

**Redhill Bridge, Bullinghope**  
**Agricultural Land Classification**  
**July 1997**

Resource Planning Team  
Bristol  
FRCA Western Region

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**REDHILL BRIDGE, BULLINGHOPE, HEREFORD**  
**AGRICULTURAL LAND CLASSIFICATION SURVEY**

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# REDHILL BRIDGE, BULLINGHOPE, HEREFORD

## AGRICULTURAL LAND CLASSIFICATION SURVEY

### INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 22.0 ha of land at Bullinghope, Hereford. Field survey was based on 23 auger borings and 3 soil profile pits, and was completed in July 1997. During the survey 2 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 connection with an application to the Planning Authority under the Town and Country Planning Act, 1990 for a new Football Club and grounds for Hereford United F.C.
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 in the south of the site, Grade 3 in the north west and Grade 4 along the northern boundary and through the centre of the site. The site was previously surveyed in 1986 at a scale of 1:25 000 (ADAS, 1987). 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. A survey on land to the east of Ross Road was carried out in 1992 (ADAS 1992). This survey details topsoil and subsoil textures in relation to a proposed golf course. Attention was paid to the textures of the soil from this survey for the soil textures from the present survey.
5. At the time of survey land cover was barley.

### SUMMARY

6. 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.

**Table 1: Distribution of ALC grades: Redhill Bridge, Bullinghope, Hereford**

Grade	Area (ha)	% Surveyed Area (22 ha)
1	3.5	15.9
2	12.1	55.0
3a	4.6	20.9
3b	4.8	8.2
Total site area	22.0	100.0





## **GEOLOGY AND SOILS**

12. The underlying geology of the site is shown on a published geology map (IGS, 1979) as being Lower Old Red sandstone, including Downtonian, from the Devonian Era. The soils found in the recent survey are those which develop on shale and limestone.

13. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as wholly Bromyard Association.

14. The Bromyard Soil Association is described as having well drained reddish, fine silty soils over shale and siltstone.

15. The soils in the recent survey were found to be silty clay loams or clay loams and sandy silt loams overlying heavier and often silty subsoils.

## **AGRICULTURAL LAND CLASSIFICATION**

16. 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**

17. A small area of excellent quality agricultural land was identified in the present survey. The soils were found to have a sandy silt loam topsoil texture overlying clay loam, silty clay loam or sandy clay loam subsoil textures. These soils were neither limited by soil droughtiness nor soil wetness, this was confirmed by a soil profile pit. They were assessed as Wetness Class I (See Appendix II).

### **Grade 2**

18. Land of very good quality covers the majority of the site particularly across the south and through the centre of the survey area. These soils were identified as having silty clay loam or clay loam topsoils which generally overlay heavier silty clay loam subsoils. A profile pit confirmed a slowly permeable layer and a wetness limitation and the soils were assessed as Wetness Class II.

### **Subgrade 3a**

19. An area of land along the western and northern boundary of the site was identified as land of good quality. The soils have clay loam or silty clay loam topsoils which pass on to heavier subsoils. The heavier subsoils were assessed as being slowly permeable and were placed in Wetness Class III.

### **Subgrade 3b**

20. A small area of land in the north east of the site bordering the ditch and Ross Road was found to be of moderate quality. These soils were described as having heavy clay loam topsoils overlying clay to depth. A soil profile pit confirmed the clay as slowly permeable and the soils were assessed as Wetness Class IV.

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July 1997

## REFERENCES

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## **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 (In preparation) Soil Survey Field Handbook, Revised Edition.

## 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, 1974).

#### 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

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

**GRDNT:** Gradient as estimated or measured by hand-held optical clinometer.

**GLEYS, 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.

<b>MREL:</b>	Microrelief limitation	<b>FLOOD:</b>	Flood risk	<b>EROSN:</b>	Soil erosion risk
<b>EXP:</b>	Exposure limitation	<b>FROST:</b>	Frost prone	<b>DIST:</b>	Disturbed land
<b>CHEM:</b>	Chemical limitation				

**LIMIT:** The main limitation to land quality: The following abbreviations are used.

<b>OC:</b>	Overall Climate	<b>AE:</b>	Aspect	<b>EX:</b>	Exposure
<b>FR:</b>	Frost Risk	<b>GR:</b>	Gradient	<b>MR:</b>	Microrelief

