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BODMIN
AGRICULTURAL LAND CLASSIFICATION SURVEY

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BODMIN

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 180.5 ha of land at Bodmin. Field survey was based on 107 auger borings and 5 soil profile pits, and was completed in June 1997. During the survey 5 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 North Cornwall 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 all Grade 3 except a small area of Grade 4 at Halgavor Moor, the site was previously surveyed in 1979 at a scale of 1:25 000 (ADAS, 1979). 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. Several blocks of land around Bodmin had been resurveyed in 1991 and 1996 (ADAS, 1991, 1996) showing significant areas of Subgrade 3a. Account of this work has been taken in the presentation of the results of the current survey.
5. At the time of survey land cover was mainly grassland with a few areas of arable cropping. Other land which was not surveyed included areas already being developed, rough land in Scarlett's Well valley and urban land.

SUMMARY

6. The distribution of ALC grades is shown on the accompanying 1:15 000 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: Bodmin

Grade	Area (ha)	% Surveyed Area (142.9 ha)
3a	57.5	40
3b	64.1	45
4	18.3	13
5	3.0	2
Other land	37.6	
Total site area	180.5	

7. 40% of the agricultural land was best and most versatile, good quality land. The main limitation to the soils was a moderate workability limitation imposed by medium clay loam topsoils. These soils are well drained. The remaining agricultural land, Subgrade 3b, 4 and 5, has moderate wetness and moderate to severe gradient limitations. Two types of wetness limited profiles were found. At Halgavor the soils had slowly permeable layers, elsewhere the Subgrade 3b wet soils only exhibited gleying. The majority of the land limited by gradient is in the west of the site.

CLIMATE

8. 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.

9. 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 Subgrade 3a across the highest parts of the site (above 148 m at The Beacon and 143 m at Castle Canyke). However the lowest parts of the site qualify for Grade 1 below 70 m.

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

Table 2: Climatic Interpolations: Bodmin

Grid Reference	SX 069 664	SX 056 662	SX 070 662
Altitude (m)	150	50	135
Accumulated Temperature (day °C)	1460	1574	1477
Average Annual Rainfall (mm)	1281	1162	1261
Overall Climatic Grade	3a	1	2
Field Capacity Days	247	229	244
Moisture deficit (mm):			
Wheat	69	87	72
Potatoes	52	76	55

RELIEF

11. Altitude ranges from 50 metres at Laveddon to 166 metres at Castle Canyke with generally sloping land which in places limits the grade to Subgrade 3b, and Grades 4 and 5.

GEOLOGY AND SOILS

12. The underlying geology of the site is shown on the published geology map (IGS, 1982, 1974) as slate in the north and east with Staddon Grit in the Southern and Western sites. Drift deposits of Head, Valley Gravel and alluvium are mapped in the Halgavor Moor area. The recent survey found poorly drained soils in the Halgavor Moor area, with generally well-drained stony soils developed over the Grits and Slates.

13. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as mainly Denbigh 2 Association. At Halgavor Moor Yeolland Park Association is mapped. Small areas of the Manod and Sportsmans Association are mapped in the east.

14. Denbigh 2 Association is described as a well drained fine loamy soil over slate which is variably affected by ground water. Manod is also a well drained fine loamy or fine silty soil. Yeolland Park Association is described as fine loamy permeable soil variably affected by groundwater with some slowly permeable seasonally waterlogged clayey soils. Sportsmans Association is a slowly permeable seasonally waterlogged fine loamy soil.

15. The majority of soils found in the recent survey were related to the Denbigh Association, being generally well drained although some showed evidence of some seasonal waterlogging. At Halgavor Moor poorly drained soils were found with slowly permeable layers.

AGRICULTURAL LAND CLASSIFICATION

16. The distribution of ALC grades found by the current survey is shown on the accompanying 1:15 000 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. 57.5 ha of the survey area is mapped as good quality land. These soils are well drained, *Wetness Class I* (see Appendix II). The topsoils are generally medium clay loams although occasional heavy clay loams were found such as at Pit 5. Heavy clay loam topsoils would impose a greater workability limitation restricting land to Subgrade 3b but these were not considered to be widespread enough to map separately. Three soil profile pits were dug in these well drained soils, Pits 2, 4 and 5 supplementing information from previous surveys of adjacent land (ADAS 1991, 1996). These pits showed stony soils with some evidence of wetness (few mottles) particularly in the upper subsoil, but insufficient to downgrade the profiles. This limited wetness was found to vary over short distances and in Pit 2 one face showed mottling whilst the other did not. The soils in this unit are slightly droughty but the main limitation is a moderate workability limitation imposed by the medium clay loam topsoils and high field capacity day value in the area.

