

**KINGSCLIFFE WORKS, FRAMPLES FIELD, KINGSCLIFFE, NORTHANTS**

**VALIDATION OF SOILS AND AGRICULTURAL LAND CLASSIFICATION**

**REPORT PREPARED BY ADAS CONSULTANCY FOR K.S.R.**

**INTERNATIONAL LIMITED**

**SUMMARY:** The validation survey carried out by ADAS Statutory staff in September 1993 confirmed that the land classification and soil physical characteristics information contained in the ADAS Consultancy Report dated July 1993 are a fair representation of the soils and land quality at Kingscliffe Works. Where very slight discrepancies were found these are explained in paragraphs 1.2 and 3.2. A summary of findings is given below and a more detailed physical characteristics report is given in Appendix 2.

**1.0 INTRODUCTION**

The site lies 3 km east of the village of Kingscliffe at Grid Reference TL 040983.

- 1.1 An Agricultural Land Classification (ALC) survey and Soil Physical Characteristics survey was undertaken in September 1993 by ADAS Statutory Resource Planning Team to validate the report prepared by ADAS Consultancy. Soils were examined using a hand held Dutch auger at a semi-detailed level at slightly less than one auger boring per two hectares. Two soil pits were dug to provide additional information on subsoil conditions.

Climate and Relief

- 1.2 Climate data was obtained by interpolating information contained in the published agricultural climatic dataset (Met Office, 1989), and is almost identical to the figures given in the ADAS Consultancy report. Average annual rainfall is 592 mm (23.3"). The field capacity days are 114 and the moisture deficits for potatoes and wheat are 106 mm and 113 mm respectively. The very slight differences, which probably result from a different reference point having been used, have no effect on land quality.

## Altitude and Relief

- 1.4 The published small scale geology and soils information indicate that soils are derived from complex geology as detailed in the ADAS Consultancy report, comprising Lower Lincolnshire Limestone in the north east. Moving south westwards this is overlain in stratigraphical sequence by Upper Estuarine 'Series', Blisworth Limestone and Clay and finally boulder clay on the highest land in the south west corner.
- 1.5 This is broadly supported by the small scale soils map which shows the presence of two soil associations, Evesham 1 is mapped approximately over limestone, whilst the Ragdale Association is mapped over the clay deposits.
- 1.6 The ADAS Statutory survey confirmed the existence of 2 main soil types on site which are briefly described in section 2 below with additional technical information contained in Appendix 1 and 2.

## **2.0 SOIL PHYSICAL CHARACTERISTICS**

### Unit 1

- 2.1 Soils in this unit are typically slightly stony, slightly to moderately calcareous, and comprise heavy clay loam or clay topsoils over similar upper subsoils which in turn overlie heavier clay subsoils at depth. Subsoils tend to be slowly permeable between 30-50 cms with gleying noted at less than 40 cms in all profiles. These profiles have all been assessed as wetness class III.
- 2.2 Along the western edge of soil unit 1 and in the shallow valley running east west soils contain weathered limestone fragments in the lower subsoils which are typically moderately stony.
- 2.3 In the southern part of the site profiles typically overlie chalky boulder clay from 50 cm, and contain upper horizons which are only very slightly calcareous.

## Unit 2

- 2.4 This soil unit is comprised of two slightly differing limestone derived soils. In the north west of the site profiles are calcareous, variably stony and comprise medium clay loam or heavy clay loam topsoils over similar or heavier upper subsoils. Hard limestone rock is encountered between 30-70 cms with the shallowest soils occurring on the western boundary of the site and in small areas immediately south of the shallow valley.
- 2.5 Topsoil stoniness ranges from slight to moderate (range 6-20%, typically 8-9%) whilst subsoils increase in stoniness until hard limestone is encountered.
- 2.6 On the eastern side of the site the second limestone derived soil is encountered. Topsoils and subsoils are similar to the above, but the limestone is softer and much more rubbly than that occurring elsewhere and may be augered through to a depth of 80 cms +. It is possible that these soils have been worked and restored at an earlier date.

