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**VALE OF WHITE HORSE LOCAL PLAN
Land Around Faringdon
Oxfordshire**

**Agricultural Land Classification
ALC Map and Report
Semi-detailed survey**

March 1999

**Resource Planning Team
Eastern Region
FRCA Reading**

**RPT Job Numbers: 3304/19-21/99
MAFF Reference: EL 33/02035**

AGRICULTURAL LAND CLASSIFICATION REPORT

VALE OF WHITE HORSE LOCAL PLAN LAND AROUND FARINGDON, OXFORDSHIRE SEMI-DETAILED SURVEY

INTRODUCTION

1. This report presents the findings of a series of semi-detailed Agricultural Land Classification (ALC) surveys on approximately 100 hectares of land around Faringdon in Oxfordshire. The surveys were carried out during March 1999 by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF) in connection with MAFF's statutory input to the Vale of White Horse Local Plan. These surveys supersede any previous ALC information for this land.
2. The fieldwork was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). Information from previous surveys on adjacent land (FRCA reference numbers 3304/227&231/94 and 3304/165/95) has been used to assist the 1999 fieldwork. A description of the ALC grades is given in Appendix I. At the time of survey agricultural land uses on the sites were varied, including both arable and grassland. The areas mapped as 'Other Land' include farm buildings, residential dwellings, a meat rendering plant, tracks, woodland and major drainage ditches.
3. The findings of the survey are shown on the enclosed ALC maps. A composite map for all of the land that has been surveyed at Faringdon (1994, 1995 and 1999) is also enclosed. The maps have been drawn at a scale of 1:15,000. They are accurate at this scale but any enlargement would be misleading. The area and proportions of the ALC grades and subgrades on the surveyed land across all the sites are summarised in Table 1.

Table 1: Land around Faringdon - Area of grades and other land (1999 fieldwork)

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	6.0	6.4	6.1
3a	12.5	13.3	12.6
3b	73.6	78.2	74.1
4	2.0	2.1	2.0
Other land	5.2	—	5.2
Total surveyed area	94.1	100	94.8
Total site area	99.3	—	100

¹ FRCA is an executive agency of MAFF and the Welsh Office

FACTORS INFLUENCING ALC GRADE

Climate

4. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics. The key climatic variables used for grading each site are given in the site specific paragraphs below and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989). The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (ATO, January to June), as a measure of the relative warmth of a locality.
5. The combination of rainfall and temperature for all of the sites means that there is no overall climatic limitation. Local climatic factors, such as exposure and frost risk are also not believed to affect land quality. All sites are climatically Grade 1.

Site

6. The survey area lies at altitudes in the range 85-135m AOD. Most of the land is located on the Corallian Ridge. Below this, the remainder of the area is situated on the scarp slope, which gives way to the flat lying Thames Valley in the extreme north. Immediately off the Corallian Ridge, the scarp slope has gradients which are sufficient to adversely affect agricultural land quality. Further down the scarp, at the junction of the Oxford Clay, the gradients become gentle.

Geology and soils

7. The most detailed published geological information for the areas surveyed (BGS, 1971) shows the land to be underlain by a series of solid geological formations. The area on the northern outskirts of Faringdon is shown as Kimmeridge Clay on the highest land, passing to limestone, sand, and silt and sand of the Corallian Beds, on the lower slopes this gives way to Oxford Clay. The area on the western fringes of Faringdon has a similar geological sequence, with the addition of Corallian Clay substituting for Kimmeridge Clay. The area on the southern periphery of Faringdon appears to be underlain mostly by the Faringdon Sponge Gravels with Corallian Clay making up the remainder.
8. According to the most recent published soils information for this area (SSEW, 1983), the land is underlain by four soil associations, namely Elmton 1, Fyfield 4, Kingston and Denchworth.
9. Elmton 1 association soils are mapped in the west. This association is described as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some similar deeper soils and some non-calcareous and calcareous clayey soils' (SSEW, 1983).
10. Fyfield 4 association soils are mapped in all areas and are described as 'deep well drained often stoneless coarse loamy and sandy soils. Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging and some slowly permeable seasonally waterlogged fine loamy over clayey soils. Risk of water erosion (SSEW, 1983).

11. Kingston association soils are mapped in the west. They are described as 'slowly permeable seasonally waterlogged fine loamy over clayey soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some well drained fine and coarse loamy soils' (SSEW, 1983).
12. Denchworth association soils are mapped in the north and west, and are described as 'slowly permeable and seasonally waterlogged clayey soils with similar fine loamy over clayey soils. Some fine loamy over clayey soils with only slight seasonal waterlogging and some slowly permeable calcareous clayey soils. Land slips and associated irregular terrain locally' (SSEW, 1983).

