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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

LAND AT BRIGHTLINGSEA, ESSEX

1.0 BACKGROUND

1.1 A detailed survey was carried out over 50.3 ha of land immediately north-west of Brightlingsea, Essex. Part of the land, some 11.8 ha in the south-west corner, is already being excavated for sand and gravel. The remaining 38.5 ha of the site is agricultural land and is the subject of a planning application to extend the existing mineral workings.

1.2 The site is bounded in the north by the B 1029 Brightlingsea to Thorrington road and by Moverons Lane. The southern boundary is formed by the aforementioned quarry, sewage works and Queech woodland. A woodland strip (The Belt) also forms the western boundary whilst along the eastern margin is a playing field and other agricultural land. The site is split by two belts of woodland running north-south. These are known as The Link and Long Plantation.

1.3 On the published 1:63 360 scale Agricultural Land Classification (ALC) map (MAFF, 1974) the whole area is mapped as Grade 2. However, this map is of a reconnaissance nature and the current survey was undertaken to provide site-specific land quality information. The site has been previously surveyed by MAFF (1980, 1981) and was mapped mostly as Grade 2 and Subgrade 3a, but with some areas of Subgrades 3b and 3c. Since these earlier surveys, however, the ALC system has been revised (MAFF, 1988) and the previous survey data are insufficient to apply the present classification criteria. Since the ALC revision, the north-eastern part of the site was included in the Tendering District Local Plan surveys (ADAS, 1993) and was mapped then as Subgrade 3a.

1.4 A total of 37 auger borings was made using a dutch auger to a depth of 1.2 m unless stopped by impenetrable stony layers. In addition, 5 soil pits representative of the main

soil types found were dug to assess subsoil conditions in more detail. Stoniness was determined by sieving representative profiles and horizons. The fieldwork was carried out during August 1995.

1.5 At the time of the survey the southernmost field was grassed set-aside. Three other fields within the site carried stubble from harvested wheat (the western field) and barley (the two eastern fields).

1.6 Irrigation water is available to part of the site. However, this is insufficient to affect the overall ALC grading of the land.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climatic criteria are considered when classifying land as these 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.

2.3 Climatic factors do, however, interact with soil properties to influence soil wetness and droughtiness. The climate in this area is relatively dry and warm and consequently the likelihood of a droughtiness limitation may be enhanced depending on soil conditions.

Table 1: Climatic Interpolation

Grid reference	TM 075 182
Altitude (m)	22
Accumulated Temperature (Day °C, Jan-June)	1447
Average Annual Rainfall (mm)	553
Moisture Deficit, Wheat (mm)	129
Moisture Deficit, Potatoes (mm)	128
Field Capacity (Days)	93
Overall Climatic Grade	1

Altitude and Relief

2.4 Most of the site forms part of a relatively flat river terrace at 20-24 m AOD. On the southern boundary there is a marked break of slope at the terrace edge and here the gradient is 3% down to a lower terrace. Altitude at this southern boundary is 15 m AOD but immediately to the north of Queech woodland occurs a lower, small depression. Altitude and relief do not impose any limitation on the agricultural quality of the site.

Geology and Soils

2.5 The published 1:253 440 geological maps (Geol. Survey, 1909, 1931) show the entire site to be covered by Glacial Drift sand and gravel overlying Eocene London Clay. The latter is shown to outcrop along the terrace edge at the south of the site.

2.6 The reconnaissance soil survey map for the area (Soil Survey, 1983) shows all of the site to comprise soils from the Wix (*) Association, a variable assemblage derived from glaciofluvial drift overlying Eocene clay.

(*) Wix Association: Deep, permeable coarse loamy soils affected by groundwater. Also, well-drained sandy and coarse loamy soils and some slowly permeable seasonally waterlogged fine loamy and clayey soils.

2.7 The detailed survey carried out on the site shows the presence of three distinct soil types and these are described briefly in the following paragraphs.

