KENILWORTH

AGRICULTURAL LAND CLASSIFICATION

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KENILWORTH

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 46 5 ha of land at the south east of Kenilworth Field survey was based on 31 auger borings and 2 soil profile pits and was completed in January 1998 During the survey 4 samples were analysed for particle size distribution (PSD)

2 The survey was conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of the Warwickshire Structure Plan

3 Information on climate geology and soils and from previous ALC surveys was considered and is presented in the relevant section Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 2 and Grade 3 the site had not been surveyed previously However the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) and supersedes any previous ALC survey Grade descriptions are summarised in Appendix I

4 At the time of survey land cover was permanent grass and arable Other land which was not surveyed included woodland sports pitches agricultural and residential buildings

5 The distribution of ALC grades is shown on the accompanying 1 10 000 scale ALC map The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas Areas are summarised in the Table 1

SUMMARY

Table 1 Distribution of ALC grades Kenilworth

Grade	Area (ha)	% Surveyed Area (28 2 ha)
1	23 3	82 6
2	4 9	17 4
Other land	18 3	
Total site area	46 5	

6 Best and most versatile land occurs across the whole of the site Grade 1 quality land occurs over the central and south western part of the site on the slightly higher land Here the soils have no limitation to their agricultural use Grade 2 land occurs around the central and eastern edge of the site where the land is slightly lower The soils have a slight wetness limitation

CLIMATE

7 Estimates of climatic variables for this site were derived from the published agricultural climate dataset Climatological Data for Agricultural Land Classification (Meteorological Office 1989) using standard interpolation procedures Data for key points around the site are given in Table 2 below

8 Since the ALC grade of land is determined by the most limiting factor present overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions Parameters used for assessing overall climate are accumulated temperature a measure of relative warmth and average annual rainfall a measure of overall wetness The results shown in Table 2 indicate that there is no overall climatic limitation

9 Climatic variables also affect ALC grade through interactions with soil conditions The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes which are compared with the moisture available in each profile in assessing soil droughtiness limitations These are described in later sections

Table 2 Climatic Interpolations Kenilworth

Grid Reference		SP 295 706	SP 306 716
Altitude (m)		76	85
Accumulated Temperature (day C)		1403	1393
Average Annual Rainfall (mm)		678	679
Overall Climatic Grade		1	1
Field Capacity Days		150	150
Moisture deficit (mm)	Wheat	101	100
	Potatoes	92	90

RELIEF

10 Altitude ranges 76 metres at the south eastern corner to 87 metres at the north western edge of the site with only gentle slopes of less than 7° being found over the site

GEOLOGY AND SOILS

11 Soils were mapped by soil survey of England and Wales at a reconnaissance scale of 1 250 000 (SSEW 1983) as Bromsgrove Association over the central and southern part of the site and Hodnet series over the northern part of the site More detailed soils information is also available in the 1 25 000 scale survey of the Warwickshire area

12 The Bromsgrove Association are described as having well drained coarse loamy soils over soft sandstone which can be deep in places The Hodnet series are described as deep well drained fine loamy soils with slowly permeable clayey subsoils These soils are occasionally waterlogged normally for short periods in winter

13 The majority of the soils in the present survey were found to closely follow the distribution described above soils were lighter on the slightly higher land with slightly heavier soils around the edge of the central and southern part of the site where the ground gently slopes down towards Rocky Lane and the dual carriageway

AGRICULTURAL LAND CLASSIFICATION

14 The distribution of ALC grades found by the current survey is shown on the accompanying 1 10 000 scale map and areas are summarised in Table 1 The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas

Grade 1

15 The majority of the site was found to be of excellent quality agricultural land This land runs in a north east south west direction from Rocky Lane to Leamington Road The soils were described as having clay loam or silty clay loam topsoil overlying silty clay or sandy silt loam subsoils A soil profile pit confirmed the soils were not droughty and occasionally have a minor wetness limitation which places the soils into Wetness Class II with light textures topsoils the soil wetness does not impose any limitation to the agricultural use of this land

