

**AGRICULTURAL LAND CLASSIFICATION****MANGREEN HALL FARM****INTRODUCTION**

- 1.1 This 152 hectare site was inspected during October and November 1990 in connection with residential/light industrial development proposals. A total of 212 soil inspections were made on site supplemented by information from 9 soil profile pits. At the time of survey the central part of the site surrounding Mangreen Hall was under horticultural use - typical crops including organically grown cabbages, carrots, leeks, parsnips, sprouts, onions and potatoes. The peripheral areas of the farm were under cereals and peas or set-aside.
- 1.2 On the provisional one inch to one mile ALC map sheet numbers 126 (MAFF 1972) the site is shown as grade 3. Subsequent semi detailed work in the vicinity of the Norwich southern bypass route indicates a predominance of subgrade 3a, with smaller areas of subgrade 3b. (Isolated auger borings of grade 2 quality are not identified at this scale of mapping.) The current survey was undertaken to provide a more detailed representation of agricultural land quality within the proposed development area.

**2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY**Climate

- 2.1 Site specific climate data has been obtained by interpolating information contained in the 5km grid dataset produced by the Meteorological Office (Met Office, 1989).
- 2.2 This shows the Mangreen site has an average annual rainfall of approximately 617 mm, which is low by national standards. Soils are at field capacity for a relatively short period of about 118 days.

- 2.3 The accumulated temperature for this area is approximately 1389° celsius. This parameter gives an indication of the cumulative build up of warmth and influences the development of soil moisture deficits (SMD)\* and hence susceptibility to drought. The soil moisture deficits for wheat and potatoes at the Mangreen site are calculated as 116 mm and 111 mm respectively.
- 2.4 The site is neither particularly exposed nor frost prone.
- 2.5 Climate itself is not limiting to agricultural land quality. However, the interaction of climate with soil texture in this fairly dry geographical area results in some soils being susceptible to drought. Although an irrigation facility is available on site, water is not available in sufficient quantity to justify upgrading land with an overall droughtiness constraint. The availability of irrigation water has therefore not been considered in determining ALC grade.

#### Altitude and Relief

- 2.6 The site occupies a watershed location between two north flowing tributaries to the River Yare. The majority of the site is level or very gently sloping and lies between altitudes of 35 metres and 40 metres AOD. Around the northwestern and eastern fringes, however the ground falls over moderately steep gradients (typically 7.5°)\*\* towards the valleys of the River Yare tributaries. In these latter areas gradient constitutes an overriding limitation to agricultural land quality restricting it to no higher than subgrade 3b.

\* SMD represents balance between rainfall and evapotranspiration which occurs during the growing season. For ALC purposes the SMD's developing under a winter wheat and maincrop potato cover are considered. These "reference" crops have been selected because they are widely grown and in terms of their susceptibility to drought, are representative of a wide range of crops.

\*\* Measured by Suunto hand held optical reading clinometer.

## Geology & Soils

2.7 The geology of this area is mapped on the 1:50,000 scale solid and drift edition geology map sheet number 161 (Geol. Surv. 1975). This shows the site to be mainly comprised of glacial boulder clay drift, with smaller areas of glacial sands and gravels overlying the drift around the northern and eastern fringes.

2.8 Field Survey observation broadly support this description but indicates that smaller areas of glacial sands and gravels also occur on the more gently sloping ground towards the extreme south of the site.

Two main soil types were identified:

2.9 Over the majority of the central and southwestern parts of the site soils have developed over underlying chalky boulder clay drift and are relatively uniform in nature. Typically profiles comprise sandy loam or sandy clay loam (rarely clay loam) topsoils overlying similar upper subsoils which in turn overlie clay lower subsoils below 40-75 cm depth. In many locations the clay overlies a friable chalky drift below approximately 80 cm. Rarely topsoils directly overlie clay upper subsoils at 30/35 cm depth.

2.10 These profiles are typically non calcareous in the upper horizons and become calcareous as the underlying chalky drift is approached. Profile stone content is generally slight or very slight (3-8% soil volume) at the surface, becoming more variable in the upper subsoils where values in the range 5-25% of soil volume were recorded. Stones are commonly in the size range small and medium and comprise mainly flints in the upper horizons and chalk in the underlying boulder clay drift. Soil drainage is assessed predominantly as wetness class II with smaller areas of wetness class III and I.

2.11 The second main soil type occurs around the northern, eastern and extreme southern fringes of the site, largely coinciding with the mapped deposits of glacial sand and gravel. Soils in these areas typically comprise sandy loam, less frequently loamy sand topsoils over similar or lighter, slightly or moderately stony subsoils (5-35% soil

volume), which may extend to depth or overlie gravel/hoggin below 40-60cm.

2.12 Surface stone within these areas is variable ranging from slight to very slight (3-8% soil volume) in the north and north east, becoming stonier (10-15%) soil volume in the east and extreme south. A small area of more severe surface stone (15-25% soil volume) was recorded to the immediate north of Dunston Hills and east of the A140. Soil drainage is free and wetness class is assessed predominantly as I. Isolated auger borings of this soil type also occur in shallow valley features in the southwest of the site.

### 3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The site is predominantly graded 2, with smaller areas of 3a and 3b. A breakdown of land quality in hectares and percentage is provided below:

| ALC              | Ha           | %            |
|------------------|--------------|--------------|
| 2                | 52.4         | 35.6         |
| 3a               | 44.4         | 29.1         |
| 3b               | 41.1         | 27.0         |
| Urban            | 9.3          | 6.1          |
| Non Agricultural | <u>3.4</u>   | <u>2.2</u>   |
| Total            | <u>152.4</u> | <u>100.0</u> |

#### Grade 2

3.2 This occurs in the vicinity of Mangreen Hall in the central part of the site and in smaller areas adjacent the northern and western boundaries. These areas comprise the less stony, better drained variants of soils described in paragraphs 2.9 to 2.10. The land is limited by minor winter wetness and summer droughtiness constraints. Even without the benefit of irrigation it remains capable of producing moderate to high yields of a wide range of agricultural and horticultural crops.

#### Subgrade 3a

3.3 This occurs fairly extensively on site encompassing the stonier, heavier and less well drained variants of soils described in paragraphs

2.9 to 2.10 together with the deeper, less stony and more water retentive variants of the lighter soils described in paragraph 2.11 to 2.12. (The latter represent soils which are transitional between the two main types.) This land is predominantly limited by winter wetness, although smaller areas of lighter soil types are limited by summer droughtiness constraints. Small areas of lighter soils in the vicinity of the A140 and in the extreme south of the site are limited by surface stoniness (see paragraph 2.12). Towards the southwest corner of the site many soil inspections are or approach grade 2 in quality, these have not been delineated separately due to their random distribution amongst borings of sub grade 3a.

#### Subgrade 3b

- 3.4 This is mapped around the northern, eastern and extreme southern fringes, coinciding largely with the areas mapped as glacial sands and gravels on the published geological map sheet number 161. Land in this area comprises the lighter, shallower, and/or stonier variants of soils described in paragraph 2.11 to 2.12 and is predominantly limited by moderately severe droughtiness constraints. Smaller areas in the extreme northwest of the site, and east of the A140 are also limited by gradient and surface stoniness constraints (see paragraphs 2.6 and 2.12).

#### Non Agricultural & Urban

- 3.5 Areas of woodland, larger ponds and waste ground are mapped as non agricultural. Major roads, buildings and their associated grounds appear as urban.

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Resource Planning Group  
Cambridge RO