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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

ELLINGHAM HALL, NEAR BUNGAY, NORFOLK

PHYSICAL CHARACTERISTICS REPORT INCORPORATING AGRICULTURAL LAND CLASSIFICATION

LAND AT ELLINGHAM HALL, NEAR BUNGAY, NORFOLK

1.0 INTRODUCTION

1.1 A soil and Agricultural Land Classification (ALC) survey was carried out over approximately 24 ha of land at Ellingham Hall, near Bungay, in connection with a planning application for the extraction of sand and gravel.

1.2 The site is located approximately 4 km to the north east of Bungay near the village of Ellingham and surrounds Ellingham Hall on three sides.

1.3 The southern part of the site comprises an area of parkland which is under permanent grass and is used for grazing horses. The field is surrounded by woodland to the south and west whilst to the east is an area of further parkland and to the north are the house and grounds of Ellingham Hall.

1.4 The northern part of the site which comprises the highest land is currently under set aside, whilst the lower lying land in the central part of the site had been sown to winter cereals. The northern and western boundaries comprise newly planted woodland, beyond which are public roads and to the east is Ellingham Hall and open farmland.

1.5 A total of 27 inspections were made using a spade and dutch auger to a depth of 1.2m unless prevented by impenetrable gravelly material. In addition three soil pits were dug to help assess subsoil conditions in more detail.

1.6 On the published provisional ALC map (MAFF, 1973), the whole site has been mapped as grade 3.

2.0 PHYSICAL CHARACTERISTICS AFFECTING LAND QUALITY

Climate

2.1 Climatic information for the site has been interpolated from the 5 km grid dataset produced by the Meteorological Office (Met Office, 1989). The average annual rainfall for the site is 616 mm, which is low in national terms and the site is likely to be at field capacity for 121 days.

2.2 The accumulated temperature for the site is approximately 1421 degrees Celsius. This parameter indicates the cumulative build up of warmth available for crop growth and in conjunction with rainfall has an influence on the development of soil moisture deficits and susceptibility to drought. The moisture deficits for both wheat and potatoes are moderately high, being 121 mm and 117 mm respectively.

2.3 Although there is no climatic limitation to the agricultural use of the land, there is an interactive limitation between climate and soils which results in a low available water capacity with land being restricted by droughtiness.

Relief

2.4 The central and southern parts of the site are relatively level with an altitude of approximately 6 m AOD. The northern part of the site rises moderately steeply to an altitude of approximately 20 m AOD on the northern boundary. The gradient between the low lying flat land and the higher land to the north ranges from approximately 12° in the woodland to 8-10° in the area of set aside.

Geology

2.5 The only geological information that covers the site is the small scale regional drift geology map (Geol. Surv, 1907) which shows the area to be underlain by glacial drift - sand and gravel. A Mineral Assessment Report (Brit. Geol. Surv, 1985) covers the land to the west of the site and this shows the land immediately to the west to be underlain by undifferentiated glacial drift which comprises channel-fill deposits of glacial sand and gravel, silt, and boulder clay.

Soils

2.6 The 1:250,000 scale soil map for the area (Soil Surv, 1984) shows the area to comprise soils of the Burlingham 1 Association. This association is described as comprising soils developed in clayey or fine loamy chalky till and head deposits which partly cover the glaciofluvial sands and gravels. The soils are therefore variable ranging from fine loamy to sandy depending on the underlying parent material. This site comprises mainly soils developed on sands and gravels.

2.7 The current survey identified three distinct soil types and their locations are shown on the accompanying Soil Types map.

Soil Type 1 (refer to Appendix 2 and Soil Types map)

2.8 This soil type has been mapped at the northern end of the site on the higher ground. The soils are very variable differing markedly over short distances, but typically have a dark brown medium sandy loam topsoil, which is slightly stony over a very variable subsoil. The subsoil generally comprises a stony sandy loam or loamy sand with bands of sandy clay loam or sandy clay, overlying a brown loamy sand or sand at depth. In some profiles the sands and gravels were found immediately below the topsoil, whilst in others horizons of sandy clay or sandy clay loam were mapped with evidence of faint ochreous mottling. The soils are generally considered to be free draining with the possible exception of localised clayey areas.

Soil Type 2 (refer to Appendix 2 and Soil Types map)

2.9 On the lower lying land in the central part of the site, deeper coarse loamy colluvial soils have been mapped. These soils have a very dark brown medium sandy loam or medium sandy silt loam topsoil, which is slightly organic at the eastern end and contains few small flints. The upper subsoil comprises a dark brown medium sandy loam, which is slightly stony and in some profiles shows faint ochreous mottling at depth. Below approximately 80 cm depth the soil becomes a brown loamy sand or sand, with varying gravel content. At the eastern end of the mapping unit a water table was found at 75 cm.

Soil Type 3 (refer to Appendix 2 and Soil Types map)

2.10 On the land at the southern end of the site the soils are generally thin over sand and gravel. These soils have a dark brown medium sandy loam topsoil which is slightly to moderately stony over a very stony loamy sand or sand. The stones generally comprise small or medium rounded flint pebbles and increase in volume with depth. In several profiles there is no recognisable subsoil horizon, with the topsoil directly overlying the sand and gravel parent material. The soils are free draining throughout.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified in accordance with the guidelines contained in the Agricultural Land classification of England and Wales (MAFF, 1988). A breakdown of the individual grades found on the site is given below:

Grade	Area	%
2	3.6	15.1
3a	3.0	12.6
3b	11.8	49.6
4	3.5	14.7
Non Agricultural	1.9	8.0
TOTAL	23.8	100.00

3.2 The major limitation associated with this site is drought. The soils are predominantly coarse textured and consequently have moderate or low available water capacities and in an area of moderately high moisture deficits, lack of available water in the growing season can be expected in most years.