### **3.0 AGRICULTURAL LAND CLASSIFICATION**

- 3.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 1.
- 3.2 The ADAS Statutory survey broadly confirmed the general distribution and extent of ALC grades provided, whilst identifying a number of very slight differences in the location of ALC boundaries. This slight variation may be explained by the differences in the precise location of auger sample holes and the inclusion of two plantations in non agricultural land in the ADAS Statutory survey.
- 3.3 The precise distribution of grades identified during the ADAS Statutory survey is shown in the table overleaf:

## AGRICULTURAL LAND CLASSIFICATION

	ADAS Statutory		ADAS Consultancy	
	ha	%	ha	%
Subgrade 3a	14.5	35	18.1	45
Subgrade 3b	11.1	27	11.1	27
Non Agricultural	12.2	29	10.8	28
Urban	4.0	9		
	<u>41.8</u>	<u>100</u>	<u>40.0</u>	<u>100</u>

- 3.4 The limitations present within each mapping unit closely confirm with those described in the ADAS Consultancy report.
- 3.5 Woodland, new plantations, areas in the process of restoration, a lake and current quarrying operations have been classified as non agricultural.
- 3.6 The existing works and The Framples have been classified as urban land.

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## 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 STATEMENTS

#### Soil Unit 1

Topsoil	Depth	:	0-30 cm
	Texture	:	heavy clay loam or clay
	Colour	:	10YR4/3 dark brown
	Stone	:	very slightly stony (2-5%) small subangular flints or limestone.
	Structure	:	cultivation zone not applicable
	Calcareous	:	variable ranging from very slightly calcareous to very calcareous.
	Roots	:	many fine and very fine
	Boundary	:	abrupt and smooth
Subsoil	Depth	:	30-120 cms
	Texture	:	clay (occasionally heavy clay loam within 60 cms)
	Colour	:	10YR5/4 and 2.5Y5/4 (yellowish brown and light olive brown) typically becoming greyer with depth. 2.5Y6/2, 2.5Y5/2 and 10YR5/3 and 10YR5/2 (light greyish brown, greyish brown and brown).
	Mottling	:	common distinct mottles typically from 30 cm 10YR5/8 (yellowish brown). 10YR5/1 (grey) often present and increase with depth.
	Stone	:	variable from very slightly stony to moderately stony (range 2-20%, typically 5%) comprising limestone, chalk or flints.
	Structure	:	moderately developed, coarse and very coarse prismatic breaking to coarse and very coarse angular blocky. With depth becomes very coarse prismatic.
	Porosity	:	<0.5%
	Consistence	:	firm →very firm with depth
	Roots	:	common fine and very fine roots which decrease with depth.
	Calcareous	:	typically becomes calcareous with depth (range 40-70 cms).
	Other	:	assessed as wetness class III

## Soil Unit 2

Topsoil	Depth	:	0-25/30 cms
	Texture	:	heavy clay loam, occasionally medium clay loam
	Colour	:	10YR4/6 or 10YR4/3 (dark yellowish brown or dark brown.
	Stone	:	variable (range 6-20%, typically 8-9%) limestone fragments of variable size.
	Structure	:	not applicable - cultivation zone
	Boundary	:	clear, smooth
	Roots	:	many fine and very fine
	Calcareous	:	very calcareous
	Upper Subsoil	Depth	:
Texture		:	clay
Colour		:	variable ranging from 2.5Y5/6 (light olive brown) to 5Y7/1 (grey).
Mottling		:	variable ranging between 30-45 cms 10YR5/8 (yellowish brown).
Stone		:	typically moderately stony which increases with depth (20%→40%) limestone fragments.
Structure		:	variable ranging from moderately developed subangular blocky to weakly developed coarse and very coarse platy.
Porosity		:	approximately 0.5% biopores
Consistence		:	friable
Boundary		:	sharp smooth
Roots		:	common fine and very fine - lateral rooting noted above hard limestone.
Calcareous		:	very calcareous
Lower Subsoil	:	limestone rock, encountered between 30-70 cms rootable only through occasional fissures to a maximum depth of 70 cms.	
Other	:	wetness class dependant on soil depth, typically wetness class II, occasionally wetness class III in deeper soils.	



## **REFERENCES**

**GEOLOGICAL SURVEY OF GREAT BRITAIN (ENGLAND & WALES) 1978** Solid and Drift, Sheet 157, Stamford, 1:50,000 scale.

**MAFF 1969** Agricultural Land Classification Sheet 134, 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 climatic data extracted from the agroclimatic dataset compiled by the Meteorological Office.

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

**SOIL SURVEY OF ENGLAND & WALES 1984** Soils and their use in Eastern England by C A Hodge, R G O Burton, W M Corbett, R Evans and R S Seale Harpenden.