LAND TO THE NORTH OF FARINGDON (FRCA reference 3304/19/99)

13. This area totals approximately 42 hectares of land lying to the north of London Street. In total, 12 borings and 2 soil pits were described. The location of the auger borings and pits is shown on the sample location map in Appendix II which also contains details of the soils data. The survey comprises the area originally described by the Vale of White Horse District Council as FRA 2.
14. The climate details of the site are given in Table 2 below. The survey area lies at altitudes in the range 85–130m AOD. Between London Street and Church Walk the site falls through gentle gradients northwards. From Church Walk down to Grove Wood, gradient alone is sufficient to restrict land quality to Subgrade 3b. The site is not affected by microrelief or flooding.
15. The geology of this area shows the highest land parallel to London Street to be Kimmeridge Clay. Over a relatively short distance, this passes to limestone, sand, and silt and sand of the Corallian Beds, which underlies most of this area. On the lowest lying land bounded by Grove Wood is Oxford Clay.
16. The soils over this area are mainly those of the Fyfield 4 association and the remainder on the lowlying land mapped as soils of the Denchworth association (SSEW, 1983). These associations are described in paragraph 10 and 12.

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SU296961	SU290961
Altitude	m, AOD	115	85
Accumulated Temperature	day°C (Jan-June)	1392	1426
Average Annual Rainfall	mm	692	679
Field Capacity Days	days	143	141
Moisture Deficit, Wheat	mm	104	108
Moisture Deficit, Potatoes	mm	95	100
Overall climatic grade	N/A	Grade 1	Grade 1

18. The agricultural land quality in this area has been classified as Subgrade 3a (good quality) and Subgrade 3b (moderate quality). The principal limitations to land quality are gradient, soil

wetness and, to a lesser extent, soil droughtiness. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 3 below.

Table 3: Land to the north of Faringdon (FAR 2) - Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	6.1	16.1	14.6
3b	31.7	83.9	75.6
Other land	4.1	—	9.8
Total surveyed area	37.8	100	90.2
Total site area	41.9	—	100

Subgrade 3a

19. Land of good quality is found in the west and south-west of the site. The land was found to have a soil droughtiness limitation, with a soil wetness limitation in places. The soil pit 1P is typical of the soils with a soil droughtiness limitation. They are well drained (Wetness Class I) and calcareous. They comprise heavy clay loam topsoils which may contain up to 5% total hard rock. These overlie clay upper subsoils which contain up to 26% total hard rock and 10% soft limestone. At 70 cm, the pit was impenetrable over solid 'brashy' limestone. Roots were observed at this depth and could probably extend further in search of available water. The combination of these soil properties with the local climate causes a shortfall in the profile available water. Moisture balance calculations indicate that this leads to a slight risk of drought stress to plants in most years and means that this land can be classified no better than Subgrade 3a.
20. Subgrade 3a land with a slight soil wetness limitation is at or close to the junction of the Oxford Clay and Corallian Beds. Soils comprise a non-calcareous gleyed medium silty clay loam topsoil which may contain up to 2% hard rock. This passes to a stoneless gleyed heavy silty clay loam upper subsoil. From 40 cm, this overlies a gleyed poorly structured silty clay which is slowly permeable causing drainage to be impeded. The depth to this slowly permeable subsoil (40 cm) results in soils being assigned to Wetness Class III. This combination of imperfect drainage, topsoil texture and the prevailing field capacity level (143 days) gives rise to a land classification of Subgrade 3a.

Subgrade 3b

21. Most of the land on this site suffers from a significant soil wetness or gradient limitation. Soil wetness occurs where the underlying geology is the Kimmeridge or Oxford Clay. The soil pit 2P (see Appendix II) is typical of the soils developed over the Kimmeridge Clay and confirmed the existence of poorly structured clay subsoils. These profiles all exhibited evidence of severely impeded drainage in the form of gleying within 40 cm. The depth to these slowly permeable subsoils (between 25–30 cm) results in soils being assigned to Wetness Class IV. This combination of poor drainage, topsoil texture and the prevailing field capacity level (143 days) gives rise to a land classification of Subgrade 3b. Soils developed over the Oxford Clay are also in a water receiving area, where excess water drains from the Corallian

Beds over the Oxford Clay. Soils in this area were particularly wet. Excessive soil wetness adversely affects seed germination and survival, partly by a reduction in soil temperature and partly because of anaerobism. It also inhibits the development of a good root system, all of which can affect the range of crops that can be grown and the level of yield. Soil wetness also influences the sensitivity of the soil to structural damage and is, therefore, a major factor in determining the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

22. On the scarp slope, gradients were measured between 7–11° and Subgrade 3b is appropriate. This is sufficient to restrict the safe and efficient use of certain agricultural machinery and so restrict the crops that may be grown in this area.

