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Land at Coleford

Agricultural Land Classification

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Resource Planning Team
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COLEFORD

AGRICULTURAL LAND CLASSIFICATION SURVEY

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COLEFORD

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INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 181.0 ha of land in four sites at Coleford, Gloucestershire. Field survey was based on 115 auger borings and 6 soil profile pits, and was completed in January 1998. During the survey 6 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 Forest of Dean Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. 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.

SUMMARY

4. The distribution of ALC grades is shown on the accompanying 1: 10 000 scale ALC maps. 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 Table 1.

Table 1: Distribution of ALC grades: Coleford, all sites

Grade	Area (ha)	% Surveyed Area (102.2 ha)
2	15.2	15
3a	52.6	51
3b	28.7	28
4	5.7	6
Agricultural land not surveyed	0.9	
Other land	77.9	
Total site area	181.0	

5. This shows that on the four sites, 66% of the area surveyed was found to be best and most versatile. Of this, the Grade 2 was found mainly on the Lower Berry Hill site where it was limited by overall climate and workability. Subgrade 3a was found mainly on the Broadwell site and also at Lower Berry Hill and was found to be limited mainly by wetness. The remaining land was mainly Subgrade 3b limited by gradient and wetness and, on the limestone parent material at Whitecliff, also by soil depth and topsoil stoniness.

CLIMATE

6. Estimates of climatic variables for each 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 sites are given in the relevant section.

7. 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 Tables 2, 3, 4 and 5 indicate that there is an overall climatic limitation at all the sites which limits the land to Grade 2.

8. 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.

BROADWELL, BAKER'S HILL AND LORD'S HILL, COLEFORD

9. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as being mainly Grade 3 with a small area of Grade 4 around Baker's Hill and Poolway, the site has not been surveyed previously. Land to the north west of Mile End Road was surveyed in 1994 (ADAS 1994b) and found Subgrades 3a and 3b limited mainly by wetness with some Grade 2 limited only by climate. Much of this area had been restored after open cast mining whereas the current survey area mainly has not been disturbed as any coal extraction has been by deep mining.

10. At the time of survey land cover was all permanent pasture.

Climate

11. The following data is taken to represent the site.

Table 2: Climatic Interpolations: Broadwell, Baker's Hill and Lord's Hill, Coleford

Grid Reference		SO 581110	S0 587117
Altitude (m)		200	220
Accumulated Temperature (day °C)		1304	1281
Average Annual Rainfall (mm)		970	973
Overall Climatic Grade		2	2
Field Capacity Days		207	208
Moisture deficit (mm):	Wheat	74	71
	Potatoes	56	53

Relief

12. Altitude ranges from 185 metres at Poolway to 220 metres on the higher ground around Broadwell with mainly gentle and moderate gradients which are not limiting. There is a small area of steeper ground at Poolway where gradients are strong to moderately steep (12- 15°).

Geology and Soils

13. The underlying geology of the site is shown on the published geology map (IGS, 1974) as Carboniferous sandstone, with mainly Pennant Sandstone except for a small area of Trenchard Sandstone at the western edge of the site. This was borne out by the current survey as soft sandstone was found throughout the area.

14. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as Neath Association on the Pennant Sandstone and Dunkeswick Association on the Trenchard Sandstone.

15. Neath association, which covers most of the area surveyed, is described as well drained fine loamy soils over Carboniferous sandstone and shale with smaller patches of similar soils which have slowly permeable subsoils and slight seasonal waterlogging. This was largely borne out by the current survey.

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.

Subgrade 3a

17. Most of the area surveyed at this site is shown as Subgrade 3a although it includes many scattered borings which were found to be Grade 2 but which did not comprise a robust mapping unit. Topsoil texture was generally found to be medium clay loam. Where no evidence of wetness was found, indicating Wetness Class I, this would be Grade 2 limited by overall climate and by workability. These conditions are illustrated by Pit 3 where the topsoil texture was medium sandy silt loam, borderline to medium clay loam. Several other borings through the area found Wetness Class II with gleying within 70 cm, illustrated by Pit 6, while a few borings were found to be Wetness Class III with a slowly permeable layer in the lower subsoil, illustrated by Pit 4.

