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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS

LAND AT FORDHAM HOUSE, FORDHAM, CAMBRIDGESHIRE

1.0 BACKGROUND

1.1 The site covers an area of approximately 35 ha and is the subject of a planing application for the development of sports facilities including sports halls, swimming pool, squash courts etc.

1.2 In December 1994, ADAS Statutory Resource Planning Team conducted a detailed Agricultural Land Classification (ALC) survey of the site to assess the quality of the agricultural land within the site. Assessment was made following the guidelines in the MAFF publication "Revised Guidelines and Criteria for Grading the Quality of agricultural land" (MAFF, 1988). Information was collected from auger borings made at a density of one per hectare. These borings were supplemented by three soil inspection pits to provide more detailed information on subsoil conditions.

1.3 At the time of the survey the land was sown with cereals, oil seed rape and peas and does not benefit from an irrigation supply.

1.4 The provisional 1:63 360 scale ALC map sheet number 135 (MAFF, 1971) shows the site to be grade 2 quality land.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climate data for the site was extrapolated from the data contained in the published agricultural climatic dataset (Meteorological Office, 1989). This

indicates that for an average altitude of 15 m AOD the average annual rainfall is 577 mm. It also indicates that field capacity days are 101 and that moisture deficits for wheat and potatoes are 121 mm and 117 mm respectively. The accumulated temperature above 0°C for the period January to June (ATO) was found to be 1443 day °C. These climatic characteristics do not impose any climatic limitation on the ALC grading of the site.

Altitude and Relief

2.2 The survey area comprises a fairly level area with some very gentle slopes of 10-15 m AOD in altitude. No gradient was sufficient to constitute a limitation for the ALC grade.

Geology and Soils

2.3 The published 1:50 000 scale solid and drift edition geology map (sheet 188, Geological Survey of England and Wales, 1981) shows the site to be covered predominantly by Lower Chalk. A small area of Middle Chalk is mapped in the south-east of the site.

2.4 The Soil Survey of England and Wales have mapped the soils in the area of the site at a reconnaissance scale of 1:250 000 (Soil Survey, 1983) with soils within the site mapped as predominantly Moulton Association (*1) with a small areas of the Wantage 2 Association(*2) in the west.

(*1) Moulton Association Well drained coarse and fine loamy soils with similar shallow calcareous coarse loamy soils over chalk or chalk rubble in places. Patterned ground of stripes and polygons gives very variable soil depth. Slight risk of water erosion.

(*2) Wantage 2 Association Shallow well drained calcareous silty soils over argillaceous chalk associated with similar soils affected by groundwater. Deeper well drained coarse loamy soils in places. Complex soil patterns locally.

A more detailed survey of the area at a scale of 1:63 360 has also been published by the Soil Survey of England and Wales (1963). This survey shows the site to consist of bands of various soil types stretching north to south across the site, being mapped as Moulton (*1), Wantage (*2), Swaffham Prior (*3) Associations and Burwell (*4) Series.

2.5 During the current survey two main soil types were identified with one type covering the majority of the area and consisting of two variants. The physical characteristics of these soil types is shown in Appendix I.

Soil Type 1

2.5.1 Soil type 1 covers the majority of the site area and consists primarily of a medium/heavy clay loam topsoil overlying chalk. The two variants of this main soil type differ in the depth to the underlying chalk.

Variant 1 typically comprises a medium/heavy clay loam topsoil of approximately 30 cm thickness with a few hard angular and subangular stones and flints. The topsoil directly overlies a white/yellow stone free - slightly stony weathered chalk (chalk marl) horizon. This weathered chalk horizon varies from 10 cm to 90 cm but it typically 40 cm thick and overlies hard impenetrable chalk within sampling depth.

Variant 2 typically comprises a slightly stony medium/heavy clay loam topsoil of approximately 30 cm thickness. The topsoil overlies a slightly to moderately stony medium/heavy clay loam textured upper subsoil horizon. The thickness

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(*3) Swaffham Prior Association Well drained calcareous coarse and fine loamy soils over chalk rubble. Some similar shallow soils. Deep non-calcareous loamy soils in places. Striped and polygonal soil patterns locally. Slight risk of water erosion.

