

Cambes 11/7/93

AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS, CROMWELL QUARRY EXTENSION, NR NEWARK, NOTTS

1.0 BACKGROUND

- 1.1 The site covers an area of 57 ha, and is the subject of an application by Ennemix Construction Materials Ltd for an extension to the existing workings.
- 1.2 ADAS Statutory Resource Planning Team undertook a detailed Agricultural Land Classification (ALC) and soil physical characteristics survey of the site during October 1993. Soil inspections using a hand held dutch auger were made on a 100 metre grid basis and three soil pits were dug to assess subsoil conditions.
- 1.3 On the published provisional 1:63,360 scale ALC map, sheet 113 (MAFF, 1974) the whole site is shown as grade 3.
- 1.4 At the time of the survey much of the land was being cultivated after cropping of barley, rape and peas.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

- 2.1 Climate data for the site was interpolated from data contained in the published agricultural climatic dataset (Met Office, 1989). This indicates that for an average site altitude of 8 m AOD the annual average rainfall is 571 mm (22.5"). This data also indicates that the field capacity days are approximately 112 and moisture deficits are 117 mm for wheat and 111 mm for potatoes respectively. The 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 of 8 m AOD in altitude adjacent to the River Trent. The land rises very slightly to the east of Horse Pool but nowhere on the site do slopes exceed 1°. Gradient and altitude do not constitute limitations to the ALC grade.

Geology and Soils

- 2.3 The published 1:63,360 scale solid and drift edition geology map, sheet 113 (Geological Survey of England and Wales, 1954) shows the whole area to be covered by recent alluvium.
- 2.4 No detailed soil map exists of the area but the reconnaissance 1:250,000 scale soil map "Soils of Eastern England" (Soil Survey of England and Wales 1983), shows the whole area to be covered by Fladbury 2 Association (*1) soils with an area of Arrow Association (*2) soils immediately east of site boundary
- 2.5 Detailed field survey work identified three soil types which correspond well with the descriptions of Fladbury 2 and Arrow soils given below.
- 2.6 To the north east of Horse Pool on the slightly raised land, profiles typically comprise medium sandy loam over similar or lighter subsoils. Soils are well drained (wetness class I) and typically only very slightly stony throughout the profile. Along the southern boundary, soils are slightly stony throughout and close to Horse Pool soils become moderately stony throughout.
- 2.7 The second soil type is mapped in a parallel strip along the River Trent on the western edge of the site. Profiles are moderately well drained (wetness class II) topsoils which typically comprise stoneless heavy clay loam over similar upper subsoils which occasionally extend to depth but more usually overlie clay lower subsoils.
- 2.8 The third soil type is mapped through the centre of site and comprises stoneless heavy clay loam (occasionally clay) topsoil over clay or silty clay subsoils. These soils are poorly draining generally being slowly permeable immediately below the topsoil (assessed as wetness class III). (See Appendix 2 for full profile descriptions).

(*1) Fladbury 2 Association. Stoneless clayey soils variably affected by groundwater, some with sandy subsoils. Some similar fine loamy soils, flat land. Risk of flooding.

(*2) Arrow Association. Deep permeable coarse loamy soils affected by groundwater.

3.0 AGRICULTURAL LAND CLASSIFICATION

- 3.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 1.
- 3.2 The survey area has largely been graded 3b with areas of subgrade 3a on the eastern and western boundaries. The table below shows the precise breakdown of ALC grades in hectares and percentage terms.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
Subgrade 3a	23.7	41
Subgrade 3b	32.7	57
Non Agricultural	0.4	1
Water	<u>0.3</u>	<u>1</u>
TOTAL	57.1	100

Subgrade 3a

- 3.3 Land graded 3a occurs in two situations.
- 3.4 Firstly land graded 3a is associated with soils described in paragraph 2.6 and are mapped on the north eastern part of the site. Soils are light textured and well drained (wetness class I). Due to the presence of medium sandy subsoils they suffer from a moderate droughtiness limitation which restricts the land to subgrade 3a.
- 3.5 Secondly, land graded 3a occurs in conjunction with the heavy textured soils described in paragraph 2.7. The combination of heavy textured topsoils with moderate profile drainage (wetness class II), result in the land being excluded from a higher grade by wetness and workability imperfections.

Subgrade 3b

- 3.6 Land assigned to subgrade 3b covers the central part of the site and is associated with the heaviest textured soils as detailed in paragraph 2.8. Heavy textured clay loam or clay topsoils generally overlie slowly permeable clay in the upper subsoils (wetness class III). These factors combine to impose significant wetness and workability imperfections thus excluding the land from a higher grade.

Non Agricultural

- 3.7 Around Horse Pool and the small pond to the south are soil embankments formed from the excavated material.

