camb 14/90

AGRICULTURAL LAND CLASSIFICATION

LAND AT WASHINGBOROUGH FEN, LINCOLNSHIRE

1. INTRODUCTION

1.1 The site, an area of 4.3 ha, is the subject of an application for the extraction of peat and subsequent restoration at low level to a wildlife lake. MAFF surveyed this land in February 1990.

1.2 Published Agricultural Land Classification (ALC) information is available at a scale of 1:63 360 (sheet 113; Provisional; 1963) and this shows the entire survey area to be grade 2. These maps are inappropriate for site-specific appraisals, however, as they were surveyed at reconnaissance scale only and do not always show areas of individual grades of less than approximately 80 ha. The current survey was undertaken to provide more detailed ALC information for the area.

1.3 10 soil inspections were made over the site to a depth of 120 cm using a hand held Dutch auger, and data collected were supplemented by information from a soil profile pit.

1.4 The site comprises part of a single enclosure and at the time of survey it was in arable use; typical crops grown include spring cereals and potatoes.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Site-specific climate data have been obtained by interpolating information contained in the 5km grid agricultural climatic dataset produced by the Meteorological Office (Met Office 1989). This indicates that the site has an average annual rainfall of 588 mm

(23.1") which is low by national standards. Soils are likely to be at field capacity for approximately 120 days and soil moisture deficits are estimated as 116 mm for wheat and 111 mm for potatoes.

2.2 These climatic factors place no limitation on the agricultural land quality of this site.

Altitude and Relief

2.3 The site is level and lies at an altitude of 2m AOD.

2.4 Neither altitude nor relief constitute a limitation to the ALC grading of this site.

Geology and Soils

2.5 The solid and drift geology of Lincoln has been mapped by the Geological Survey of Great Britain at a scale of 1:50 000 (sheet 114; Provisional 1973). This maps the entire site as marine or estuarine silt and clay overlain by peat, with Kellaways Sands and Clay at depth.

2.6 No detailed soils information is available for this area, however, the 1:250 000 reconnaissance scale soils map "Soils in Eastern England" (Soil Survey of England and Wales 1983) maps the Adventurers 2 Association* over the entire survey area. The current survey confirmed the presence of deep peat soils and one soil type was identified.

2.7 The soils identified during the survey are very uniform in nature and comprise black loamy peat topsoils to 28/32 cms over humified peat subsoils which extend to 120 cms+. Subsoils are reddish black in colour and contain common woody fragments below 40-50 cms depth.

2.8 The permeability of these soils is high and groundwater levels in this lowlying area are controlled by a pumping station and network of

* Adventurers 2 Association: Deep peat over variable subsoils, usually sandy, sometimes gravelly. Sandy soils with a peaty or humose surface horizon. Complex soil patterns locally. Flat land. Groundwater levels controlled by ditches and pumps.

ditches. The soils are still estimated as being wet within 70 cms for 31-90 days in most years and are hence assessed as wetness class II. No irrigation facilities are available at this site.

2.9 Assessments of soil pH were made throughout the subsoil at approximately 10 cm intervals. These data indicate that subsoil pH is typically pH 4.5 or below from immediately below the topsoil, indeed topsoil pH ranged from pH 4.5 to pH 6.0. These strongly acid conditions are formed by the oxidation of pyrite (Ferrous disulphide), which is a stable constituent of some anaerobic marine sediments (MAFF 1983). Following drainage, air is allowed to penetrate the soil mass and the pyrite oxidises to form sulphuric acid. Low pH levels are maintained in the long term by progressive wasting of the peat, which continually taps unoxidised reserves of pyrites held at depth in the soil. (Soil Survey, 1987).

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The site has been graded using the Revised guidelines and criteria for grading the quality of agricultural land. Definitions of the ALC grades are given in Appendix 1.

3.2 Land on this site is graded 2. It is excluded from grade 1 by susceptibility to drought. This imperfection derives from the presence of strongly acid conditions within the subsoil below plough depth. Soil profile pit observations on site indicate that rooting within these acid horizons is impaired and crops are consequently unable to utilize the considerable reserves of water held at depth within the peat. Normal crop rooting was assumed to occur to 40 cms, since this is the depth to which pH levels can normally be managed by liming operations. No allowance was made for rooting in the strongly acid horizons below this depth. Acid conditions below depths of 40 cm are not easily corrected by normal management operations, hence this effectively constitutes a long term constraint and limits the land to grade 2.

REFERENCES

MAFF (1963): Agricultural Land Classification sheet 113; Provisional; scale 1:63 360

METEOROLOGICAL OFFICE (1989): Climatological Data for Agricultural Land Classification.

GEOLOGICAL SURVEY OF GREAT BRITAIN (1973): Solid and Drift Geology Map: Lincoln (sheet 114) Provisional; scale 1:50 000

SOIL SURVEY OF ENGLAND AND WALES (1983): Soils in Eastern England: Scale 1:250 000

MAFF (1983): The Management of Acid Fen and Marsh Soils in East Anglia. Unpublished Report by Soil and Water Management Panel. Eastern Region.

SOIL SURVEY (1987): Lowland Peat in England and Wales. Special Survey no. 15.

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