Subgrade 3b

18. The small area of Subgrade 3b is limited by gradient.

Grade 4

19. The small area of Grade 4 is also limited by gradient.

Other Land

20. Other land which was not surveyed in this survey area was mainly residential land and roads with a school, sports grounds, and a golf driving range.

LOWER BERRY HILL, COLEFORD

21. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as being Grade 3, the site had not been surveyed previously. Land to the south of the site was surveyed in 1994 (ADAS 1994a) and found mainly Grade 2 adjacent to the current survey area although the report for the 1994 survey does indicate that the area shown as Grade 2 includes auger borings of other grades, particularly some where gleying was evident. Although it is understood that these areas were also subject to open cast mining and restoration, it is considered that different methods of restoration or different weather conditions at that time may have contributed to the rather different ALC grades indicated by the current survey, particularly to the south west of Lower Berry Hill.

22. At the time of survey land cover was mainly grass for sheep.

Climate

23. The following data is taken to represent the site.

Table 3: Climatic Interpolations: Lower Berry Hill, Coleford

Grid Reference		SO 567117	SO 574121
Altitude (m)		200	225
Accumulated Temperature (day °C)		1305	1276
Average Annual Rainfall (mm)		946	950
Overall Climatic Grade		2	2
Field Capacity Days		204	205
Moisture deficit (mm):	Wheat	77	73
	Potatoes	60	55

Relief

24. Altitude ranges from 198 metres at Crossways to 230 metres at Crowash Farm with mainly gentle and moderate gradients which are not limiting. A small area to the west of Beeches Farm was found to be strongly sloping with gradients of 8 - 11 degrees.

Geology and Soils

25. The underlying geology of the site is shown on the published geology map (IGS, 1974) as Carboniferous sandstone, Trenchard Sandstone to the west of Lower Berry Hill and Pennant Sandstone underlying the rest of the site. This was largely borne out by the current survey which found varying content of soft sandstone in the soil profiles throughout the survey area, although this was largely determined by restoration where fields had been subject to open cast mining. A small area in the extreme west of the site was found to have conspicuous red clay, believed to have been derived from a nearby pottery works.

26. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) Neath Association on the Pennant Sandstone and Dunkeswick Association on the Trenchard Sandstone in the west of the site. Neath association is described as well drained fine loamy soils often over rock with small patches of similar soils with slowly permeable subsoils and slight seasonal waterlogging. Dunkeswick association is described as slowly permeable seasonally waterlogged fine loamy soils associated with similar clayey soils. This was largely borne out by the current survey for the Neath association but soils of the Dunkeswick association were found to be confined more to the north and west of the area than where they had been indicated.

Agricultural Land Classification

27. 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 2

28. The area shown as Grade 2 was found to have mainly medium clay loam or sandy clay loam topsoil textures which at Wetness Class I with no evidence of wetness implies a minor limitation due to restricted workability, although the area is subject to an overiding overall climatic limitation, also to Grade 2. This is illustrated by Pit 5. It is not clear to what extent this area has been subject to open cast mining as the field evidence is inconclusive for much of the area, although it was reported that at least the field with ASP 16 and 17 had not been worked.

Subgrade 3a

29. Much of the area shown as Subgrade 3a accords with the general description of Neath association soils but was generally found to be Wetness Class II with gleying in the lower subsoil and with medium clay loam topsoil. At the least the area to the north of the Staunton Road was reported to have been worked by open cast mining in the 1960's and has been restored. This is illustrated by Pit 1.

Subgrade 3b

30. The main area shown as Subgrade 3b was found to be variable although several borings were found to be similar to Pit 2 which shows medium clay loam topsoil at Wetness Class IV with a slowly permeable layer starting at 45 cm in the restored profile. This implies a more serious moderate limitation due to wetness. Other borings in the west of this area were also found to be Wetness Class IV but in a red clay believed to be derived from pottery workings.

31. The smaller area shown as Subgrade 3b is limited mainly by gradient.

MILKWALL, COLEFORD

32. Apart from the published regional ALC map (MAFF 1977), which shows the site at a reconnaissance scale as Grade 3, the site has not been surveyed previously. There is no adjacent previous survey.

