# AGRICULTURAL LAND CLASSIFICATION
# PROPOSED WESTMERE DEVELOPMENT SOUTH OF WILBURTON, CAMBRIDGESHIRE

## 1.0 BACKGROUND

1.1 The site covers an area of land of 185ha in extent situated to the south of the villages of Wilburton and Stretham, Cambridgeshire centred on grid reference TL 495732. It is proposed that the land will be developed to form a new settlement.

1.2 The site area was previously surveyed in 1987 at a reconnaissance level and subsequently revisited and additional work carried out in 1988 following the introduction of revised guidelines and criteria for assessing the quality of agricultural land (MAFF, 1988). Recent changes to the site boundary have resulted in additional survey work which was carried out during August 1995.

1.3 At the time of the original surveys the majority of the site was under grass, however, the additional survey areas had mostly been cultivated following cereals. However, in the south westerly part of the site potatoes were being grown.

1.4 The published 1:63 360 scale provisional Agricultural Land Classification (ALC) map (MAFF, 1971) shows the site as grade 1 in the east, grade 2 in the north and south east. A band of grade 3 land is mapped across the centre of the site and forming the majority of the site in the east. Definitions of the ALC grades are shown in Appendix 1.

## 2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climatic criteria are considered when classifying land as they 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 no overall climatic limitation affecting the site. Climatic factors however do interact with soil properties to influence soil wetness and droughtiness.

**Table 1. Climatic Interpolation**

| | |
|---|---|
| Grid Reference | TL 495732 |
| Altitude (m) | 2 |
| Accumulated Temperature (day °C, Jan-June) | 1459 |
| Average Annual Rainfall (mm) | 534 |
| Moisture Deficit, Wheat (mm) | 123 |
| Moisture Deficit, Potatoes (mm) | 119 |
| Field Capacity Days | 91 |
| Overall Climatic Grade | 1 |

Altitude and Relief

2.3 The highest ground within the site, at just over 11 m AOD occurs in the vicinity of Mitchell's Farm in the north west corner of the site. From this point the land falls southward to a minimum altitude of approximately 1 m AOD in

the extreme south of the site. Altitude and relief therefore do not impose any limitation on the agricultural quality of the site.

Geology and Soils

2.4 The geology of this area is mapped on the 1:50 000 scale solid and drift edition geology map, sheet number 188 (Geol. Survey, 1981). The solid geology of the site is mapped as mainly Kimmeridge Clay. In the low lying land in the south west of the site at Lazier Fen and Middle Cuts the solid geology is masked by more recent 1st Terrace deposits. In the immediate vicinity of Red Hill Farm and Mitchell's Farm, on the slightly higher ground, the clay is overlain by deposits of Lower Greensand which extends northwards.

2.5 The reconnaissance scale (1:250 000) soil survey map for the area (Soil Survey, 1983) shows the occurrence of two main soil associations within the site. The Peacock Association (*1) is shown in the centre and north east of the site and the Clayhythe Association (*2) is mapped in the south west of the site. As the land rises in the north small areas are mapped as Evesham 3 Association (*3) and further north the Bearsted 1 Association (*4).

2.6 A more detailed survey at a scale of 1:63 360 (Hodge and Seale, 1966) of the Cambridge area shows the main associations may be subdivided into seven soil

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(*1) Peacock Association: Deep humose calcareous clayey and non-calcareous fine loamy over clayey soils. Some peat soils. Formed from Jurassic clays, till and associated drift.

(*2) Clayhythe Association: Deep humose fine loamy over sandy and fine loamy over clayey soils, mainly calcareous. Some peat soils. Formed in Terrace drift.

(*3) Evesham 3 Association: Slowly permeable calcareous clayey, and fine loamy over clayey soils. Some slowly permeable seasonally waterlogged non calcareous clayey soils. Formed on Jurassic clays.

(*4) Bearsted 1 Association: Well drained coarse loamy and sandy soils over sand or sandstone, in places ferrugineous. Some permeable coarse and fine loamy soils affected by groundwater. Formed in Cretaceous Sand and Sandstone.

series. The Peacock Series (*i) is shown to cover most of the site area. Smaller areas of Wicken Series (*ii) are shown in the north with Clayhythe (*iii) and Bracks (*iv) Series mapped in the west and north west of the site. Adventurers (*v) and Bottisham (*vi) Series are found in the south west of the site with a small area of St Lawrence Series (*vii) shown in the extreme north west on the rising ground.