<b>FL:</b>	Flood Risk	<b>TX:</b>	Topsoil Texture	<b>DP:</b>	Soil Depth
<b>CH:</b>	Chemical	<b>WE:</b>	Wetness	<b>WK:</b>	Workability
<b>DR:</b>	Drought	<b>ER:</b>	Erosion Risk	<b>WD:</b>	Soil Wetness/Droughtiness
<b>ST:</b>	Topsoil Stoniness				

**TEXTURE:** Soil texture classes are denoted by the following abbreviations:-

<b>S:</b>	Sand	<b>LS:</b>	Loamy Sand	<b>SL:</b>	Sandy Loam
<b>SZL:</b>	Sandy Silt Loam	<b>CL:</b>	Clay Loam	<b>ZCL:</b>	Silty Clay Loam
<b>ZL:</b>	Silt Loam	<b>SCL:</b>	Sandy Loam	<b>C:</b>	Clay
<b>SC:</b>	Sandy clay	<b>ZC:</b>	Silty clay	<b>OL:</b>	Organic Loam
<b>P:</b>	Peat	<b>SP:</b>	Sandy Peat	<b>LP:</b>	Loamy Peat
<b>PL:</b>	Peaty Loam	<b>PS:</b>	Peaty Sand	<b>MZ:</b>	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:-

<b>F:</b>	Fine (more than 66% of the sand less than 0.2mm)
<b>M:</b>	Medium (less than 66% fine sand and less than 33% coarse sand)
<b>C:</b>	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

<b>F:</b>	faint - indistinct mottles, evident only on close inspection
<b>D:</b>	distinct - mottles are readily seen
<b>P:</b>	Prominent - mottling is conspicuous and one of the outstanding features of the horizon.

**PED. COL:** Ped face colour using Munsell notation.

**GLEYS:** 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.

<b>HR:</b>	All hard rocks and stones	<b>SLST:</b>	Soft oolitic or dolimitic limestone
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<b>CH:</b>	Chalk	<b>FSST:</b>	Soft, fine grained sandstone
<b>ZR:</b>	Soft, argillaceous, or silty rocks	<b>GH:</b>	Gravel with non-porous (hard) stones
<b>MSST:</b>	Soft, medium grained sandstone	<b>GS:</b>	Gravel with porous (soft) stones
<b>SI:</b>	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

<b><u>Degree of development</u></b>	<b>WK:</b> Weakly developed	<b>MD:</b> Moderately developed
	<b>ST:</b> Strongly developed	
<b><u>Ped size</u></b>	<b>F:</b> Fine	<b>M:</b> Medium
	<b>C:</b> Coarse	<b>VC:</b> Very coarse
<b><u>Ped Shape</u></b>	<b>S:</b> Single grain	<b>M:</b> Massive
	<b>GR:</b> Granular	<b>AB:</b> Angular blocky
	<b>SAB:</b> Sub-angular blocky	<b>PR:</b> Prismatic
	<b>PL:</b> Platy	

**CONSIST:** Soil consistence is described using the following notation:

<b>L:</b> Loose	<b>VF:</b> Very Friable	<b>FR:</b> Friable	<b>FM:</b> Firm
<b>VM:</b> Very firm	<b>EM:</b> Extremely firm	<b>EH:</b> 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:

<b>EF:</b> Extremely fine <1mm	<b>M:</b> Medium 5-15mm
<b>VF:</b> Very fine 1-2mm>	<b>C:</b> Coarse >15mm
<b>F:</b> 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

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

**STRUCTURE:** Ped Development \*

<b>WA:</b> Weakly adherent	<b>M:</b> Moderately developed
<b>W:</b> Weakly developed	<b>S:</b> Strongly developed

**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 <sup>2</sup> :	Very Fine and Fine	Medium and Coarse
<b>F:</b> Few	1-10	1 or 2
<b>C:</b> Common	10.25	2 - 5
<b>M:</b> Many	25-200	>5
<b>A:</b> Abundant	>200	

**ROOT SIZE**

<b>VF:</b> Very fine <1mm	<b>M:</b> Medium 2 - 5mm
<b>F:</b> Fine 1-2mm	<b>C:</b> Coarse >5mm

**HORIZON BOUNDARY DISTINCTNESS:**

<b>Sharp:</b> <0.5cm	<b>Gradual:</b> 6 - 13cm
<b>Abrupt:</b> 0.5 - 2.5cm	<b>Diffuse:</b> >13cm
<b>Clear:</b> 2.5 - 6cm	

**HORIZON BOUNDARY FORM:** Smooth, wavy, irregular or broken.\*

\* See Soil Survey Field Handbook (Hodgson, 1974) for details.