33. At the time of survey land cover of the several isolated fields was permanent pasture for sheep.

Climate

34. The following data is taken to represent the site.

Table 4: Climatic Interpolations: Milkwall, Coleford

Grid Reference		SO 583 091
Altitude (m)		190
Accumulated Temperature (day °C)		1317
Average Annual Rainfall (mm)		1003
Overall Climatic Grade		2
Field Capacity Days		213
Moisture deficit (mm):	Wheat	72
	Potatoes	55

Relief

35. Altitude ranges from 180 metres at Gosty Knoll in the east to 189 metres in the north west of the site with gentle and moderate gradients which are not limiting.

Geology and Soils

36. The underlying geology of the site is shown on the published geology map (IGS, 1974) as mainly Carboniferous Drybrook sandstone with a band of Crease limestone running through the centre of the site. The intermittent borings of the current survey found only sandy deposits and did not locate the Crease limestones.

37. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as mainly Neath Association with a small area of Dunkeswick Association in the eastern part of the site.

38. Only Neath Association is shown in the small areas covered by the current survey. This is described as well drained fine loamy soils often over rock developed on carboniferous sandstone and shale with small patches of similar soils which have slowly permeable subsoils and slight seasonal waterlogging. This was largely borne out by the current survey.

Agricultural Land Classification

39. 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.

40. The three isolated areas surveyed each found a small area of a different grade. The south area found Grade 2 with ASP 182 showing one medium sandy loam topsoil at Wetness Class I giving Grade 2 limited by overall climate and ASP 178 showing medium clay loam topsoil at Wetness Class I, a minor limitation due to workability. The central area with ASP 168 found a sandy clay loam topsoil at Wetness Class II, Subgrade 3a limited by wetness. The northern area found medium clay loam topsoil with two borings showing Wetness Class IV with a slowly permeable layer from the upper subsoil indicating Subgrade 3b limited by wetness. ASP 163 was found to be impenetrable at 50 cm and was included in the 3b mapping unit.

41. Most of the site area was found to be non agricultural, mainly woodland with some bracken scrub and large areas of scattered residential land. Two other small areas are believed to be agricultural but were not surveyed as access was not available.

WHITECLIFF, COLEFORD

42. Apart from the published regional ALC map (MAFF 1977), which shows the site at a reconnaissance scale as being mainly Grade 3 with Grade 4 in the valley sides, the site has not been surveyed previously. Several surveys adjacent to this site have found various grades of land including Grade 2 limited by overall climate and restricted workability on land to the north (ADAS 1994b). Surveys to the east (ADAS 1984a) and to the south (ADAS 1997) both found Subgrade 3b limited by gradient and topsoil stoniness.

43. At the time of survey land cover was mainly grass for mixed grazing, with maize in one field.

Climate

44. The following data is taken to represent the site.

Table 5: Climatic Interpolations: Whitecliff, Coleford

Grid Reference		*SO 571 101*	*SO 569104*
Altitude (m)		190	180
Accumulated Temperature (day °C)		1317	1328
Average Annual Rainfall (mm)		963	956
Overall Climatic Grade		2	2
Field Capacity Days		207	206
Moisture deficit (mm):	Wheat	77	79
	Potatoes	61	63

Relief

45. Altitude ranges from 150 metres in the valley bottom to 195 metres at the top of Rock Lane and 205 metres above the old quarry. The top fields at either side of the site have mainly moderate gradients which are not limiting but the steeper valley sides have mainly moderately steep slopes limiting the land to Grade 4.

Geology and Soils

46. The underlying geology of the site is shown on the published geology map (IGS, 1974) as mainly Carboniferous limestone: Lower Dolomite, Crease Limestone and Whitehead Limestone with some Drybrook Sandstone and alluvium in the valley bottom. This was entirely borne out by the current survey.

47. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as Crwbin Association with a small area of Neath Association at the eastern end of the site.

48. Soils of the Crwbin association are described as being very shallow and shallow well drained loamy soils over limestone, often on steep slopes. Soils of the Neath association are described as well drained fine loamy soils over sandstone rock, with small patches of similar soils with slowly permeable subsoils and slight seasonal waterlogging. All auger borings in this survey revealed profiles typical of the Crwbin association.

Agricultural Land Classification

49. 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.

Subgrade 3b

50. Most of this site is shown as Subgrade 3b with various limitations including gradient and soil depth, particularly around ASP 132 and 133. The maize field which includes ASP 151 has produced many large limestone boulders which have been removed after cultivations indicating a widespread limitation due to topsoil stoniness or soil depth.

Grade 4

51. The several small areas shown as Grade 4 are limited by gradient.

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30 January 98

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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 (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical *Monograph No 5*, Silsoe.

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.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Coleford (Lower Berry Hill)	Pit 1 (ASP 35)	1° South West	Permanent Grass	Av Rainfall: 946 mm ATO: 1305 day °C	Trenchard Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 204 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN
82/97	5/1/98	SO 5680 1161	HLJ/PB		Topsoil 0-25 cm : MCL (S36:Z39: C 25%)

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	MCL	10YR43	2% HR (vis)	None	None	-	-	-	Good	MF+VF	-	Diffuse Smooth
2	60	MCL	10YR64,72	20%MSST(vis)	FFDO[*1] (10YR56)	None	WCSAB	Friable	Moderate	Good	CF+VF	-	Gradual Irregular
3	80+	HCL	10YR64,72 10Y61	30%MSST(vis)	CFDO (10YR56)	None	WCSAB	Friable	Moderate	Good	FF+VF	-	-

Profile Gleyed From: 60 cm

Slowly Permeable Horizon From: No spl

Wetness Class: II

Wetness Grade: 3a

Available Water Wheat: 136 mm

Potatoes: 107 mm

Moisture Deficit Wheat: 75 mm

Potatoes: 58mm

Moisture Balance Wheat: 61 mm

Potatoes: 49 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: [*1] Common in patches

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Coleford (Lower Berry Hill)	Pit 2 (ASP 19)	4° North West	Permanent Grass	Av Rainfall: 946 mm ATO: 1305 day °C FC Days: 204 Climatic Grade: 1 Exposure Grade: 1	Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		PSD SAMPLES TAKEN
82/97	5/1/98	SO 5688 1188	HLJ/PB		Topsoil 0-25 cm : MCL (S29:Z46: C 25%)

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	20	MCL	10YR33	2% HR (vis)	None	None	-	-	-	Good	MF+VF	-	Clear Smooth
2	35	HCL	10YR54	5%HR (vis)	FDFO (10YR56)	None	MDCSAB	Friable	Moderate	Good	CF+VF	-	Gradual Smooth
3	45	C	10YR72,62	5%HR(vis)	CFDO (10YR56)	None	WKCSAB	Firm	Poor	Poor	FF+VF	-	Gradual Wavy
4	80+	C	10YR61 10YR72,62	10%HR(vis)	MDMO (10YR56)	None	WACSAB	Firm	Poor	Poor	FF+VF	-	-

Profile Gleyed From: 35 cm

Slowly Permeable Horizon From: 45 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 121 mm

Potatoes: 100 mm

Moisture Deficit Wheat: 75 mm

Potatoes: 58 mm

Moisture Balance Wheat: 46 mm

Potatoes: 42 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Coleford (Broadwell)	Pit 3 (ASP 104)	2° South	Permanent Grass	Av Rainfall: 970 mm ATO: 1304 day °C	Pennant Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 207 Climatic Grade: 2 Exposure Grade: 1	PSD SAMPLES TAKEN
82/97	5/1/98	SO 5830 1072	HLJ/PB		Topsoil 0-25 cm : MSZL* MCL, MSL (S49:Z34: C 17%)

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	20	MSZL	10YR32	2% > 2 cm (s) 18%<2 cm (s+d) 20% HR	None	None	-	-	-	Good	MF+VF	-	Clear Wavy
2	48	HCL	10YR 43,54	30%> 2 cm (s) 21%< 2 cm (s+d) 51% HR	None	None	WKCSAB	Friable	Moderate	Good	CF+VF	-	Gradual Smooth
3	95+	SC	10YR64	60%> 2 cm (s) 9%< 2 cm (s+d) 69% HR	None	None	Too stony	-	Moderate[*1]	Good	FF+VF	-	-

