Cambs 08/91

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS
SCOTLAND WOOD FARM, MAIDWELL, NORTHANTS

1. BACKGROUND

1.1 The site, an area of 17.2 hectares, is the subject of an application, by Peter Bernie Limited, for the extraction of sand and gravel near Maidwell, Northamptonshire. Of the above application area the proposed sand and gravel extraction area equates to the central 7.3 hectares. MAFF surveyed the site in February 1991 to assess the agricultural land quality and soil physical characteristics.

2. SITE PHYSICAL CHARACTERISTICS

Climate

2.1 Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that for the site's mid range altitude of 145m AOD the annual average rainfall is 676 mm (26.6"). This data also indicates that field capacity days are 148 and moisture deficits are 99 mm for wheat and 88 mm for potatoes. For the parts of the site which lie in excess of 148m AOD minor climatic limitations are inherent. Consequently, the whole site is restricted to grade 2 by climate imperfections.

Altitude and Relief

2.2 The site comprises a network of gently undulating slopes which range in altitude from 140 to 150m AOD. At their steepest, to the south of the track (tk), slopes range in gradient from 4 to 5°. Neither gradient nor altitude constitute limitations to the ALC grade.

3. SOIL PHYSICAL CHARACTERISTICS

Geology

3.1 The published 1:50,000 scale solid and drift edition geology map No 185 (Geological Survey of England and Wales, 1980), shows the majority of the site to comprise glacial sand and gravels with smaller deposits

of Oolitic Limestone, boulder clay and Estuarine Clay to the western, northern and southern peripheries respectively.

Soils

3.2 The detailed site inspection identified the presence of three main soil types.

3.2.1 Soil Type 1 (refer to Appendix 1 and Soil Map)

The majority of the survey area typically comprises very slightly or slightly stony sandy clay loam or heavy clay loams to depth (50/65 cm). Below this, profiles often become stonier; stone percentages generally range from 30 to 70%. Ironstones (30/40%) commonly comprise the profile stone to the south and west, whilst Limestone rubble (approximately 70% Limestones in a clay matrix) forms the lower subsoil of the soils north of the track (tk). Flints may also be present at variable depths within these profiles.

3.2.2 Soil Type 2 (refer to Appendix 1 and Soil Map)

Forming a central tract, running north south through the survey area, a slightly smaller deposit of heavier soils outcrop. These soils typically comprise heavy clay loam topsoils over clay subsoils which may contain chalk fragments at depth.

3.2.2 Soil Type 3 (refer to Appendix 1 and Soil Map)

South of the track (tk) towards the eastern end of the site a smaller area of sandy soils outcrops. These soils typically comprise brashy (Limestone) heavy clay loam topsoils over sand subsoils. Topsoil stone ranges from 20 to 25% and consists of large and medium Limestone fragments.

4. AGRICULTURAL LAND CLASSIFICATION

4.1 The definitions of the Agricultural Land Classification grades are included in Appendix 2.

4.2 Table 4.2 shows the breakdown of ALC grades for the survey area.

Table 4.2	AGRICULTURAL LAND CLASSIFICATION	
Grade	ha	%
2	6.3	36.6
3a	5.9	34.3
3b	4.5	26.2
Non Agricultural	0.5	2.9
TOTAL	17.2	100.0

4.3 Table 4.3 shows the breakdown of ALC grades in the area where gravel extraction is proposed.

Table 4.3	AGRICULTURAL LAND CLASSIFICATION	
Grade	ha	%
2	1.5	20.4
3a	3.8	52.0
3b	2.0	27.6
TOTAL	7.3	100.0

4.4 Grade 2

The land graded 2 is associated with the less stony variant of Soil Type 1. Profiles are freely draining (ie. wetness class I) and hold good or moderately good reserves of available water depending on the abundance of profile stone. Topsoils comprise heavy clay loams or sandy clay loams; where the former occurs slight workability and climate limitations restrict the land to grade 2. Elsewhere, climate and/or slight droughtiness imperfections exclude the land from grade 1.

4.5 Subgrade 3a

Two areas of the site have been graded 3a. Two main situations occur.

4.5.1 The eastern part of the land north of the track (tk) lies in association with the Limestone derived soils of Soil Type 1. Moderate droughtiness imperfections restrict the land to subgrade 3a.

4.5.2 The remainder of the subgrade 3a land lies in association with the better drained variant of Soil Type 2. Profiles have a wetness class of II; this combined with the relatively heavy topsoils and decalcified nature of the upper soil horizons restricts the land to subgrade 3a.

4.6 Subgrade 3b

Two main situations occur.

4.6.1 To the north of the track (tk) a poorly drained variant (ie wetness class III) of Soil Type 2 outcrops. Significant wetness and workability limitations exclude this land from subgrade 3a.

4.6.2 The remaining area of subgrade 3b comprises soils of Soil Type 2 and 3. The limitation common to these two soil types is the presence of many Limestone fragments in the topsoil. These Limestone fragments have a significant damaging effect on the cultivation machinery, seedling germination and crop root development. Consequently topsoil stone limitations restrict this land to subgrade 3b.

4.7 Non Agricultural

A new plantation, grown for pheasant cover, has been mapped as Non Agricultural land.

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RESOURCE PLANNING GROUP
Cambridge RO

APPENDIX 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE 1

Topsoil	texture	:	sandy clay loam or heavy clay loam (occasionally medium clay loam)
	stone	:	4-5% flints, Ironstones or Limestones
	depth	:	30 cm
Upper Subsoil	texture	:	sandy clay loam or heavy clay loam
	stone	:	4 to 10% flints or Ironstones, occasional Limestones
	structure	:	moderately or weakly developed coarse subangular blocky
	consistence	:	friable
	depth	:	50/65 cm
Lower Subsoil	texture	:	sandy clay loam, heavy clay loam or clay
	stone	:	5-40% Ironstone and flints OR 70% Limestone fragments
	structure	:	weakly developed coarse subangular blocky where Ironstones predominate. Structural assessment is not possible where rubble Limestone occurs.
	consistence	:	friable
	depth	:	120 cm

SOIL TYPE 2

Topsoil	texture	:	heavy clay loam
	stone	:	1-2% flints and/or Limestones (occasionally 20%)
	depth	:	30 cm
Subsoil	texture	:	clay
	stone	:	3-5% flints or Ironstone; may be chalky at depth.
	structure	:	no gleying - moderately developed coarse subangular blocky where gleyed - weakly developed coarse prisms (35/55 cm+)
	consistence	:	firm
	depth	:	120 cm

SOIL TYPE 3

Topsoil	texture	:	heavy clay loam
	stone	:	20 to 25% Limestone fragments, mainly large and medium in size
	depth	:	30 cm
Subsoil	texture	:	medium sand
	stone	:	negligible
	structure	:	structureless - single grain
	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 with 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.

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES 1980. Solid and drift edition geology map No 185.

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

METEOROLOGICAL OFFICE (1989). Climatic Data extracted from the published Agricultural Climatic Dataset.