(*4) Burwell Series Grey calcareous fine loamy over slightly mottled/yellow mottled white marl.

of this horizon is variable and ranges from 10 cm to 65 cm but is typically found to be 35 cm. A weathered chalk (chalk marl) horizon usually underlies the upper subsoil but again there is variability in the thickness of this layer. This weathered chalk horizon when present ranges between 10 cm and 75 cm but is typically 15 cm thick and overlies hard impenetrable chalk within sampling depth. Occasionally the upper subsoil directly overlies the hard chalk.

The profiles have been assessed as wetness class I or II. Root penetration into the hard chalk is limited and does not extend beyond 5 cm into the hard chalk. Hence the available moisture for plant growth within these soil profiles is limited.

Soil Type 2

2.5.2 Soil type 2 covers a small area in the north east of the site and consists of a very slightly stony medium clay loam/medium sandy clay loam topsoil of approximately 30 cm thickness. This topsoil overlies a slightly stony medium clay loam/medium sandy clay loam textured upper subsoil of approximately 10 cm thickness. This thin upper subsoil overlies a generally coarser textured medium sandy clay loam or loamy medium sand lower subsoil which may become more sandy with depth. These profiles were assessed as wetness class I or II. Moisture retention within these profiles will be low and hence plant available moisture will be limiting for crop growth.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The site comprises a mix of grade 2 and subgrades 3a and 3b quality land. The table overleaf shows the precise breakdown of ALC grades for the site.

AGRICULTURAL LAND CLASSIFICATION

Grade	Area (ha)	% of site area
2	6.9	19.8
3a	20.5	58.7
3b	4.1	11.7
Urban	0.9	2.6
Non-agricultural	2.5	7.2
TOTAL	34.9	100.0

The definitions of the ALC grades are shown in Appendix II.

Grade 2

3.2 Grade 2 quality land occurs in the west of the site and in two small blocks, one in the north east and a second in the south of the site. The areas of land in the west and the south are associated with those profiles of soil type 1 in which the subsoil and /or weathered chalk (chalk marl) horizons are deep as described in paragraph 2.5.1. These profiles have minor wetness limitations and have a sufficient rootable depth of subsoil and/or weathered chalk material to provide enough moisture so that plant growth is only slightly affected by droughtiness. The small area of grade 2 land is the north east of the site is associated with soil type 2 as described in paragraph 2.5.2. These profiles have only minor wetness limitations. Availability of moisture for plant growth within these profiles is sufficient so that only a minor droughtiness limitation exists. These profiles of soil type 2 assessed as grade 2 have a slightly thicker topsoil layer than other profiles in this soil type and hence have an increased moisture availability within the profile.

Subgrade 3a

3.3 Land of this subgrade covers much of the agricultural land within the site and is associated with both soil types 1 and 2. Droughtiness of the soil profiles in both soil types limit the grading of much of the site to subgrade 3a. Within soil type 1 in both variants it is the depth to hard unrootable chalk which

determines the final ALC grading of the profile. Within areas of soil type 2 those areas in which a thicker topsoil layer was found had sufficient moisture for the profiles to be of grade 2 quality. However, the majority of profiles within this soil type were graded as 3a due to droughtiness limitations.

Subgrade 3b

3.4 Three small areas of subgrade 3b quality land were found, with all the areas being associated with very shallow profiles of soil type 1. The depth to hard unrootable chalk in these areas was such that droughtiness would limit productivity in those areas in most years. Hence the quality of land was limited to subgrade 3b.

Urban

3.5 The house, associated outbuildings and tarmac/concrete roads and hard standing were mapped as urban.

Non-agricultural

3.6 The large garden and associated tree/shrub areas were mapped as non-agricultural land.

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REFERENCES

Geological Survey of England and Wales (1981). Solid and drift edition. Sheet 188 Cambridge 1:50 000 scale.

MAFF (1971). Agricultural Land Classification provisional map. Sheet 135 1:63 360 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 climatic data extracted from the agroclimatic dataset compiled by the Meteorological Office.

Soil Survey of England and Wales (1963). Sheet 188 1:63 360 scale.