LAND TO THE WEST OF FARINGDON (FRCA reference 3304/21/99)

23. This area totals approximately 39 hectares of land located on the western fringes of Faringdon. The site is effectively split into two by the B4019. In total, 18 borings and 1 soil pit were described. The survey area relates to the land originally described by the Vale of White Horse District Council as FRA 7 (to the south of the B4019) and FRA 8 (to the north).
24. The climatic details for the site are given in Table 4 below. The survey area lies at altitudes in the range 100–140m AOD. The highest land occurs south of the B4019 and falls through gentle gradients southwards. North of the B4019, gradient alone is sufficient to restrict land quality to Grade 4 and Subgrade 3b. The site is not affected by microrelief or flooding.

Table 4: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SU278948	SU282954
Altitude	m, AOD	135	90
Accumulated Temperature	day°C (Jan-June)	1370	1421
Average Annual Rainfall	mm	693	681
Field Capacity Days	days	144	142
Moisture Deficit, Wheat	mm	101	107
Moisture Deficit, Potatoes	mm	91	98
Overall climatic grade	N/A	Grade 1	Grade 1

25. The geology of the site is best described in two parts. North of the B4019, the shoulder of the scarp slope is mapped as Corallian limestone, over a very short distance this is succeeded by Corallian silt and sand, which forms the steep scarp slope, on the lower slopes and flatter lying land Oxford Clay and alluvium is shown. South of the B4019, the Corallian limestone passes to Corallian Clay and then back to Corallian limestone.
26. The soils are mapped as the Fyfield 4 and Denchworth association to the north and Kingston, and Elmton 1 association to the south (SSEW, 1983.). These soil associations are described in paragraphs 9–12.
27. The agricultural land at this site has been classified as Subgrade 3b (moderate quality) and Grade 4 (poor quality). The main limitations to land quality are soil wetness and gradient. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 5, below.

Subgrade 3b

28. Subgrade 3b agricultural land is limited by a significant soil wetness and gradient limitation. South of the B4019, on the lower lying land, soils developed upon the Oxford Clay and alluvium, comprise non-calcareous heavy silty clay loam or heavy clay loam topsoils which directly overlie poorly structured clayey subsoils which act to impede drainage. The soils are similar to those from an adjacent survey (FRCA reference 3304/165/95). These slowly permeable horizons are found at depths of 20–35 cm which assigns these soils to Wetness

Class IV. This combination of poor drainage, heavy topsoil textures and the prevailing climate means that this land is subject to significant restrictions on the flexibility of cropping, stocking and cultivations. Similarly, the soils developed over the Corallian clay south of the B4019 are also poor draining. Pit 1 (see Appendix II) is typical of these soils and confirmed the existence of poorly structured clay subsoils. The depth to these slowly permeable clayey horizons is in the range 25–50 cm, this assigns these soils to Wetness Class IV or III. These poor to imperfect draining soils and the heavy textured subsoils, interact with the local climate to effect the range of crops which can be grown and the level of yield. A significant soil wetness limitation can also affect the ease with which mechanised operations can be carried out or the advisability of grazing by livestock.

Table 5: Land to the west of Faringdon (FAR 7 and FAR 8) - Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3b	36.2	96.3	95.0
4	1.4	3.7	3.7
Other land	0.5	-	1.3
Total surveyed area	37.6	100	98.7
Total site area	38.1	-	100

29. Gradient alone affects land north of the B4019 on the slopes of the Corallian Scarp. Gradients were measured in the range 7–11° which restricts such land to Subgrade 3b. Gradients in excess of this were also recorded limiting land quality to Grade 4. Steep slopes restrict the safe and efficient use of certain agricultural machinery and so limit the range of crops that may be grown in this area.

LAND TO THE SOUTH OF FARINGDON (FRCA reference 3304/20/99)

30. This area totals approximately 20 hectares of land to the south of Faringdon. In total, 16 borings and 1 soil pit were described. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II. The survey comprises part of the total area originally described by the Vale of White Horse District Council as FRA 4 and FRA 5.
31. The climatic details for the site are given in Table 6 below. The survey area lies between approximately 100–125m and includes a variety of topographic elements - crest top, mid-slopes and valley bottom features. In some areas, a gradient limitation exists. The site is not affected by microrelief or flooding limitations.