SITE NAME Redhill Bridge, Bullinghope, Hereford		PROFILE NO. Pit 1, ASP 2	SLOPE AND ASPECT -	LAND USE BAR	Av Rainfall: 698 mm ATO: 1450 day °C	PARENT MATERIAL Not available
JOB NO. 55/97		DATE 8/7/97	GRID REFERENCE SO 505 371	DESCRIBED BY SH/ SK	FC Days: 154 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN T/S ZC: S8; Z48; C44

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	30	HZCL	75YR43	1% HR (VIS)	-	-	-	-	-	-	C F Fib	-	Abrupt smooth
2	43	C	2.5Y51	-	MDF 75YR46	Few	STCPR breaking to STCAB	Fm	Poor	<0.5	F F Fib	-	Abrupt smooth
3	80+	HZCL	5YR44 + 10YR52 (75YR53)	-	MDF 75YR46-56	-	STVCAB	Fm	Poor	<0.5	F Fine Fib	-	-

Profile Gleyed From: 30  
Depth to Slowly Permeable Horizon: 30  
Wetness Class: IV  
Wetness Grade: 3b

Available Water Wheat: 124 mm  
Potatoes: 106 mm  
Moisture Deficit Wheat: 104 mm  
Potatoes: 95 mm  
Moisture Balance Wheat: 20 mm  
Potatoes: 11 mm  
Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3b  
Main Limiting Factor(s): Wetness

Remarks: HZCL (H3) is an SPL. Reference across to 3a profiles.

SITE NAME Redhill Bridge, Bullinghope, Hereford		PROFILE NO. Pit 2, ASP 13, 17	SLOPE AND ASPECT -		LAND USE BAR		Av Rainfall: 698 mm ATO: 1450 day °C		PARENT MATERIAL Not available				
JOB NO. 55/97		DATE 8/7/97	GRID REFERENCE SO 5028 3675		DESCRIBED BY SH/ SK		FC Days: 154 Climatic Grade: 1 Exposure Grade: 1		PSD SAMPLES TAKEN Topsoil MZCL: S15; Z68; C17				

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	32	MZCL	75YR43	< 1% HR (VIS)	-	-	-	-	-	-	C F F	-	Smooth clear
2	56	M/ HZCL	75YR44	-	75YR46 F	Few	WDCPR	Fm	Poor	< 0.5	F F F	-	Smooth clear
3	66	HZCL	75YR53	-	75YR46M	Few	WKCSAB	Fm	Poor	> 0.5	F F F	-	Smooth clear
4	80+	HZCL	75YR44	-	75YR46M	Many	WDCPR	Fm	Poor	< 0.5	F F F	-	Smooth clear

Profile Gleyed From: 56  
Depth to Slowly Permeable Horizon: 66  
Wetness Class: II  
Wetness Grade: 2

Available Water Wheat: 124 mm  
Potatoes: 106 mm  
Moisture Deficit Wheat: 104 mm  
Potatoes: 95 mm  
Moisture Balance Wheat: 20 mm  
Potatoes: 11 mm  
Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2  
Main Limiting Factor(s): Wetness

Remarks: H2 porosity <0.5. This may relate to some compaction. The lower HZCL is a SPL ref across to 3a profiles.



SITE NAME Redhill Bridge, Bullinghope, Hereford		PROFILE NO. Pit 3 ASP 14	SLOPE AND ASPECT	LAND USE BAR	Av Rainfall: 698 mm ATO: 1450 day °C	PARENT MATERIAL Not available
JOB NO. 55/97		DATE 8/7/97	GRID REFERENCE SO 504 368	DESCRIBED BY SH/ SK	FC Days: 154 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN None

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	35	FSZL	75YR43	< 1% HR (VIS)	None	None	-	-	-	-	C F F	-	Smooth abrupt
2	85	MZCL	75YR44	< 1% HR (VIS)	None	None	MDCPR to depth 55 changing to MDCSAB to 100	Fr	Moderate	> 0.5	C F F	-	Smooth clear
3	100	M/ HZCL	05YR54	< 1% HR (VIS)	75YR46	Common many	-	Fr	-	-	-	-	-

Profile Gleyed From: Not gleyed  
Depth to Slowly Permeable Horizon: No SPL  
Wetness Class: I  
Wetness Grade: 1

Available Water Wheat: 173 mm  
Potatoes: 137 mm  
Moisture Deficit Wheat: 104 mm  
Potatoes: 95 mm  
Moisture Balance Wheat: 69 mm  
Potatoes: 42 mm  
Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 1

Main Limiting Factor(s):

Remarks: