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# NORTH-WEST LEICESTERSHIRE LOCAL PLAN; EMPLOYMENT DEVELOPMENT NORTH OF KEGWORTH (Site No 7247) Agricultural Land Classification June 1996

Resource Planning Team
Huntingdon Statutory Group
ADAS Cambridge

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# AGRICULTURAL LAND CLASSIFICATION

## NORTH-WEST LEICESTERSHIRE LOCAL PLAN
## EMPLOYMENT DEVELOPMENT NORTH OF KEGWORTH (Site No 7247)

## INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 154.2 hectares north of Kegworth, to the north and east of Junction 24 of the M1 motorway. The land comprises two areas divided from each other by the A453 road. The site is bounded to the west by the M1 motorway, to the south-west by the A6 road and the Hero Drinks Factory, to the north by a railway line and to the south and east by agricultural land.

2. The survey was commissioned by the Land Use Planning Unit (LUPU) of the Ministry of Agriculture, Fisheries and Food (MAFF) in connection with the North West Leicestershire Local Plan (representation 7247 / 7265). Most of the site was surveyed and mapped in detail in September 1995 (ADAS, 1995) and the additional survey work (in the north-east and immediately south of the A453 road) was carried out in May 1996 by the Resource Planning Team (RPT) of the ADAS Huntingdon Statutory Group, Cambridge to provide total cover. The present report synthesises the results of these two surveys and now supersedes all the previous ALC surveys at the site. Prior to the 1995 work there had been three ALC assessments covering all or part of the site (MAFF; 1971, 1982, 1985).

3. At the time of the present survey the majority of the site was under arable cropping, mainly cereals or maize but with a small area of grass ley at the northern end of the site near Warren Farm. Other, non-agricultural, land within the site includes two areas of mixed woodland at Green Spot Wood and March Covert, the buildings at Warren Farm, parts of Warren and Ratcliffe Lanes, a car park in the south of the site and various farm tracks.

4. The land has been classified in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

## SUMMARY

5. The land classification was established by a total of 147 soil auger borings (i.e. approximately 1 per hectare) to a depth of 120 cm or to impenetrable stony layers. Subsoil conditions were assessed from twelve inspection pits and the stone content of the more stony soils was measured by sieving both the topsoil and subsoil horizons. The location of the pits and the auger borings is shown on the accompanying Sample Point Map.

6. The results of the ALC survey are summarised in Table 1 and the distribution of the grades and subgrades is shown on the accompanying ALC map. The map is accurate at the scale of 1:10 000 but any enlargement would be misleading.

**Table 1: Areas of grades and other land**

| Grade/Other land | Area (hectares) | % surveyed |
|---|---|---|
| 2 | 10.5 | 7 |
| 3a | 70.0 | 45 |
| 3b | 60.9 | 40 |
| Other land | 12.8 | 8 |
| Total agricultural land | 141.4 | 92 |
| Total survey area | 154.2 | 100 |

7. A little more than half of the site is of good (Subgrade 3a) and very good (Grade 2) agricultural quality with the former being dominant. These gradings are due primarily to moderate or minor droughtiness limitations but some land also suffers from a minor wetness limitation (see Appendix II). The remainder of the site is largely graded 3b (moderate quality agricultural land) because the soils suffer from either moderately severe wetness or moderately severe droughtiness limitations. A relatively small area comprises other land.

## FACTORS INFLUENCING ALC GRADE

### Climate

8. Climate criteria are considered first when classifying land because severe climatic limitations will restrict land to low grades irrespective of favourable site or soil conditions. The overall climate itself may affect grading, or grading may be affected through climatic factors interacting with soil properties to influence soil wetness and droughtiness.

9. The main parameters used in the assessment of the overall climate limitation for ALC purposes are average annual rainfall as a measure of wetness and accumulated temperature as a measure of the relative warmth of an area. Estimates of these variables were obtained from the published 5 km grid datasets using the standard interpolation methods (Met. Office, 1989). The results of this analysis are given in Table 2 overleaf and show that the combination of rainfall and temperature at the site present no limitation for agricultural use.

### Site

10. The site is relatively flat and low-lying with minor undulations occurring locally. The altitude of the site ranges from a high of 35 m AOD adjacent to Junction 24 of the M1, falling to approximately 28 m AOD in some of the lower lying alluvial areas. The majority of the area, however, is relatively flat and lies at an altitude of approximately 30 m AOD. Slopes are very gentle over the site so neither altitude nor relief impose any limitation on the agricultural quality of the site.