Table 6: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SU293945	SU286941
Altitude	m, AOD	110	125
Accumulated Temperature	day°C (Jan-June)	1398	1381
Average Annual Rainfall	mm	687	690
Field Capacity Days	days	142	143
Moisture Deficit, Wheat	mm	105	102
Moisture Deficit, Potatoes	mm	96	93
Overall climatic grade	N/A	Grade 1	Grade 1

32. The geology of the site is mapped mostly as Faringdon Sponge Gravels with Corallian clay in the west.
33. The site is mapped entirely as soils of the Fyfield 4 association (SSEW, 1983). The soils of this association are in paragraph 10.
34. The agricultural land at this site has been classified as Grade 2 (very good quality), Subgrade 3a (good quality), Subgrade 3b (moderate quality) and Grade 4 (poor quality). The main limitations to land quality are soil droughtiness, soil wetness and gradient. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 7, below.

Grade 2

35. Grade 2 agricultural land occurs in the minor dry valley feature in the centre of the site. It is mostly classified on the basis of soil droughtiness with soil workability to a lesser extent. The soils are well drained (Wetness Class 1) and comprise medium or sandy clay loam topsoils which contain up to 5% hard rock. These pass to a medium sandy loam or sandy clay loam or heavy clay loam with 5–10% hard rock, and to clay or sandy clay loam or loamy medium sand lower subsoils which may contain 2–30% hard rock. Occasionally, these profiles were impenetrable over gravel type material. An adjacent survey (FRCA ref: 3304/231/94), confirmed the gravel material to be 50% total hard rock in pit 1. The combination of soil

textures and subsoil stone contents cause these freely draining soils to have a short fall of available water, given the prevailing climatic regime. This may effect the consistency and level of yield, particularly in drier years. Where topsoil texture is heavier this results in a soil workability limitation. In addition, there are profiles which are better quality, however, these were not extensive enough to map out separately at this scale.

Table 7: Land to the south of Faringdon (part FAR 4 and FAR 5) - Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	6.0	32.1	31.1
3a	6.4	34.2	33.2
3b	5.7	30.5	29.5
4	0.6	3.2	3.1
Other land	0.6	—	3.1
Total surveyed area	18.7	100	96.9
Total site area	19.3	—	100

Subgrade 3a

36. Subgrade 3a land is a stonier variant of the Grade 2 land described above. Pit 1 (see Appendix II) is typical of these soils which is calcareous with medium sandy loam textures and an increasing stone content with depth. At 72 cm, the pit was impenetrable over a fossiliferous medium sandstone. Roots extended down to this depth and moisture balance calculations which take account of these soil characteristics and the prevailing climate indicate that Subgrade 3a is appropriate. The resulting drought stress may be more acute than that experienced by the Grade 2 soils above.

Subgrade 3b

37. The Subgrade 3b land in the north suffers from a significant soil wetness limitation related to heavy clay loams over gleyed, slowly permeable clays. Elsewhere, gradient is the main limitation.

Grade 4

38. This unit picks out an area of recently disturbed land amidst what would otherwise be wet, heavy Subgrade 3b soils. The disturbance has created a very varied soil resource. In places, clay subsoils have come to the surface in the absence of topsoil, whilst heavily compacted clay subsoils or very stony topsoils or subsoils occur. These conditions would severely limit access to the land to perform agricultural operations as well as limiting both the range of crops and crop yields.

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SOURCES OF REFERENCE

British Geological Survey (1971) *Sheet 253. Abingdon. Drift Edition, 1:63,360 Scale.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

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

Soil Survey of England and Wales (1983) *Sheet 6 Soils of South East England. 1:250,000 Scale*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England SSEW:*
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 DATA FOR INDIVIDUAL SITES

Contents:

Soil abbreviations - explanatory note

Sample location map for each site

Soil pit and soil boring descriptions (boring and horizon levels) by site

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF:** national 100 km grid square and 8 figure grid reference.

2. **USE:** Land use at the time of survey. The following abbreviations are used:

ARA:	Arable	WHT:	Wheat	BAR:	Barley
CER:	Cereals	OAT:	Oats	MZE:	Maize
OSR:	Oilseed rape	BEN:	Field beans	BRA:	Brassicacae
POT:	Potatoes	SBT:	Sugar beet	FCD:	Fodder crops
LIN:	Linseed	FRT:	Soft and top fruit	FLW:	Fallow
PGR:	Permanent pasture	LEY:	Ley grass	RGR:	Rough grazing
SCR:	Scrub	CFW:	Coniferous woodland	OTH:	Other
DCW:	Deciduous woodland	BOG:	Bog or marsh	SAS:	Set-Aside
HTH:	Heathland	HRT:	Horticultural crops	PLO:	Ploughed

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

4. **GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.

5. **AP (WHEAT/POTS):** Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted MD)

7. **DRT:** Best grade according to soil droughtiness.

8. 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				

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

OC:	Overall Climate	AE:	Aspect	ST:	Topsoil Stoniness
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
EX:	Exposure				

Soil Pits and Auger Borings

1. **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)

2. **MOTTLE COL:** Mottle colour using Munsell notation.

3. **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% +

4. **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

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

6. **GLEYS:** If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

7. **STONE LITH:** Stone Lithology - one of the following is used:

HR:	all hard rocks and stones	FSST:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	CH:	chalk
MSST:	soft, medium grained sandstone	GS:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock	GH:	gravel with non-porous (hard) stones

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **STRUCT:** the degree of development, size and shape of soil peds are described using the following notation:

Degree of development	WK:	weakly developed	MD:	moderately developed
	ST:	strongly developed		
Ped size	F:	fine	M:	medium
	C:	coarse		
Ped shape	S:	single grain	M:	massive
	GR:	granular	AB:	angular blocky
	SAB:	sub-angular blocky	PR:	prismatic
	PL:	platy		

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

L: loose	FM: firm	EH: extremely hard
VF: very friable	VM: very firm	
FR: friable	EM: extremely firm	

10. **SUBS STR:** Subsoil structural condition recorded for the purpose of calculating profile droughtiness:
G: good M: moderate P: poor

11. **POR:** Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

12. **IMP:** If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

13. **SPL:** Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

14. **CALC:** If the soil horizon is calcareous, a 'Y' will appear in this column.

15. Other notations:

APW: available water capacity (in mm) adjusted for wheat
APP: available water capacity (in mm) adjusted for potatoes
MBW: moisture balance, wheat
MBP: moisture balance, potatoes

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M. REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
8	SU28909610	PGR NE	4	50 50	3 3B	100	-4	112	17	3A			WE	3B	SPL49/50CM
10	SU29109610	ARA		30 30	4 3B	81	-23	83	-12	3B			WE	3B	SPL30CM
16	SU29709610	WHT N	1		1 1	77	-27	77	-18	3B			TS	3B	IMP48AT2P
17	SU29009600	PGR		30 40	3 3A	99	-5	109	14	3A			WE	3A	SPL40
23	SU29609600	WHT E	1	67 67	2 2	117	13	118	23	2			WD	2	IMP90SPL67CM
25	SU29809600	WHT E	1	26 26	4 3B	87	-17	93	-2	3A			WE	3B	SPL26SEE1P
31	SU29509590	WHT E	1	27 27	4 3B	86	-18	91	-4	3A			WE	3B	SPL27SEE1P
33	SU29709590	WHT NW	3	25 25	4 3B	84	-20	90	-5	3A			WE	3B	SPL25SEE1P
35	SU29009580	PGR N	4	82 82	1 1	146	42	115	20	1				1	
37	SU29209580	PGR			1 2	81	-23	84	-11	3B			DR	3A	I55QMSEE2P
39	SU29409580	WHT NW	3	30 30	4 3B	86	-18	92	-3	3A			WE	3B	SPL30SEE1P
42	SU29309570	PGR E	2		1 1	66	-38	66	-29	3B			DR	3B	IMP42SEE2P
1P	SU29509590	WHT N	3	28 28	4 3B	84	-20	87	-8	3A			WE	3B	PITATAB31
2P	SU29309570	PGR			1 2	82	-22	93	-2	3B			DR	3A	PIT70CM

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS						
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR	POR	IMP	SPL	CALC
8	0-20	HZCL	10YR42						0	0	0							
	20-50	C	25Y 53						0	0	0		M					
	50-70	C	25Y 53	10YR56	C			Y	0	0	0		P				Y	
10	0-30	HCL	10YR42						0	0	0							
	30-52	C	25Y 52	10YR56	C			Y	0	0	0		P				Y	
16	0-29	MZCL	10YR43						16	0	HR	25						Y
	29-37	C	10YR44						0	0	HR	2		M				Y
	37-48	C	10YR54						0	0	HR	30		M				Y
17	0-30	MZCL	10YR42	10YR56	C			Y	0	0	HR	2						
	30-40	HZCL	10YR52	10YR56	M			Y	0	0	0			M				
	40-70	ZC	10YR53	10YR56	C			Y	0	0	0			P			Y	
23	0-33	MZCL	10YR43						0	0	HR	3						
	33-67	C	10YR54						0	0	HR	3		M				
	67-90	C	25Y64	10YR58	M D			Y	0	0	0			P			Y	
25	0-26	MZCL	10YR42	10YR42	C F			Y	0	0	HR	1						
	26-60	C	25Y6162	25Y66	M D			Y	0	0	0			P			Y	
31	0-27	MZCL	10YR42						0	0	HR	2						
	27-60	C	25Y6162	25Y66	M D			Y	0	0	HR	5		P			Y	
33	0-25	MZCL	10YR42						0	0	HR	3						
	25-60	C	25Y6162	25Y66	M D			Y	0	0	HR	5		P			Y	
35	0-30	MCL	10YR32						0	0	HR	2						
	30-60	HCL	25Y 52						0	0	HR	2		M				
	60-82	SC	10YR54						0	0	HR	2		M				
	82-120	SC	10YR64	10YR56	C			Y	0	0	0			P			Y	
37	0-20	HCL	10YR42						0	0	HR	2						Y
	20-55	C	25Y 53						0	0	HR	10		M				Y
39	0-30	MZCL	10YR42						0	0	HR	4						
	30-60	C	25Y6162	25Y66	C D			Y	0	0	HR	5		P			Y	
42	0-15	HCL	10YR42						0	0	HR	3						Y
	15-34	C	25Y43						0	0	HR	5		M				Y
	34-42	C	25Y53						0	0	HR	25		M				Y
1P	0-28	MZCL	10YR42						0	0	HR	2						
	28-55	C	25Y 62	25Y 66	M			Y	0	0	HR	2	MDCAB	FM P	Y		Y	NOT POROUS
2P	0-27	HCL	10YR42						0	0	HR	5						Y
	27-70	C	25Y64						0	0	HR	26		M				Y

STONES=26%HR+10%S

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST		CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT	
2	SU28209550	RGR SW	3	0 20	4	3B	81	-26	84	-14	3B				WE 3B	SPL1P-165/95
4	SU28109540	RGR		20 20	4	3B	81	-26	84	-14	3B				WE 3B	SPL1P-165/95
5	SU28209550	RGR		20 35	4	3B	87	-20	92	-6	3B				WE 3B	SPL1P-165/95
7	SU28009530	WHT		27 27	4	3B	85	-22	91	-7	3B				WE 3B	SPL1P-165/95
10	SU28009520	WHT N	1	29 29	4	3B	85	-22	91	-7	3B				WE 3B	SPL1P-165/95
13	SU27809500	CER		26 26	4	3B	99	-3	104	12	3A				WE 3B	SPL1P-165/95
14	SU27709490	OSR N	4	26 26	4	3B	85	-17	91	-1	3A				WE 3B	SPL1P-165/95
16	SU27709480	OSR S	3	27 55	3	3B	93	-9	104	12	3A				WE 3B	SPL1P-165/96
17	SU27809480	OSR		20 20	4	3B	81	-21	87	-5	3B				WE 3B	SPL1P-165/96
19	SU27709470	OSR S	6	20 20	4	3B	82	-20	88	-4	3A				WE 3B	SPL1P-165/96
21	SU27609460	PGR S	1	0 50	3	3B	102	0	114	22	3A				WE 3B	SPL1P-165/96
22	SU27709460	PGR S	2	0 39	4	3B	89	-13	95	3	3A				WE 3B	SPL1P-165/96
23	SU27509450	WHT		40 40	4	3B	89	-13	93	1	3A				WE 3B	SPL-SEE1P
25	SU27709450	PGR		50 50	3	3B	88	-14	100	8	3A				WE 3B	SPL-49/50
27	SU27909450	PLO		35 35	4	3B	82	-20	85	-7	3A				WE 3B	SPL-SEE1P
29	SU27809440	PLO		35 35	4	3B	83	-19	84	-8	3A				WE 3B	SPL-SEE1P
31	SU28009440	PLO		25 25	4	3B	79	-23	82	-10	3B				WE 3B	SPL-SEE1P
35	SU28009420	PLO		35 35	4	3B	83	-19	85	-7	3A				WE 3B	SPL-SEE1P
1P	SU28009420	WHT		32 32	4	3B	87	-15	90	-2	3A				WE 3B	PITATAB35

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS					
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR	POR	IMP	SPL
2	0-20	HZCL	10YR42	10YR56		C		Y	0	0	0						
	20-55	C	25Y 52	10YR56		M		Y	0	0	0		P				Y
4	0-20	MZCL	10YR42						0	0	0						
	20-55	C	25Y 52	10YR56		M		Y	0	0	0		P				Y
5	0-20	MZCL	10YR42						0	0	0						
	20-35	C	25Y 53	10YR56		C		Y	0	0	0		M				
	35-58	C	25Y 63	10YR56		M		Y	0	0	0		P				Y
7	0-27	HCL	10YR42						0	0	HR	2					
	27-60	C	25Y6163	25Y66		M D		Y	0	0	0		P				Y
10	0-29	HCL	10YR42						0	0	HR	3					
	29-60	C	25Y6163	25Y66		M D		Y	0	0	0		P				Y
13	0-26	HCL	10YR42						0	0	HR	1					
	26-55	C	10YR52	10YR56		C F		Y	0	0	0		P				Y
	55-80	C	10YR61	10YR58		M D		Y	0	0	0		P				Y
14	0-26	HCL	10YR42						0	0	HR	1					
	26-44	C	10YR61	10YR58		C D		Y	0	0	0		P				Y
	44-60	C	10YR61	10YR58		M D		Y	0	0	0		P				Y
16	0-27	HCL	10YR42						0	0	HR	5					
	27-55	MSL	10YR53	10YR58		C D		Y	0	0	HR	10		M			
	55-70	C	25Y 61	10YR58		M D			0	0	0		P				Y
17	0-20	HCL	10YR42						0	0	HR	2					
	20-45	C	10YR61	10YR58		C D		Y	0	0	HR	2		P			Y
	45-60	C	10YR61	10YR58		M D		Y	0	0	0		P				Y
19	0-20	HCL	10YR42						0	0	HR	1					
	20-45	C	25Y61	10YR46		C D		Y	0	0	0		P				Y
	45-60	C	25Y 61	10YR58		C D		Y	0	0	0		P				Y
21	0-31	HZCL	10YR53	10YR46		C D		Y	0	0	HR	2					
	31-50	C	10YR54	10YR54		C D		S	0	0	HR	2		M			
	50-70	C	25Y61	10YR58		M D		Y	0	0	0		P				Y
22	0-26	HCL	25Y51	10YR46		C D		Y	0	0	0						
	26-39	C	10YR54	25Y51		C D		S	0	0	0		M				
	39-60	C	25Y61	10YR58		M D		Y	0	0	0		P				Y
23	0-25	HZCL	10YR54						0	0	HR	2					
	25-40	C	10YR5456						0	0	0		M				
	40-57	C	10YR53	10YR56		C D		Y	0	0	0		P				Y

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			CALC		
				COL	ABUN	CONT		GLEY	>2	>6		LITH	TOT	STR		POR	IMP
25	0-25	C	75YR54						0	0	HR	2					
	25-50	C	75YR64						0	0		0		M			
	50-70	C	75YR63	75YR66		C		Y	0	0		0		P		Y	
27	0-25	HCL	10YR53						0	0	HR	2					
	25-35	C	75YR53						0	0	HR	2		M			
	35-55	C	75YR53	75YR56		M		Y	0	0	HR	2		P		Y	
29	0-25	HZCL	75YR42						0	0	HR	2					
	25-35	C	75YR53						0	0	HR	2		M			
	35-52	C	75YR53	75YR56		C		Y	0	0		0		P		Y	
31	0-25	MCL	10YR43						0	0	HR	5					
	25-55	C	75YR53	75YR56		M		Y	0	0		0		P		Y	
35	0-25	HZCL	75YR42						0	0	HR	2					
	25-35	C	75YR53						0	0	HR	1		M			
	35-52	C	75YR53	75YR56		M		Y	0	0		0		P		Y	
1P	0-32	HZCL	10YR43						0	0	HR	2					N
	32-55	C	25Y61	10YR58		M D		Y	0	0		0	MDCAB	FM P	Y	Y	N

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M. REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
1	SU29409480	SAS		45 45	3 3B	98	-7	107	11	3A		Y	DS	4	DISTURBED
1A	SU29459479	SAS		30 30	4 3B	85	-20	88	-8	3A			WE	3B	SEE2P-231/94
3	SU29609480	SAS	W	2 27 27	4 3B	81	-24	87	-9	3B			WE	3B	SEE2P-231/94
5	SU29559475	SAS	E	2 49 49	3 3B	99	-6	111	15	3A			WE	3B	SEE2P-231/94
6	SU29189456	FAL			1 2	130	25	116	20	2			WD	2	IMP100QDR+WK
7	SU29299460	FAL			1 1	142	37	106	10	1				1	VALLEY
8	SU29209450	FAL			1 1	134	29	107	11	2			DR	2	
9	SU29299445	FAL			1 1	149	44	110	14	1				1	VALLEY
10	SU28949428	OSR			1 1	87	-18	92	-4	3A			DR	3A	I70-SEE1P231/9
11	SU29169441	OSR	E	1	1 1	136	31	112	16	1				1	BORDER GR2
12	SU29009430	OSR	E	2	1 1	116	11	101	5	2			DR	2	SEE1P231-94
13	SU29109430	OSR	E	2	1 1	105	0	112	16	3A			DR	2	IMP78PROBG2
14	SU28619420	PGR			1 1	113	8	79	-17	3A			DR	3A	SEE1P
15	SU29009430	OSR			1 1	63	-42	63	-33	3B			DR	3B	IMP40MIDSLOPE
16	SU28509410	WHT		90	1 1	144	39	112	16	1				1	WE 90CM+
17	SU28609410	ARA			1 1	110	5	99	3	1			DR	2	IMP100-SEE1P
1P	SU28699412	PGR			1 1	86	-16	93	-13	3A			DR	3A	PIT72AUG90IMP

