Torridge Local Plan

Holsworthy

Agricultural Land Classification
September 1996

Resource Planning Team
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ADAS Bristol

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Land Use Planning U it

TORRIDGE LOCAL PLAN

HOLSWORTHY

AGRICULTURAL LAND CLASSIFICATION SURVEY

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HOLSWORTHY

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1 This report presents the findings of a semi detailed Agricultural Land Classification (ALC) survey of 229 ha of land at Holsworthy Field survey was based on 88 auger borings and 4 soil profile pits and was completed in September 1996

2 The survey was conducted by the Resource Planning Team of ADAS Taunton Statutory Group on behalf of MAFF Land Use Planning Unit in its statutory role in the preparation of Torridge Local Plan

3 Information on climate geology and soils and from previous ALC surveys was considered and is presented in the relevant section Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as a mix of Grades 3 and 4 with Grade 3 along the eastern and northern fringes of the town and Grade 4 in the west and beyond the Grade 3 the river valley in the west was previously surveyed in 1981 at a scale of 1 25 000 (ADAS 1981) However the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) and supersedes any previous ALC survey Grade descriptions are summarised in Appendix I

4 At the time of survey land cover was permanent grazing An area of 4 2 ha of agricultural land at Trewyn was not surveyed because there was evidence of building development despite the rest of the field still being grazed Other land which was not surveyed included playing fields industrial development and urban areas

SUMMARY

5 The distribution of ALC grades is shown on the accompanying 1 20 000 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 Holsworthy

Grade	Area (ha)	% Surveyed Area (191 6 ha)
3a	2 4	1 3
3b	170 6	89 0
4	13 0	6 8
5	1 4	0 7
Agricultural land not surveyed	4 2	2 2
Other land	37 4	
Total site area	229 0	

6 Only one small area of Subgrade 3a with a moderate workability limitation was mapped The rest of the area is downgraded by wetness limitations to Subgrade 3b and Grade 4 with isolated steep slopes mapped as Grades 4 and 5

CLIMATE

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

8 Since the ALC grade of land is determined by the most limiting factor present overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions Parameters used for assessing overall climate are accumulated temperature a measure of relative warmth and average annual rainfall a measure of overall wetness The results shown in Table 2 indicate that there is an overall climatic limitation which limits the land to Grade 2 over the majority of the site and Subgrade 3a above 150m

9 Climatic variables also affect ALC grade through interactions with soil conditions The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes which are compared with the moisture available in each profile in assessing soil droughtiness limitations These are described in later sections A critical boundary of 250 FC Days was found at 150m

Table 2 Climatic Interpolations Holsworthy

Grid Reference		SS347040	SS349040
Altitude (m)		130	150
Accumulated Temperature (day °C)		1459	1436
Average Annual Rainfall (mm)		1220	1255
Overall Climatic Grade		2	3a
Field Capacity Days		249	254
Moisture deficit (mm)	Wheat	71	66
	Potatoes	55	50

RELIEF

10 Altitude ranges from 105 metres at Rydon in the West to 150 metres at Court Farm and Crosspark Cross with narrow bands of limiting slopes along the valleys

GEOLOGY AND SOILS

11 The underlying geology of the site is shown on the published geology map (IGS 1974) All of the site is underlain by the Bude formation which is heavily faulted The majority of the site is mapped as mainly sandstone with areas of mainly shale mapped in the north, west and around Waterloo Recent deposits of aluminium and terrace deposits are mapped along the streams The geology was reflected in the findings of the survey

12 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1 250 000 (SSEW 1983) as the Neath soils broadly following the sandstones of the Bude formation and Hallsworth 2 Association over the Shales More detailed soils information is also available in the 1 25 000 scale survey of Holsworthy area (SSEW 1977) This more detailed soils map shows a similar pattern to the smaller scale map with Holsworthy and Neath series soils over the sandstone and Tedburn over the shales Hellions is found along the streams