Soil Type 1 (Refer to Soil Types Map and Appendix 1)

2.8 Soil Type 1 is mapped only in the north-east corner of the site. Profiles are deep well-drained fine loamy and clayey overlying sand at variable depths. The soils typically have a dark brown medium clay loam topsoil with a few small and medium subrounded hard stones. The topsoil passes into strong brown or yellowish brown medium clay loam, silty clay loam or sandy silt loam horizons with a similar stone content to the topsoil. At depths varying from 60-85 cm the soil texture becomes sandier (sandy clay loam), passing into loamy coarse sand and sand below 75-95 cm. The stone content of the subsoil seldom exceeds 5%. A few fine and medium brown and reddish yellow distinct mottles and some manganese staining sometimes occur in the finer materials above the sand, indicating the presence of a fluctuating GWT. The soil structural condition is assessed as mostly moderate with no slowly permeable layers and the soil, despite its mottling and manganese, is assessed as wetness class I.

2.9 The map unit designated Soil Type 1 is relatively variable. Apart from the typical profile described above, soils that are both stonier and where the sandy substrata are closer to the surface occur locally. This variability is significant to the ALC mapping.

Soil Type 2 (Refer to Soil Types Map and Appendix 1)

2.10 This soil is mapped in the west and south of the site and is characterised by being coarse textured and moderately stony. The topsoil is a dark brown medium sandy loam and especially in the south of the site it can contain up to 25% medium and small stones. The upper subsoil is a strong brown or dark yellowish brown medium sandy loam to loamy medium sand and again, this horizon can contain up to 30% stones. Below 50-60 cm the profile becomes a slightly stony (<15% stones) sand. This sand is marked by variegated colouring (typically yellowish red or strong brown dominant) and by lenses with clay coatings. The soil structural condition is assessed as moderate throughout and the soil is assessed as wetness class I.

Soil Type 3 (Refer to Soil Types Map and Appendix 1)

2.11 Soil Type 3 is widespread in the centre of the site and comprises a sandy loam profile overlying sand at variable depths. It is significantly less stony than Type 2. The topsoil is a dark brown medium sandy loam and it overlies a strong brown medium sandy loam upper subsoil. There may be up to 10% small and medium hard subrounded stones in these horizons. At depths ranging from 40-100 cm occurs a loamy coarse sand or sand similar to that described for Soil Type 2, above. This considerable variation in the depth to sand over short distances affects the ALC grading.The soil structural condition is assessed as good or moderate throughout and the soil is assessed as wetness class I.

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 on the site is given in Table 2 and a description of each grade is given in Appendix 2.

Table 2: Distribution of Grades and Subgrades

AGRICULTURAL LAND CLASSIFICATION

Grade	Area (ha)	%
3a	19.9	39.6
3b	14.3	28.4
Urban	0.7	1.4
Non-Agricultural	11.8	23.5
Woodland	3.6	7.1
TOTAL	50.3	100

Subgrade 3a

3.2 The area shown as Soil Type 1 (paragraph 2.9) is mapped as Subgrade 3a. Within this soil type the typical deep fine loamy soil profiles have sufficient plant-available moisture to warrant a Grade 2 classification. However, there are within the unit significant shallow or stony profiles having a moderate droughtiness limitation such that an overall Subgrade 3a classification for this soil type is prudent. The variability and scale of mapping make it impractical to separately delineate areas of Grade 2 and Subgrade 3a.

3.3 The ALC of land mapped as Soil Type 3 (paragraph 2.11) is either Subgrade 3a or 3b (see below) depending on the degree of droughtiness limitation imposed by the depth of sandy loam above sand. In those profiles where the depth to the sandy subsoil exceeds 55 cm the land is mapped as Subgrade 3a on account of a moderate droughtiness limitation. Some deep loamy (Grade 2) and some sandy, stony (Subgrade 3b) profiles occur locally but this variability linked to the scale of mapping makes it impractical to delineate these areas separately.

Subgrade 3b

3.4 Land having coarse textured stony soils (Soil Type 2; paragraph 2.10) is mapped as Subgrade 3b on account of topsoil stoniness and a moderately severe droughtiness limitation more pronounced than that characteristic of Subgrade 3a. The moisture balance calculations show the soil available water capacity to be limiting for the requirements of most crops.

3.5 Also mapped as Subgrade 3b are those areas of Soil Type 3 (paragraph 2.11) where predominantly the sandy subsoil comes within 55 cm of the surface. Some better (deeper, loamier), Subgrade 3a, profiles will occur locally but it is not feasible to map these separately.