SAMPLE	DEPTH	TEXTURE	COLOUR	---MOTTLES---		PED		----STONES----				STRUCT/		SUBS		CALC	
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR		IMP
1	0-30	HZCL	10YR42							0	0	HR	2				
	30-45	HZCL	10YR53							0	0	HR	2		M		
	45-65	C	10YR53	10YR56	M			Y	0	0		0		P		Y	PLASTIC
1A	0-30	HZCL	10YR53							0	0	HR	2				
	30-55	C	25Y 63	10YR56	M			Y	0	0		0		P		Y	PLASTIC
3	0-27	HCL	10YR43							3	0	HR	10				Y
	27-60	C	10YR41	10YR68	C	D		Y	0	0		0		P		Y	Y
5	0-30	HCL	10YR43							0	0		0				
	30-49	C	10YR56							0	0	HR	2		M		
	49-70	C	10YR53	10YR58	M	D		Y	0	0		0		P		Y	PLASTIC
6	0-30	HCL	10YR42							0	0	HR	2				
	30-68	HCL	75YR44							0	0	HR	2		M		
	68-80	SC	75YR53							0	0	HR	5		M		
	80-100	SCL	75YR43							0	0	HR	20		M		
7	0-30	SCL	75YR43							0	0	HR	5				
	30-80	SC	75YR53							0	0	HR	5		M		
	80-120	SC	75YR53							0	0	HR	10		M		
8	0-20	MCL	10YR43							0	0	HR	5				
	20-60	SCL	75YR44							0	0	HR	5		M		
	60-80	C	75YR53							0	0	HR	2		M		
	80-120	C	10YR53							0	0	HR	2		M		
9	0-30	MCL	75YR44							0	0	HR	2				
	30-80	SCL	75YR43							0	0	HR	5		M		
	80-120	HCL	75YR53							0	0	HR	2		M		
10	0-30	SCL	10YR43							0	0	HR	5				
	30-50	MSL	75YR44							0	0	HR	10		M		
	50-60	LMS	75YR56							0	0	HR	25		M		
	60-70	LMS	75YR56							0	0	HR	50		M		SEE1P-231/94
11	0-29	MCL	10YR43							0	0	HR	5				
	29-52	SCL	10YR44							0	0	HR	2		M		
	52-120	C	75YR5646							0	0	HR	2		M		
12	0-29	SCL	10YR43							0	0	HR	5				
	29-68	MSL	75YR46							0	0	HR	10		M		
	68-120	LMS	75YR5846							0	0	HR	30		M		Y
13	0-28	MCL	10YR44							0	0	HR	5				
	28-58	HCL	10YR4644							0	0	HR	5		M		
	58-78	C	75YR4446							0	0	HR	3		M		

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----		PED		----STONES----			STRUCT/ CONSIST	SUBS					
				COL	ABUN	CONT	COL.	GLE	>2	>6		LITH	TOT	STR	POR	IMP	SPL
14	0-29	SCL	10YR43					0	0	HR	5						
	29-75	LMS	75YR46					0	0	HR	15			M			
	75-120	SCL	75YR5646					0	0	HR	20			M			
15	0-31	SCL	10YR43					0	0	HR	5						
	31-40	MSL	10YR46					0	0	HR	5			M			IMP40CM+MIDSLOPE
16	0-30	MCL	10YR43					0	0	HR	5						
	30-60	MCL	10YR44					0	0	HR	5			M			
	60-90	HCL	10YR54					0	0	HR	5			M			
	90-120	C	10YR53	10YR58		C	D	Y	0	0	HR	2		M			
17	0-30	SCL	75YR44					0	0	HR	5						
	30-50	MSL	75YR54					0	0	HR	10			M			
	50-80	SCL	75YR53					0	0	HR	25			M			
	80-100	C	10YR63					0	0	HR	33			M			
1P	0-30	MSL	10YR44					0	0	HR	15						Y
	30-52	MSL	75YR44					0	0	HR	20			M			Y
	52-72	MSL	10YR54					0	0	MSST	30			M			Y