Grade 2

3.3 Grade 2 is mapped on the lower lying land in the central part of the site correlating with the area of moderately deep, colluvial sandy loam soils overlying sands and gravels. These soils have moderately high available water capacities and have therefore been mapped as grade 2.

Grade 3a

3.4 This occurs where the depth to the underlying sands and gravels is slightly shallower and the land has a correspondingly lower available water capacity and therefore greater droughtiness limitation.

Grade 3b

3.5 This occurs in 2 main situations:

The land at the northern end of the site has been mapped as grade 3b due to a moderately severe droughtiness limitation and also as a result of a gradient limitation locally. The soils in this area are very variable and are described in detail in paragraph 2.8 of this report, but generally have a moderately low available water capacity and will therefore be very susceptible to drought during the drier periods of the year. The area contains profiles which may be classified as both subgrades 3a and 3b, but it is not possible to map these separately, and as the majority equate to the lower subgrade the land has been mapped as grade 3b. The land also falls moderately steeply to the south and east of the are mapped as non agricultural and therefore also has a gradient limitation in this area.

3.6 At the southern end of the site 3b has also been mapped in areas of generally shallow soils over sands and gravels which are more full described in paragraph 2.10. This land is limited also by most severe droughtiness imperfections.

Grade 4

3.7 This is mapped at the southern end of the site where soils are very shallow over sand and gravels (see paragraph 2.10). The land is limited by severe droughtiness imperfections.

3.8 The two areas of woodland have been mapped as non agricultural.

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REFERENCES

BRITISH GEOLOGICAL SURVEY (1985). Mineral Assessment Report 145, Sand and Gravel Resources, Harleston and Bungay, Norfolk and Suffolk.

GEOLOGICAL SURVEY OF GREAT BRITAIN (1907). Drift Edition Geology Map, Sheet 16, 1:253,440 scale.

MAFF (1973). Provisional Agricultural Land Classification Map, Sheet 134, 1:63,360 scale.

MAFF (1988). Agricultural Land Classification of England and Wales - Revised Guidelines and Criteria for grading the quality of agricultural land.

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

SOIL SURVEY OF ENGLAND AND WALES (1984). Soils and their Use in Eastern England.

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 yields 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 winter 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 (eg. 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.

Appendix 2

SOIL PHYSICAL CHARACTERISTICS

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SOIL TYPE 1 (11.0 ha)

Topsoil	Texture	:	medium sandy loam
	Colour	:	10YR4/3 dark brown
	Stone	:	5-15% small and medium subangular and subrounded flints.
	Roots	:	common fine and very fine
	Depth	:	35 cm
	Boundary	:	clear smooth
Subsoil 1	Texture	:	loamy sand, sandy loam, sandy clay loam, occasionally sandy clay, often banded.
	Colour	:	7.5YR4/4 brown
	Stone	:	5-35% small and medium subangular flints
	Structure	:	weak/moderate medium subangular blocky, often masked by stones.
	Consistence	:	friable
	Roots	:	common fine and very fine
	Depth	:	75-90 cm
	Boundary	:	merging
Subsoil 2	Texture	:	loamy sand, sand
	Colour	:	7.5YR5/6 strong brown
	Stone	:	variable as above
	Structure	:	single grain
	Consistence	:	loose
	Roots	:	few fine and very fine

SOIL TYPE 2 (7.1 ha)

Topsoil	Texture	:	medium sandy loam, medium sandy silt loam
	Colour	:	10YR2/3 very dark brown
	Stone	:	3-5% small and medium subangular flints
	Depth	:	30-35 cm
	Boundary	:	gradual

Subsoil 1	Texture	:	medium sandy loam
	Colour	:	10YR3/2 very dark greyish brown
	Stone	:	as above
	Structure	:	weak coarse subangular blocky
	Consistence	:	friable
	Roots	:	common fine and very fine
	Depth	:	80 cm
	Boundary	:	abrupt
Subsoil 2	Texture	:	sand, occasionally loamy sand
	Colour	:	10YR6/4 light yellowish brown
	Stone	:	few small flints
	Structure	:	single grain
	Consistence	:	loose
	Roots	:	few fine and very fine

SOIL TYPE 3 (5.7 ha)

Topsoil	Texture	:	medium sandy loam
	Colour	:	10YR3/2 very dark greyish brown
	Stone	:	5-15% small and medium round flint pebbles, occasionally large.
	Roots	:	many fine and very fine
	Depth	:	30-35 cm
	Boundary	:	clear
Subsoil 1	Texture	:	loamy sand, sand
	Colour	:	7.5YR4/4 dark brown
	Stone	:	15-35% small and medium round flint pebbles
	Structure	:	single grain
	Consistence	:	loose
	Roots	:	few
	Depth	:	50 cm

Sand and gravel (60-70% stones) below 50 cm. In some profiles the sand and gravel is found immediately below the topsoil.

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MAP 1: AGRICULTURAL LAND CLASSIFICATION

MAP 2: SOILS TYPES