Urban

3.6 The metalled and gravelled access tracks within the site are mapped as urban.

Non-Agricultural

3.7 The existing mineral workings in the south-west of the site are mapped as Non-Agricultural.

Woodland

3.8 The belts of trees known respectively as Queech, The Link and Long Plantation are mapped as Woodland.

August 1995

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REFERENCES

ADAS STATUTORY, 1993. Agricultural Land Classification, Tendering District Local Plan, Essex (site 4 - Brightlingsea).

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1909. Sheet 16, Drift Edition 1:253 440 scale.

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MAFF, 1974. Agricultural Land Classification Map. Provisional. Scale 1:63 360, Sheet 149.

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

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

SOIL SURVEY OF ENGLAND AND WALES, 1983. Sheet 4, "Soils of Eastern England". 1:250 000 scale.

Appendix 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE 1

Topsoil	Texture	:	medium clay loam
	Colour	:	dark brown 7.5YR3/3 and 4/3
	Stones	:	very slightly stony, 3-5% small and medium, hard
	Depth	:	30 cm
	Boundary	:	clear smooth
Upper Subsoil	Texture	:	medium clay loam, silty clay loam, sandy silt loam or sandy clay loam
	Colour	:	brown 7.5YR4/4, dark yellowish brown 10YR4/4 or yellowish brown 10YR5/5
	Mottles	:	few very fine faint yellowish brown 10YR5/6, brown 7.5YR5/4 and reddish yellow 7.5YR7/8; few distinct manganese stains
	Stones	:	very slightly and slightly stony, 0-15% small and medium, hard
	Structure	:	weak and moderate coarse subangular blocky
	Roots	:	few and common very fine and fine
	Depth	:	75 / 95 cm
	Boundary	:	abrupt smooth
Lower Subsoil	Texture	:	loamy coarse sand and medium sand, clayey lenses
	Colour	:	strong brown 7.5YR4/6, 5/6 or reddish brown 5YR4/5
	Stones	:	very slightly stony, 0-4% small and medium, hard
	Structure	:	massive
	Roots	:	few very fine and fine
	Depth	:	120+ cm

Wetness Class I

SOIL TYPE 2

Topsoil	Texture	:	medium sandy loam
	Colour	:	dark brown 7.5YR3/3
	Stones	:	slightly to moderately stony, 5-25% small and medium, hard
	Depth	:	25/35 cm
	Boundary	:	sharp smooth
Upper Subsoil	Texture	:	medium sandy loam or loamy medium sand

	Colour	:	brown 7.5YR4/4 or dark yellowish brown 10YR4/4
	Stones	:	slightly to moderately stony, 5-30% small and medium, hard
	Structure	:	weak coarse subangular blocky and single grain
	Roots	:	common fine and very fine
	Depth	:	45/85 cm
	Boundary	:	abrupt wavy or irregular
Lower Subsoil	Texture	:	medium and coarse sand, clayey lenses
	Colour	:	strong brown 7.5YR4/6 or reddish brown 5YR4/5
	Stones	:	very slightly and slightly stony, 0-15% small and medium, hard
	Structure	:	massive
	Roots	:	few very fine and fine
	Depth	:	120+ cm

Wetness Class I

SOIL TYPE 3

Topsoil	Texture	:	medium sandy loam
	Colour	:	dark brown 7.5YR3/3
	Stones	:	very slightly stony, 1-5% small and medium, hard
	Depth	:	25/35 cm
	Boundary	:	clear/abrupt smooth
Upper Subsoil	Texture	:	medium sandy loam
	Colour	:	brown 7.5YR4/4 and strong brown 7.5YR4/6
	Stones	:	slightly and very slightly stony, 1-10% small and medium, hard
	Structure	:	weak very coarse and coarse angular blocky
	Roots	:	common fine and very fine
	Depth	:	40/100 cm
	Boundary	:	abrupt smooth
Lower Subsoil	Texture	:	loamy coarse/medium sand or medium sand, clayey lenses
	Colour	:	yellowish red 5YR4/6 and strong brown 7.5YR5/6
	Stones	:	very slightly and slightly stony, 0-15% small and very small, hard
	Structure	:	single grain and massive
	Roots	:	few fine and very fine
	Depth	:	120+ cm

Wetness Class I

Appendix 2

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.