Grade 2

16 A small area of the site was found to be of very good quality This can be found as a strip around the central and eastern part of the site ie along the western side of Rocky Lane and to the north west of the dual carriageway These soils typically have a clay loam topsoil overlying clay to depth A soil profile pit confirmed the clay was not slowly permeable The soils have a minor wetness limitation which places them into wetness class II

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February 1998

REFERENCES

BRITISH GEOLOGICAL SURVEY (1984) Sheet 184 Warwick 1 50 000 series Solid and Drift edition BGS London

HODGSON J M (Ed) (1997) Soil Survey Field Handbook Soil Survey Technical Monograph No 5 Silsoe

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

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification Meteorological Office Bracknell

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 3 Soils of Midland and Western England 1 250 000 scale SSEW Harpenden

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and Their Use in Midland and Western England Bulletin No 12 SSEW Harpenden

APPENDIX I

DESCRIPTION OF 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 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 root 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 level of yields It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields 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

Source MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land MAFF Publications Alnwick

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years

Wetness Class 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 not wet within 40 cm depth for more than 30 days in most years

Wetness Class 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 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 and 90 days in most years

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 40 cm depth for 91 210 days in most years

Wetness Class V

The soil profile is wet within 40 cm depth for 211 335 days in most years

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years

Notes The number of days specified is not necessarily a continuous period

In most years is defined as more than 10 out of 20 years

Source Hodgson J M (Ed) (1997) Soil Survey Field Handbook Soil Survey Technical Monograph No 5 Silsoe

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kenilworth	Pit 1 (A S P 22)	LEVEL	MAIZE STUBBLE	Av Rainfall 678 mm ATO 1403 day C FC Days 150 Climatic Grade 1 Exposure Grade	PERMIAN SANDSTONE
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		PSD SAMPLES TAKEN
80/97	22 1 98	SP 303 711	SK & SH		TS 0 25 cm S 20 / Z 53% C 27 / CL/ZCL MID SUBSOIL 49-60 cm S 13 / Z 52 / C 35 / ZC/ZCL

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	29	MCL/ MZCL	75YR 4/3								CF&VFF		Sharp smooth
2	49	HCL/ HZCL	75YR 4/6 (75YR 5/3)			band mn concs at base of horizon 2 (≈46 49cm)	MDC PR (with some MDCSAB at top of horizon 2)	FR	M	(>0 5 /) G	FF& VFF		Clear smooth
3	81	HZCL/ ZC	05YR 5/4 (75YR 5/3)		75YR 5/8 common fine distinct	C	MDCPR	FR	M	(>0 5 /) G	F VF		Wavy Gradual
4	120	ZC (banded with vfs/ heavier clay	25YR4/6 (5YR 4/4 on SAB Peds)		75 YR 5/6 5/8 common fine distinct	F	MDCPL with a developing MDMSAB	FM	P	(<0 5%) P	F VF		

Profile Gleyed From 49

Slowly Permeable Horizon From 81

Wetness Class I

Wetness Grade 1

Available Water Wheat 144mm

Potatoes 120mm

Moisture Deficit Wheat 101mm

Potatoes 92mm

Moisture Balance Wheat +43mm

Potatoes +28mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 1/2

Main Limiting Factor(s)

Remarks

Horizon 4 appears to be weathering mudstone/fine sandstone and platy structure is relic of deposition not soil structure

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kenilworth	Pit 2 (ASP 30)	2 East	PGR	Av Rainfall 678 mm ATO 1403 day C	PERMIAN SANDSTONE
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 150 Climatic Grade 1 Exposure Grade	PSD SAMPLES TAKEN TS 0 25cm MCL s 34 / z-43 / c 23 % Upper subsoil 25-40cm SZL/MCL s 40 /, z-41 / c 19 /
80/97	22 1 98	SP 300 709	SK & SH		

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	25	MCL	75YR4/3 4/2								CF&VFF		Smooth clear
2	40 57	MCL	75YR4/3 5YR 4/3				MDCSAB	FR	M	(>0 5%) G	CF&VFF		Irregular clear
3	57-65	FSZL	5YR 4/4				MDCSAB	FR	M	(>0 5%) G	CF&VFF		Wavy gradual
5	120	FSZL msst/ weathered mudstone	5YR 5/4				MDCPL with WKCAB developing	FR(FM where sst has not weathered much)	G	(>0 5%) where material has weathered sst porosity is lower	CF&VFF		