Profile Gleyed From: Not gleyed

Slowly Permeable Horizon From: No spl

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 80 mm

Potatoes: 66 mm

Moisture Deficit Wheat: 74 mm

Potatoes: 54 mm

Moisture Balance Wheat: 6 mm

Potatoes: 12 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Climate, Droughtiness (Borderline to 3a)

Remarks:
Hard rock in the pit is sandstone
Stones in H3 are larger than in H2.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Coleford (Broadwell)	Pit 4 (ASP 97)	3° North East	Permanent Grass	Av Rainfall: 970 mm ATO: 1304 day °C	Carboniferous Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 207 Climatic Grade: 2 Exposure Grade: 1	PSD SAMPLES TAKEN
82/97	7/1/98	SO 5850 1081	HLJ/PB		Topsoil 0-25 cm : MCL, (S43: Z36: C21%)

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	20	MCL	10YR32	5%HR (vis)	None	None	-	-	-	-	MF+VF	-	Abrupt Smooth
2	42	MCL	10YR43	10%HR(vis)	None	None	WKCSAB	Friable	Moderate	Good	CF+VF	-	Sharp Smooth
3	66	SCL	2.5Y63 10YR53	35%MSST (vis)	FDFO 10YR56	None	WKMSAB	Friable	Good	Good	CF+VF	-	Abrupt Wavy
4	90+	C	10Y71	20%MSST (vis)	CDFO 10YR56	None	Massive	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 66 cm

Slowly Permeable Horizon From: 66 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 125 mm

Potatoes: 103 mm

Moisture Deficit Wheat: 74 mm

Potatoes: 54 mm

Moisture Balance Wheat: + 51 mm

Potatoes: + 49 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:
Hard rock in the pit is sandstone
Stones in H3 are larger than in H2.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Coleford (Lower Berry Hill)	Pit 5 (ASP 4)	3° South	Permanent Grass	Av Rainfall: 946 mm ATO: 1305 day °C	Pennant Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 204 Climatic Grade: 2 Exposure Grade: 1	PSD SAMPLES TAKEN
82/97	8/1/98	SO 5752 1220	HLJ/PB		Topsoil 0-25 cm : SCL * MSL (S54: Z27: C19%)

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	SCL	10YR33	10%HR (vis)	None	None	-	-	-	Good	MVF	-	Gradual Smooth
2	65	SCL	10YR64,	20%MSST(vis)	None	None	MDMSAB	Friable	Good	Good	CVF	-	Gradual Smooth
3	88+	LMS	0.5Y62 7.5YR54	20%MSST (vis)	FDFO 7.5YR56	None	WKMSAB	Friable	Friable	Good	FVF	-	-

Profile Gleyed From: Not gleyed

Slowly Permeable Horizon From: No spl

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 133 mm

Potatoes: 110 mm

Moisture Deficit Wheat: 75 mm

Potatoes: 58 mm

Moisture Balance Wheat: 58 mm

Potatoes: 52mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): WK, OC

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Coleford (Broadwell)	Pit 6 (ASP 61)	3° West	PGR	Av Rainfall: 970 mm ATO: 1304 day °C FC Days: 207 Climatic Grade: 2 Exposure Grade: 1	Carboniferous Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		PSD SAMPLES TAKEN
82/97	8/1/98	SO 5850 1120	HLJ/PB		Topsoil 0-25 cm : MCL (S42: Z37: C21%)

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	10YR33	1%>2cm (s) 13%< 2 cm (s+d) 14%HR	None	None	-	-	-	Good	MF,VF	-	Clear Smooth
2	70	HCL	10YR56	40%>2cm (s) 21%<2 cm (s+d) 61%HR	None	None	Too stony	Friable	(Moderate)	Good	CF,VF	-	Clear Smooth
3	98+	MSL	0.5Y62 2.5YR61	20%>2 cm (s) 36%<2 cm (s+d) 56%MSST	CDFO 10YR56	None	WKMSAB	Friable	Good	(Good)	FVF	-	-

Profile Gleyed From: 70 cm

Slowly Permeable Horizon From: No spl

Wetness Class: II

Wetness Grade: 3a

Available Water Wheat: 102 mm

Potatoes: 73 mm

Moisture Deficit Wheat: 74 mm

Potatoes: 54 mm

Moisture Balance Wheat: 28 mm

Potatoes: 19 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:
HR in H2 is a sandstone