Table 2: Climatic and altitude data

| Parameter | Value | |
|---|---|---|
| Grid reference | SK 478 276 | SK 475 290 |
| Altitude (m, AOD) | 30 | 30 |
| Accumulated Temperature (day °C, Jan.–June) | 1426 | 1426 |
| Average Annual Rainfall (mm) | 617 | 613 |
| Field Capacity Days | 133 | 133 |
| Moisture Deficit, Wheat (mm) | 111 | 111 |
| Moisture Deficit, Potatoes (mm) | 103 | 104 |
| Overall Climatic Grade | 1 | 1 |

## Geology and soils

11. The published 1:50 000 scale geology map (Geol. Survey, 1976) shows the northern and eastern parts of the site to comprise Alluvium, with River Terrace gravels occurring to the south and west of March Covert adjacent to the M1 motorway. All of these Pleistocene or Recent deposits overlie Keuper Marls and Sandstone at depth.

12. There is no detailed published soils information for the site. The relevant reconnaissance soil map and legend (Soil Survey, 1983) shows the occurrence of two soil associations, namely Wharfe and Wick 1. The Wharfe association is briefly described as deep, stoneless, permeable, fine loamy soils developed on river alluvium and the Wick 1 association is described as deep, well drained, coarse loamy and sandy soils locally over gravel, developed on glaciofluvial or river terrace drift.

13. The detailed surveys carried out on the site have identified two distinct soil types, one of which occurs on the river terrace deposits and the other developed on the alluvial deposits. The soil types have a number of variants which are important in ALC terms, particularly the depth to the sandy and stony lower subsoil, the stone content of the topsoil and upper subsoil and the severity of wetness.

14. The soils developed on the river terrace deposits comprise loamy soils overlying sand and gravel. These soils typically have a dark brown medium sandy loam or sandy clay loam topsoil, approximately 30 cm deep and containing 5-10% small and medium-size pebbles overlying a brown, medium sandy loam or sandy clay loam upper subsoil to approximately 50/70 cm depth and containing 10-20% pebbles. Below this depth the lower subsoil is typically loamy medium sand or medium sand with 25-35% stones. The lower subsoil may have a banded appearance, with layers of stoneless sand. These soils occur extensively over the central part of the site with the slightly lighter textures predominating towards the southern and western parts of this area. Ochreous mottling in the subsoil horizons becomes more frequent toward the eastern side of the area, with manganiferrous staining particularly evident in the lower subsoil indicating the presence of a fluctuating groundwater table. In the field to the west of March Covert, red clays (Keuper Marl) were found within 1.2 m depth in some of the profiles, but not in sufficiently large enough areas to warrant separate delineation. The soils have been assessed as Wetness Class I or II.

15. At the southern end of the site, to the south of the A453 road, a deeper variant of the soils developed on the river terrace deposits has been mapped. These soils typically have a medium sandy loam topsoil approximately 30 cm deep with 3-5% small and medium-size pebbles overlying a medium sandy loam subsoil extending to 70/90 cm depth and containing 5-15% stones. Some profiles, especially toward the eastern side of the area, display ochreous mottling indicating the presence of a fluctuating groundwater table. The soils have been assessed as Wetness Class I or II.

16. A further variant has been mapped on the river terrace deposits which occur at the northern end of the site and also on the slightly higher land to the west of March Covert. These soils have a dark brown medium sandy loam or sandy clay loam topsoil approximately 30 cm deep with 5-15% small and medium-size stones overlying a gravelly (10-25% stones) loamy medium sand upper subsoil. Below 45/60 cm depth the texture is typically medium sand with 25-35% stones. The soils at the northern end of the site typically have manganiferrous staining in the subsoil horizons indicating a fluctuating groundwater table, although this is not evident in the soils adjacent to March Covert, probably due to the slightly raised ground levels in this area. The soils have been assessed as Wetness Class I or II.

17. The second distinct soil type has been mapped on the slightly lower land associated with the alluvial deposits. Typically, these soils have a dark greyish brown heavy clay loam or clay topsoil, approximately 30 cm deep, with few (1-2%) small and medium-size stones overlying a stoneless, grey, slowly permeable clay subsoil with common distinct ochreous mottles. In many profiles coarse-textured gravelly material was encountered at depths ranging from 60-120 cm, with textures ranging from sandy clay loam to sand. The soils have been assessed as Wetness Class III.

18. In a few places, notably north of Warren Lane and at the margins of the more extensive alluvial areas, some alluvial profiles are lighter textured and better drained. The topsoil and upper subsoil are sandy clay loam, with slowly permeable mottled clay or sandy clay occurring below about 50 cm. The soils have been assessed as Wetness Class II or III, depending on the depth to the clay and the severity of gleying above it.