2.7 The surveys undertaken over the site have identified two main soil types, one of which has two further variants.

Soil Type 1

2.8 Over the majority of the site soils have developed directly from the underlying Kimmeridge Clay. Profiles are fairly uniform in nature and typically comprise non calcareous clay topsoils over similar subsoils which may become slightly or moderately calcareous at depth. Profiles are typically stoneless and drainage is assessed as wetness class III.

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(*i) Peacock Series: Humose clay loam and clay on calcareous gleyed clay.

(*ii) Wicken Series: Similar to Peacock but calcareous topsoil.

(*iii) Clayhythe Series: Calcareous humose loamy and clayey soils on gravelly sand.

(*iv) Bracks Series: Non calcareous humose fine loamy soils on gleyed clay.

(*v) Adventurers Series: 30-90 cm peat loam over undifferentiated mineral substrata.

(*vi) Bottisham Series: 30-90 cm calcareous peaty loam over undifferentiated mineral substrata.

(*vii) St Lawrence Series: Slightly calcareous clay loam overlying mottled calcareous gleyed clay.

Soil Type 1, variant 1

2.9 On the higher ground west of Red Hill Farm and Mitchell's Farm and in a small band in the centre of the site clayey soils occur which are calcareous throughout the profile.

Soil Type 1, variant 2

2.10 Towards the northern and eastern edges of Lazier Fen, the overlying peat deposit has wasted, and has progressively become incorporated into the underlying Clay to give soil variants with organic clay surface horizons.

Soil Type 2

2.11 The second main soil type occurs towards the south and west of Lazier Fen and into the Middle Cuts area where soils have developed in wasted peat overlying first terrace river gravels. Soils in this area typically comprise organic clay topsoils overlying subsoils of clay loam or sandy clay loam which may contain sand or clay lenses at depth. Profiles are typically non calcareous, stoneless or slightly stony and are assessed as wetness class II or III.

## 3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified using the guidelines contained in the Agricultural Land Classification of England and Wales (MAFF, 1988). A breakdown of the individual grades found within the site is shown at Table 2. The definition of the ALC grades is given in Appendix 1.

**Table 2. Distribution of grades and subgrades**

| Grade | Area (ha) | % |
|---|---|---|
| 2 | 20.77 | 11.2 |
| 3 | 49.60 | 26.8 |
| 3b | 110.41 | 59.7 |
| Non agricultural | 2.83 | 1.5 |
| Agricultural Buildings | 1.48 | 0.8 |
| TOTAL | 185.09 | 100.0 |

Grade 2

3.2 Land of grade 2 quality occurs in the south west of the site associated with soils described in paragraph 2.11. These soils have evidence of wetness within the subsoil and/or slowly permeable subsoil horizons. These factors give rise to slight wetness and workability constraints which are partly offset by relatively high organic matter contents of the topsoil. The wetness constraint limits the quality of these areas to ALC grade 2.

Subgrade 3a

3.3 In the north of the site and in a small band running north west to south east in the centre of the site subgrade 3a quality land occurs where the clay topsoil is calcareous in nature (paragraphs 2.8 and 2.9). The presence of calcium carbonate within the soil profile promotes the development of more stable structures, facilitating soil drainage, and improving root development. However, the soils remain slowly permeable, and heavy textured within the topsoil, consequently the land remains limited by seasonal wetness and workability constraints.

3.4 In the south west of the site subgrade 3a is also mapped in an area of organic clayey soil (paragraphs 2.8 and 2.10). Although the workability of this land is

improved by enhanced levels of topsoil organic matter, the clayey nature of the topsoil in combination with slow subsoil permeability prevents a grading of 2 on land of this type. Seasonal wetness continues to impose the chief constraint on agricultural use.

3.5 Subgrade 3b

This occurs extensively in the central part of the site in areas of non calcareous clayey soils derived directly from the underlying Kimmeridge Clay (see paragraph 2.8). Soils in these areas do not benefit from enhanced levels of topsoil organic matter and have less stable soil structures than their calcareous counterparts to the north. The land is consequently limited by more severe wetness and workability constraints.

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**REFERENCES**

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1981. Sheet 188, Solid and Drift. 1:50 000 scale.

HODGE, C.A.H. and SEALE, R.S. 1966. The soils of the District around Cambridge. (Map scale 1:63 360). Harpenden.

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MAFF, 1989. Agricultural Land Classification. Proposed Westmere Development. 1:10 000 scale. Appendix 3.

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

Appendix 1

**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.