Profile Gleyed From

Slowly Permeable Horizon From

Wetness Class I

Wetness Grade 1

Available Water	Wheat	201mm
	Potatoes	133mm
Moisture Deficit	Wheat	101mm
	Potatoes	92mm
Moisture Balance *	Wheat	+100mm
	Potatoes	+41mm
Droughtiness Grade	1	(Calculated to 120 cm)

Final ALC Grade 1

Main Limiting Factor(s)

Remarks MB calculated using higher depths of 40cm for MCL and 57cm for SZL

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report Terms used and abbreviations are set out below These conform to definitions contained in the Soil Survey Field Handbook (Hodgson, 1997)

1 Terms used on computer database, in order of occurrence

GRID REF National 100 km grid square and 8 figure grid reference

LAND USE At the time of survey

WHT	Wheat	**SBT**	Sugar Beet	**HTH**	Heathland
BAR	Barley	**BRA**	Brassicas	**BOG**	Bog or Marsh
OAT	Oats	**FCD**	Fodder Crops	**DCW**	Deciduous Wood
CER	Cereals	**FRT**	Soft and Top Fruit	**CFW**	Coniferous Woodland
MZE	Maize	**HRT**	Horticultural Crops	**PLO**	Ploughed
OSR	Oilseed Rape	**LEY**	Ley Grass	**FLW**	Fallow (inc Set aside)
POT	Potatoes	**PGR**	Permanent Pasture	**SAS**	Set Aside (where known)
LIN	Linseed	**RGR**	Rough Grazing	**OTH**	Other
BEN	Field Beans	**SCR**	Scrub		

GRDNT Gradient as estimated or measured by hand held optical clinometer

GLEY SPL Depth in centimetres to gleying or slowly permeable layer

AP (WHEAT/POTS) Crop adjusted available water capacity

MB (WHEAT/POTS) Moisture Balance (Crop adjusted AP crop potential MD)

DRT Best grade according to soil droughtiness

If any of the following factors are considered significant Y will be entered in the relevant column

MREL	Microrelief limitation	**FLOOD**	Flood risk	**EROSN**	Soil erosion risk
EXP	Exposure limitation	**FROST**	Frost prone	**DIST**	Disturbed land
CHEM	Chemical limitation				

LIMIT The main limitation to land quality The following abbreviations are used

OC	Overall Climate	**AE**	Aspect	**EX**	Exposure
FR	Frost Risk	**GR**	Gradient	**MR**	Microrelief
FL	Flood Risk	**TX**	Topsoil Texture	**DP**	Soil Depth

CH	Chemical	**WE**	Wetness	**WK**	Workability
DR	Drought	**ER**	Erosion Risk	**WD**	Soil Wetness/Droughtiness
ST	Topsoil Stoniness				

TEXTURE Soil texture classes are denoted by the following abbreviations

S	Sand	**LS**	Loamy Sand	**SL**	Sandy Loam
SZL	Sandy Silt Loam	**CL**	Clay Loam	**ZCL**	Silty Clay Loam
ZL	Silt Loam	**SCL**	Sandy Clay Loam	**C**	Clay
SC	Sandy clay	**ZC**	Silty clay	**OL**	Organic Loam
P	Peat	**SP**	Sandy Peat	**LP**	Loamy Peat
PL	Peaty Loam	**PS**	Peaty Sand	**MZ**	Marine Light Silts

For the sand loamy sand sandy loam and sandy silt loam classes the predominant size of sand fraction will be indicated by the use of the following prefixes

F Fine (more than 66% of the sand less than 0 2mm)
M Medium (less than 66% fine sand and less than 33% coarse sand)
C Coarse (more than 33% of the sand larger than 0 6mm)

The clay loam and silty clay loam classes will be sub divided according to the clay content **M** Medium (< 27% clay) **H** heavy (27 35% clay)