## AGRICULTURAL LAND CLASSIFICATION

### Grades, Subgrades

19. The Agricultural Land Classification of the land is shown on the attached ALC Map and the areas of each grade and subgrade have been given in Table 1. Within any grade and subgrade small areas of better or poorer quality land may occur but these cannot be separately delineated at the scale of survey.

*Grade 2*

20. Two areas of Grade 2 land have been identified in the south of the site. These correlate with the deep coarse loamy soils developed on the river terrace deposits (paragraph 15). These free-draining soils have a minor droughtiness limitation. Moisture balance calculations indicate that in this relatively low rainfall area the deep slightly less stony medium sandy loam

profiles will be slightly droughty for the deep rooting crops such as wheat, whilst the slightly shallower profiles will be slightly droughty for both wheat and potatoes, restricting the land to Grade 2.

*Subgrade 3a*

21. The areas mapped as Subgrade 3a correlate with the moderately deep loamy soils developed on the river terrace deposits (paragraph 14) and with the slightly better drained alluvial soils (paragraph 18). In the first case, the major limitation associated with the land is droughtiness due to the depth to the underlying sands and gravels and the stone content in the upper soil horizons, restricting the available water capacity of the soils. Moisture balance calculations indicate that these soils will be moderately droughty in this relatively low rainfall area limiting the land to Subgrade 3a. Soil observations also indicated the presence of a moderate wetness limitation in some areas due to a fluctuating groundwater table. The soils typically have a sandy clay loam upper profile over a slowly permeable and gleyed sandy clay lower subsoil, indicating that they will lie wet for significant periods during the wetter parts of the year. Care with cultivations and harvesting will be necessary to prevent structural damage to the soils.

*Subgrade 3b*

22. Land has been mapped as Subgrade 3b on the basis of either moderately severe wetness / workability or droughtiness limitations. The heavy textured alluvial soils which occur on the slightly lower areas within the site (paragraph 17) typically have a heavy clay loam or clay topsoil over a slowly permeable and gleyed clay subsoil, indicating that workability will be limited for considerable periods during the wetter parts of the year. Cultivations and harvesting, therefore, will need to be carefully controlled to prevent serious structural damage to the soils, thereby affecting the range of crops that can be successfully grown.

23. Other land mapped as Subgrade 3b comprises the shallow stony soils on the river terrace deposits (paragraph 16). These soils are very droughty on account of their shallow depth to the underlying sands and gravels and their relatively high stone content in the upper horizons. Moisture balance calculations indicate that the soils have a low available water capacity, which in this low rainfall area will result in substantially reduced crop yields in dry years.

Resource Planning Team
Huntingdon Statutory Group
ADAS Cambridge

## SOURCES OF REFERENCE


ADAS (1995) *Agricultural Land Classification: North West Leicestershire Local Plan; Site J13/J13(b).* Resource Planning Team Internal Report, 77/95, ADAS Cambridge.

GEOLOGICAL SURVEY OF GREAT BRITAIN (1976) *Sheet 141, Loughborough, Solid and Drift edition, 1:50 000 scale.*

MAFF (1971) *Agricultural Land Classification Map, Sheet 121, Provisional, 1:63 360 scale.*

MAFF (1982) *Agricultural Land Classification Report for Lockington Kegworth.* Internal Paper L/66/82, MAFF, Cambridge.

MAFF (1985) *Agricultural Land Classification Report for Kegworth Industrial Site.* Internal Paper, MAFF, Cambridge.

MAFF (1988) *Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.* MAFF: London.

METEOROLOGICAL OFFICE (1989) *Climatological Data for Agricultural Land Classification.* Met. Office: Bracknell.

SOIL SURVEY OF ENGLAND AND WALES (1983) *Soils of England and Wales, Sheet 3, Midland and Western England, 1:250 000 scale map and legend.* Soil Survey of England and Wales: Harpenden.

## APPENDIX I

## DESCRIPTIONS OF THE GRADES AND SUBGRADES

**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 includes 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 or horticultural crops can usually be grown but on some land of this grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1 land.

**Grade 3: Good to Moderate Quality Land**

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

## APPENDIX II

## SOIL WETNESS CLASSIFICATION

### Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

| Wetness Class | Duration of waterlogging[1] |
|---|---|
| I | The soil profile is not wet within 70 cm depth for more than 30 days in most years[2]. |
| II | The soil profile is wet within 70 cm depth for 31-90 days in most years **or**, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years. |
| III | The soil profile is wet within 70 cm depth for 91-180 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years. |
| IV | The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years. |
| V | The soil profile is wet within 40 cm depth for 211-335 days in most years. |
| VI | The soil profile is wet within 40 cm depth for more than 335 days in most years. |

### Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.

[2] 'In most years' is defined as more than 10 out of 20 years.