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REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN. (England & Wales) 1954. Solid and Drift Edition Sheet 113 1:63,360 scale.

MAFF, 1974. Agricultural Land Classification map Sheet 113 Provisional 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 climatological data for Agricultural Land Classification.

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

SOIL SURVEY OF ENGLAND AND WALES 1984. Soils and their uses in Eastern England by C A H Hodges *et al.*

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

CROMWELL QUARRY EXTENSION, NR NEWARK, NOTTINGHAMSHIRE

SOIL TYPE I (12.07 ha)

Topsoil	Texture	: medium sandy loam (occasionally sandy clay loam)
	Colour	: 10YR4/3 and 7.5YR4/3 (dark brown)
	Stone	: in the range of 0-4%, typically 1% small flints
	Depth	: 30-40 cm
	Structure	: cultivation zone - not applicable
	Boundary	: abrupt, smooth
	Roots	: common fine and very fine
Upper Subsoil	Texture	: medium sandy loam or loamy medium sand (occasionally sandy clay loam).
	Colour	: 7.5YR4/4 and 10YR4/4 (dark brown or dark yellowish brown).
	Stone	: in the range 0-10%, typically 1% small flints
	Depth	: typically in the range 50-90 cm
	Structure	: weakly developed coarse and very coarse subangular blocky and angular blocky.
	Consistence	: friable/very friable
	Porosity	: >0.5% biopores
	Boundary	: clear and smooth
	Roots	: common fine and very fine
Lower subsoil	Texture	: medium sand (occasionally loamy medium sand)
	Colour	: 7.5YR4/4 (dark brown), 7.5YR5/4 (brown), 7.5YR4/6 and 5/6 (strong brown).
	Stone	: in the range of 0-5%, typically <1% flints
	Depth	: 120 cm +
	Structure	: single grain
	Consistence	: loose
	Porosity	: >0.5% biopores
	Roots	: few fine and very fine
Other observations	: Non calcareous throughout. Well drained - wetness class I.	

SOIL TYPE 2 (11.96 ha)

Topsoil	Texture	: heavy clay loam
	Colour	: 10YR4/3 (dark brown) and 10YR4/2 (dark greyish brown).
	Stone	: negligible
	Depth	: 30-35 cm
	Structure	: cultivation zone - not applicable
	Boundary	: smooth, clear
	Roots	: common fine and very fine
Upper Subsoil	Texture	: heavy clay loam (occasionally clay)
	Colour	: 7.5YR4/3 and 10YR4/3 (dark brown) and 7.5YR5/4 and 5/3 (brown) and 10YR5/2 (greyish brown).
	Stone	: negligible
	Depth	: 50-120 cm
	Structure	: moderately developed, medium and coarse subangular blocky.
	Consistence	: firm
	Porosity	: 0.5% biopores
	Boundary	: smooth and gradual
Roots	: common fine and very fine	
Lower subsoil	Texture	: clay
	Colour	: 7.5YR4/3 and 4/4 (dark brown) and 7.5YR5/3 and 5/4 (brown) ped faces 7/5YR4/2 (dark brown).
	Stone	: negligible
	Depth	: >120 cm (sometimes absent)
	Structure	: moderately developed coarse prismatic breaking to medium and coarse angular blocky.
	Consistence	: firm
	Porosity	: approximately 0.5% biopores
	Roots	: common fine and very fine becoming few below 90 cm.
Other observations	: Non calcareous throughout Faint ochreous mottling noted 50 cm + Common ochreous mottles noted from 70-90 cm Assessed as wetness class II.	

SOIL TYPE 3 (32.41 ha)

Topsoil	Texture	: heavy clay loam (occasionally clay)
	Colour	: 10YR4/3 (dark brown) and 10YR4/2 (dark greyish brown).
	Stone	: negligible
	Depth	: 30-35 cm
	Structure	: cultivation zone - not applicable
	Boundary	: abrupt and smooth
	Roots	: common fine and very fine
Subsoil	Texture	: clay or silty clay
	Colour	: 7.5YR5/2 and 5/3 and 10YR5/3 (brown) 10YR5/2 (greyish brown).
	Stone	: negligible
	Depth	: 120 cm
	Structure	: weakly developed coarse and very coarse prismatic becoming moderately developed medium and coarse angular blocky (below 50 cm)
	Consistence	: firm
	Porosity	: <0.5% biopores
Roots	: few fine and very fine	
Other observations	: Non calcareous throughout	
	: Common distinct ochreous mottles from 30-35 cms	
	: Assessed as wetness class III	
	: Pit filled with water to 80 cm, profile saturated from 70 cms and ped faces wet from 50 cm.	