MOTTLE COL Mottle colour using Munsell notation

MOTTLE ABUN Mottle abundance expressed as a percentage of the matrix or surface described

F few <2% **C** common 2 20% **M** many 20 40% **VM** very many 40%+

MOTTLE CONT Mottle contrast

F faint indistinct mottles evident only on close inspection
D distinct mottles are readily seen
P Prominent mottling is conspicuous and one of the outstanding features of the horizon

PED COL Ped face colour using Munsell notation

GLEY If the soil horizon is gleyed a Y will appear in this column If slightly gleyed an S will appear

STONE LITH Stone Lithology One of the following is used

HR	All hard rocks and stones	**SLST**	Soft oolitic or dolimitic limestone
CH	Chalk	**FSST**	Soft fine grained sandstone
ZR	Soft argillaceous or silty rocks	**GH**	Gravel with non porous (hard) stones
MSST	Soft medium grained sandstone	**GS**	Gravel with porous (soft) stones

SI Soft weathered igneous or metamorphic rock

Stone contents are given in % by volume for sizes >2cm, >6cm and total stone >2mm

STRUCT The degree of development size and shape of soil peds are described using the following notation

Degree of development	**WA**	Weakly developed Adherent	**WK**	Weakly developed
	MD	Moderately developed	**ST**	Strongly developed
Ped size	**F**	Fine	**M**	Medium
	C	Coarse	**VC**	Very coarse
Ped Shape	**S**	Single grain	**M**	Massive
	GR	Granular	**AB**	Angular blocky
	SAB	Sub angular blocky	**PR**	Prismatic
	PL	Platy		

CONSIST Soil consistence is described using the following notation

L	Loose	**VF**	Very Friable	**FR**	Friable	**FM**	Firm
VM	Very firm	**EM**	Extremely firm	**EH**	Extremely Hard		

SUBS STR Subsoil structural condition recorded for the purpose of calculating profile droughtiness **G** Good **M** Moderate **P** Poor

POR Soil porosity If a soil horizon has poor porosity with less than 0 5% biopores >0 5mm, a Y will appear in this column

IMP If the profile is impenetrable to rooting a Y will appear in this column at the appropriate horizon

SPL Slowly permeable layer If the soil horizon is slowly permeable a Y will appear in this column

CALC If the soil horizon is calcareous with naturally occurring calcium carbonate exceeding 1% a Y will appear this column

2 Additional terms and abbreviations used mainly in soil pit descriptions

STONE ASSESSMENT

VIS	Visual	**S**	Sieve	**D**	Displacement

MOTTLE SIZE

EF	Extremely fine <1mm	**M**	Medium 5 15mm
VF	Very fine 1 2mm>	**C**	Coarse >15mm
F	Fine 2 5mm		

MOTTLE COLOUR May be described by Munsell notation or as ochreous (OM) or grey (GM)

ROOT CHANNELS In topsoil the presence of rusty root channels should also be noted

MANGANESE CONCRETIONS Assessed by volume

N	None		**M**	Many	20-40%
F	Few	<2%	**VM**	Very Many	>40%
C	Common	2 20%			

POROSITY

P	Poor	less than 0 5% biopores at least 0 5mm in diameter
G	*Good*	*more than 0 5% biopores at least 0 5mm in diameter*

ROOT ABUNDANCE

The number of roots per 100cm^2		Very Fine and Fine	Medium and Coarse
F	Few	1 10	1 or 2
C	Common	10 25	2 5
M	Many	25 200	>5
A	Abundant	>200	

ROOT SIZE

VF	Very fine	<1mm	**M**	Medium	2 5mm
F	Fine	1 2mm	**C**	Coarse	>5mm

HORIZON BOUNDARY DISTINCTNESS

Sharp	<0 5cm	**Gradual**	6 13cm
Abrupt	0 5 2 5cm	**Diffuse**	>13cm
Clear	2 5 6cm		

HORIZON BOUNDARY FORM Smooth wavy irregular or broken *

* See Soil Survey Field Handbook (Hodgson 1997) for details