13 The Neath Association is described as well drained fine loamy soils over rock with similar soils with permeable subsoils and slight seasonal waterlogging The Hallsworth 2 Association is described as slowly permeable seasonally waterlogged clayey fine loamy and fine silty soils The Tedburn series is identified as stony clayey soils over shaley drift containing sandstone and siltstone whereas the Holsworth/Neath series is a stony fine loamy soil over drift containing sandstone and siltstone The Hellions series is identified as a stoneless fine loamy soil over river alluvium

14 The majority of the soils found in the current survey were stony and poorly drained The stones were variably shale and sandstone

AGRICULTURAL LAND CLASSIFICATION

15 The distribution of ALC grades found by the current survey is shown on the accompanying 1 20 000 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

16 A small area of Subgrade 3a is mapped The soils here are slightly stony but well drained They are assessed as Wetness Class I (see Appendix II) and with medium clay loam topsoils experience a moderate workability limitation

Subgrade 3b

17 The majority of the site is mapped as Subgrade 3b There are isolated areas where gradients were measured between 8 and 11° imposing a moderate limitation to agriculture The main limitation to these soils is from a moderate wetness limitation partly imposed by the high Field Capacity Day value for the area Many of the soils were impenetrable to the auger at variable depths but soil pits showed that subsoils were either slowly permeable or waterlogged for extended periods The soils were variably assessed as Wetness Classes II III and IV The topsoil textures were noted to be medium clay loams although PSD analysis

showed that the clay content of topsoils from the pit locations were 26% and 27% and hence borderline medium/heavy clay loam Thus in some cases the soils may actually be slightly worse than subgrade 3b However there are also some patches of slightly better soils within the areas mapped as Subgrade 3b Pit 4 showed that not all impenetrable areas have wetness limitations This stony pit had no evidence of wetness within 70cm The pit may represent certain areas on higher land but nearby profiles showed that poorly drained clay exist in the subsoils at varying depths The variability of the soil combined with the borderline topsoil texture suggest that Subgrade 3b is overall most representative of the area The low moisture deficits for the area mean that draughtiness is not a limitation to the soils The river valley at Rydon is mapped as Subgrade 3b rather than Grade 4 as in the previous survey (ADAS 1981) because under the Revised Guidelines the presence of relatively light topsoils allow the better grade despite the high FCD value The area of agricultural land not surveyed at Trewyn is likely to be Subgrade 3b based on surrounding evidence

Grades 4 and 5

18 Small areas along streams are mapped as Grade 4 where there is a severe wetness limitation (Wetness Class V) The remaining areas of Grade 4 have serious gradient limitations with slopes between 12 and 18 There is a small area near Bodmin Street where slopes of over 18° impose a very severe limitation to agricultural versatility and hence Grade 5

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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

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Holsworthy	Pit 1 (ASP 39)	0	PGR	Av Rainfall 1222 mm ATO 1459 day C FC Days 149 Climatic Grade 2 Exposure Grade 1	Bude Formation mainly sandstone
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
26/96	18/9/96	SS 3490 0470	GMS/SC		GMS 561

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	10YR42	2% HR (VIS)	FDFO 10YR56 RR	NONE					MVF		Gradual Smooth
2	35	MCL	10YR43	4% > 2cm (S) 5% > 2mm (VIS) 9% HR TOTAL	NONE	NONE	WCSAB	Friable	MOD	GOOD	CVF		Clear Smooth
3	65+	C	2 5Y63	Patches of Weathered Shale	MDFO 10YR58 becoming CDFO with depth	FEW	MCPr (less well developed where shale present)	FIRM	POOR	POOR	FVF		

Profile Gleyed From 35cm

Depth to Slowly Permeable Horizon 35cm

Wetness Class IV

Wetness Grade 3b

Available Water Wheat 98 mm

Potatoes 103 mm

Moisture Deficit Wheat 71 mm

Potatoes 55 mm

Moisture Balance Wheat 27 mm

Potatoes 48 mm

Droughtiness Grade 2 (Calculated to 80 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Topsoil clay content 27%

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Holsworthy	Pit 2 (ASP26)	1 North	PGR	Av Rainfall 1229 mm ATO 1459 day C FC Days 149 Climatic Grade 2 Exposure Grade 1	Bude Formation mainly sandstone
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
26/96	18/9/96	SS 34600485	GMS/SC		GMS 562

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	28	MCL	10YR42	<1% HR VIS	CDFO 10YR56	NONE					MVF		Abrupt Smooth
2	40	HCL	2 5Y63	< 1% HR (VIS)	MDFO 10YR56	NONE	MCPr	Friable	MOD	POOR	CVF		Clear Smooth
3	65	C	2 5Y61	5 / HR (VIS)	CDFO 2 5YR46	NONE	MCAB tending to Prismatic	FIRM	POOR	POOR	CVF		

Profile Gleyed From Surface

Depth to Slowly Permeable Horizon 28cm

Wetness Class IV/V

Wetness Grade 3b/4

Available Water	Wheat	128 mm
	Potatoes	106 mm
Moisture Deficit	Wheat	71 mm
	Potatoes	55 mm
Moisture Balance	Wheat	57 mm
	Potatoes	51 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b/4

Main Limiting Factor(s) Wetness

Remarks Sandstone
Topsoil clay content 26%

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Holsworthy	Pit 3 (ASP 109)	2 North East	PGR	Av Rainfall 1220 mm ATO 1459 day C FC Days 249 Climatic Grade 2 Exposure Grade 1	Bude Formation mainly sandstone
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
26/96	19/9/96	SS 3365 0350	GMS/SC		GMS 563

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	22	MCL	10YR42	4 / >2cm ( ) 8% TOTAL HR	FFFO	NONE					MVF		Clear Smooth
2	50	MCL	10YR43	12 % > 2cm (S) 15 % > 2mm (VIS) 27% TOTAL HR	FFFO	NONE	WMSAB	Friable	GOOD	GOOD	MVF		Clear Wavy
3	80+	C	10YR51/ 61	40% SHALE (ZR) V WEATHERED	Variable in places CDFO 7 5YR58	NONE	Where predom Clay MDCSAB Mainly WCSAB	Friable	MOD	GOOD	CVF		

Profile Gleyed From 50cm in patches

Depth to Slowly Permeable Horizon 50cm in patches

Wetness Class II/III

Wetness Grade 3b

Available Water Wheat 114 mm

Potatoes 106 mm

Moisture Deficit Wheat 71 mm

Potatoes 55 mm

Moisture Balance Wheat 43 mm

Potatoes 51 mm

Droughtiness Grade 1 (Calculated to 100 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Horizon 3 variable due to patches of weathered shale Overall some wetness limitation hence 3b Topsoil clay content 26 %

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Holsworthy	Pit 4 (Asp 88 89)	3 North West	PGR	Av Rainfall	1220 mm	Bude Formation mainly sandstone
				ATO	1459 day C	
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days	254	SOIL SAMPLE REFERENCES
26/96	20 9 96	SS 35000405	GMS/SC	Climatic Grade	3a	GMS 564
				Exposure Grade	1	

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/ HCL	10YR42	2% > 2cm 8% HR Total (VIS)	RRC	NONE					MVF		Clear Smooth
2	70+	HCL	10YR53	20 % > 2cm (S) 20% > 2mm (VIS) 40 / HR TOTAL	NONE	NONE	WFSAB	Friable	GOOD	GOOD	CVF		

Profile Gleyed From Not gleyed

Depth to Slowly Permeable Horizon No SPL

Wetness Class I

Wetness Grade 3a/3b

Available Water	Wheat	115 mm
	Potatoes	98 mm
Moisture Deficit	Wheat	71 mm
	Potatoes	55 mm
Moisture Balance	Wheat	44 mm
	Potatoes	43 mm

Droughtiness Grade 1 (Calculated to 100 cm)

Final ALC Grade 3a/3b

Main Limiting Factor(s) Workability

Remarks Topsoil clay content 27% Thus pit represents certain areas on higher land but nearby profiles show that poorly drained clay exists in subsoils at varying depths The variability suggest 3b overall is most representative

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

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	**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%			

STRUCTURE Ped Development *

WA	Weakly adherent	**M**	Moderately developed
W	Weakly developed	**S**	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^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, 1974) for details