Soil Survey of England and Wales (1983). Soils of Eastern England. Sheet 4 1:250 000 scale.

Appendix I

STATEMENT OF PHYSICAL CHARACTERISTICS

SOIL TYPE 1 : VARIANT 1

Topsoil	Texture	:	medium clay loam or heavy clay loam
	Colour	:	typically 10YR4/2 or 10YR5/2 (dark greyish brown or greyish brown).
	Stones	:	range 1-10% but typically 5% hard small - medium angular and subangular stone and flints.
	Boundary	:	abrupt, smooth
	Roots	:	many fine and very fine
Thickness	of horizon	:	30 cms typically
Subsoil	Texture	:	chalk marl-weathered chalk (textured as medium clay loam/silty loam).
	Colour	:	2.5Y8/2 + occasionally 2.5Y7/4 (pale yellow).
	Stones	:	typically stone free but occasionally 5% small to medium hard angular and subangular stone and flint.
	Structure	:	weakly developed medium - coarse subangular blocky.
	Consistence	:	friable
	Porosity	:	1-2% fine - medium biopores
	Boundary	:	gradual
	Roots	:	many fine and very fine
Thickness	of horizon	:	range 10-90 cm, typically 40 cm

Overlies hard chalk

SOIL TYPE 1 : VARIANT 2

Topsoil	Texture	:	medium clay loam or heavy clay loam
	Colour	:	10YR5/2 or 10YR4/2 (greyish brown or dark greyish brown).
	Stones	:	range 1-10%, typically 4% hard small to medium angular and subangular stone and flints.
	Boundary	:	abrupt, smooth
	Roots	:	many fine and very fine
Thickness	of horizon	:	30 cm typically
Upper Subsoil	Texture	:	medium clay loam - heavy clay loam
	Colour	:	10YR5/3 typically (brown)
	Stones	:	range 1-6%, typically 4% hard, small to medium angular and subangular stone and flints.

	Structure	:	weakly developed medium and coarse subangular blocky.
	Consistence	:	friable
	Porosity	:	2% medium and fine biopores
	Boundary	:	abrupt, smooth
	Roots	:	many fine and very fine
Thickness	of horizon	:	range 10-65 cm, typically 35 cm
Lower Subsoil	Texture	:	chalk marl-weathered chalk (textured as medium clay loam/silt loam).
	Colour	:	2.5Y8/2 (pale yellow)
	Stones	:	stone free
	Structure	:	weakly developed coarse subangular blocky
	Consistence	:	friable
	Porosity	:	<0.5% biopores
	Roots	:	few fine and very fine
Thickness	of horizon	:	range 10-75 cm, typically 15 cm

Overlies hard chalk

SOIL TYPE 2

Topsoil	Texture	:	medium clay loam/medium sandy clay loam
	Colour	:	10YR5/3 OR 10YR4/2 (brown or dark greyish brown).
	Stones	:	range 2-7%, typically 5% small - medium, hard angular and subangular stone and flints.
	Boundary	:	abrupt smooth
	Roots	:	many fine and very fine
Thickness	of horizon	:	range 25-35 cm, typically 30 cm
Upper Subsoil	Texture	:	medium clay loam/medium sandy clay loam
	Colour	:	typically 10YR5/4, occasional 10YR6/6 - 6/8 (yellowish brown, brownish yellow).
	Stones	:	range 5-15%, typically 10% small-medium hard angular and subangular stones and flints.
	Structure	:	weakly developed medium - coarse subangular blocky.
	Consistence	:	friable
	Porosity	:	0-5 - 1% biopores
	Boundary	:	abrupt, smooth
	Roots	:	many fine and very fine
Thickness	of horizon	:	range 15-50 cm, typically 35 cm

Lower Subsoil	Texture	:	loamy medium sand/medium sand, occasionally medium sandy clay loam.
	Colour	:	10YR7/6, 10YR5/6 and 10YR7/8 (yellow, yellowish brown).
	Stones	:	range 10-15%, typically 10% small - medium, hard angular and subangular stones and flints.
	Structure	:	massive, granular
	Roots	:	few fine and very fine
Thickness	of horizon (to 120 cm)	:	range 45-75 cm, typically 55 cm

Appendix II

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.