This shows average annual rainfall (AAR) to be 641 mm (25.9"). This data also indicates that soils are at field capacity for 139 days and moisture deficits are 106 mm for wheat and 97 mm for potatoes. The accumulated temperature above 0°C January to June (ATO) is 1384 day°C. These climatic characteristics do not impose any climatic limitation to agricultural land quality.

Altitude and Relief

2.2 The site comprises a gentle east facing slope. The maximum height of approximately 95 m AOD occurs on the western edge and from this point the land falls to approximately 85 m AOD on the eastern boundary of the site. Gradient does not constitute a limitation to agricultural land use.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 On the Ministry's published 1:63,360 scale provisional ALC map, sheet 133 (MAFF, 1974). The site is shown as approximately two thirds grade 3 and one third grade 2.This map is of a reconnaissance nature designed primarily for strategic planning purposes and does not always delineate areas of less than 80 ha (200 acres).

3.2 In 1991, a desk study of more recently published soil information indicated that the likely grade of this site was 3a with smaller areas of grade 2 and 3b. The current field survey was undertaken to provide more detailed information on land quality.

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

	AGRICULTURAL LAND CLASSIFICATION	
Grade	ha	%
2	7.8	50.3
3a	5.7	36.8
3b	2.0	12.9
TOTAL	15.5	100.0

Grade 2

3.4 The grade 2 land is associated with soil type B which is described in detail in paragraph 4.4.

3.5 Soils typically comprise medium clay loam or sandy clay loam topsoils over variable subsoils of sandy clay loam and clay textures. These soils have slightly impeded drainage and are assessed as wetness class II, thus a slight wetness limitation restricts the land to grade 2.

Subgrade 3a

3.6 The grade 3a is associated with the heavier land associated with soil type A (described in paragraph 4.3). The profiles comprise heavy clay loam and heavy silty clay loam topsoils over heavy clay loam or clay upper subsoils. The lower clay subsoils show signs of gleying indicative of impeded drainage. Thus these soils are assessed as wetness class II, limiting this land to subgrade 3a.

Subgrade 3b

3.7 There is a small area of land in the south west corner of the site which has been graded 3b. These soils are similar to those graded 3a, however gleying occurs in the upper subsoils indicating a more severe drainage impediment. These soils are assessed as wetness class III thus restricting the land to subgrade 3b.

4. SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The geology of this area has been mapped at a scale of 1:63,360 (Geological Survey of England and Wales, 1969). This map shows the whole of the area as glacial boulder clay.

Soils

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 Hanslope Association. These soils are described as slowly permeable calcareous clayey soils and some slowly permeable non-calcareous clayey soils. The detailed site inspection indicates that two soil types occur.

Soil Type A (refer to Appendix 1 and Soil Types Map)

4.3 This soil type covers about half the site and typically comprises non calcareous heavy clay loam or heavy silty clay loam topsoil which is very slightly stony over a heavy clay loam or clay upper subsoil. Lower subsoils are slightly stony calcareous clay and occur from 55/60 cm depth.

Soil Type B (refer to Appendix 2 and Soil Types Map)

4.4 Over the remainder of the site slightly sandier soils occur, they typically comprise non calcareous medium clay loam or sandy clay loam topsoils over heavy clay loam or occasionally sandy clay loam upper subsoils which are occasionally calcareous. Lower subsoils consist of sandy clay or clay with sandy pockets which are slightly stony and occur from 65/70 cm depth.

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SOIL PHYSICAL CHARACTERISTICS
MILTON QUARRY EXTENSION, KISLINGBURY

SOIL TYPE A

Topsoil	Texture	:	heavy silty clay loam or heavy clay loam
	$CaCO_3$	:	non-calcareous
	Colour	:	dark yellowish brown (10YR44)
	Stone	:	very slightly stony (3%)
	Structure	:	cultivation zone - not applicable
	Boundary	:	clear smooth
	Roots	:	many fine and very fine
	Depth	:	30 cm
Upper Subsoil	Texture	:	heavy clay loam or clay
	$CaCO_3$	:	variably calcareous
	Colour	:	yellowish brown (10YR56)
	Stone	:	very slightly stony (angular, subangular and rounded flints)
	Structure	:	moderately developed coarse subangular blocky
	Boundary	:	clear smooth
	Roots	:	common fine and very fine
	Depth	:	variable in the range 50/60 cm, typically 55 cm
Lower Subsoil	Texture	:	clay
	$CaCO_3$	:	calcareous
	Colour	:	brown (10YR53) and yellowish brown (10YR56)
	Stone	:	slightly stony, 10% chalk fragments
	Structure	:	weakly developed coarse subangular blocky
	Roots	:	common fine and very fine
	Depth	:	120 cm

SOIL TYPE B

Topsoil	Texture	:	medium clay loam or sandy clay loam
	$CaCO_3$	:	non-calcareous
	Colour	:	dark yellowish brown (10YR44)
	Stone	:	very slightly stony (2-4% small angular, subangular and rounded flints)
	Structure	:	cultivation zone - not applicable
	Boundary	:	clear smooth
	Roots	:	common fine and very fine
	Depth	:	30/35 cm
Upper Subsoil	Texture	:	heavy clay loam or sandy clay loam
	$CaCO_3$	:	occasionally calcareous
	Colour	:	dark yellowish brown (10YR44) and (10YR46)
	Stone	:	very slightly stony (2-4%) occasionally 12% small angular, subangular and rounded flints
	Structure	:	moderately developed coarse subangular blocky
	Boundary	:	clear smooth
	Roots	:	common fine and very fine
	Depth	:	65/70 cm
Lower Subsoil	Texture	:	clay or sandy clay
	$CaCO_3$	:	non-calcareous
	Colour	:	dark yellowish brown (10YR56) or yellowish brown (10YR58)
	Stone	:	slightly stony, 5-10% small subangular, and rounded flints
	Structure	:	moderately developed coarse angular blocky
	Roots	:	common fine and very fine
	Depth	:	120 cm

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 (1969). Solid and drift edition sheet 202, Towcester 1:63360 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 criteria 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.