Subgrade 3b

18. Parts of the site have slopes over 7° up to 11° which affect the types of machinery that can be safely and efficiently operated and hence the versatility of the land. These areas are found in Scarlett's Well Valley, parts of The Beacon, Island Lanes and Castle Canyke.

19. Other areas mapped as Subgrade 3b have a wetness limitation. At Halgavor Moor medium clay loam topsoils lie over heavier stony material which is gleyed and has slowly permeable layers in the subsoils. These soils were assessed as Wetness Class III and IV. A soil profile pit was dug here to confirm the presence of the SPL. This was confirmed despite 30-40% small hard stones in the subsoil. Elsewhere Subgrade 3b has been mapped because the soils developed over Grits and Shales show indications of seasonal waterlogging. Whilst the soils mapped as Subgrade 3a and described by Pits 2, 4 and 5 (see above) show slight evidence of wetness, the soils which have been mapped as Subgrade 3b indicate a greater wetness limitation. Soil profile Pit 3 describes the soils. Again the soils show mottling at the boundary of the topsoil and upper subsoil but mottling continues down the profile indicating that the whole profile experiences waterlogging. These soils do not have slowly permeable layers in the subsoil, but were assessed as Wetness Class III because of the high field capacity day level in the area. This downgrades the soils to Subgrade 3b with medium clay loam topsoils. These soils were found mainly on higher land at The Beacon and St Lawrence, but also at Callywith Road.

Grades 4 and 5

20. Land with gradients over 11° were found in Scarletts Well Valley and north of Berrycombe Road. Where they exceeded 18° they are mapped as Grade 5, otherwise Grade 4. These slopes severely restrict agricultural versatility, primarily limiting the land to grazing. Grade 4 land is also mapped at Halgavor Moor. Here the soils are poorly drained and are assessed as Wetness Class IV with gleying and slowly permeable layers high in the profile. The topsoils are heavy clay loams. These soils experience a severe wetness limitation.

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August 1997

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APPENDIX I

DESCRIPTION OF GRADES AND SUBGRADES

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly include top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a - good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b - moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable. In most climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

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

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

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

Wetness Class I

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

Wetness Class II

The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but not wet within 40 cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31 and 90 days in most years.

Wetness Class IV

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

Wetness Class V

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

Wetness Class VI

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

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

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

Source: Hodgson, J M (In preparation) Soil Survey Field Handbook, Revised Edition.

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report. Terms used and abbreviations are set out below. These conform to definitions contained in the Soil Survey Field Handbook (Hodgson, 1974).

1. Terms used on computer database, in order of occurrence.

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

LAND USE: At the time of survey

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.

GLEYS, SPL: Depth in centimetres to gleying or slowly permeable layer.

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

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

DRT: Best grade according to soil droughtiness.

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

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

<u>Degree of development</u>	WK: Weakly developed	MD: Moderately developed
	ST: Strongly developed	
<u>Ped size</u>	F: Fine	M: Medium
	C: Coarse	VC: Very coarse
<u>Ped Shape</u>	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
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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.

SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE	Av Rainfall: 1261 mm	PARENT MATERIAL	
Bodmin		Pit 1 (ASP 144)	3° SW	PGR	ATO: 1477 day °C	Head and Valley Gravel	
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 229	PSD SAMPLES TAKEN	
37/97		12/6/97	SX 072 655	GMS/PB	Climatic Grade: 1	TS 0-25 cm MCL S:25; Z:50, C:25	
					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	10YR41	10% HR (VIS)	CRRC	None	-	-	-	-	MVF	-	Ab smooth
2	42	HCL	25Y73	30% HR (VIS)	MDMO 10YR68	None	MCSAB	Friable	Mod	P (low)	CM, F	-	Grad wavy
3	68+	ZC	5Y81	20% HR (VIS)	CDMO	None	WCSAB	Friable	Mod	P (low)	CM, F	-	

Profile Gleyed From: 0 cm	Available Water	Wheat: 100 mm	Final ALC Grade: 3b
Depth to Slowly Permeable Horizon: 42 cm		Potatoes: 92 mm	Main Limiting Factor(s): We
Wetness Class: IV	Moisture Deficit	Wheat: 72 mm	
Wetness Grade: 3b		Potatoes: 55 mm	
	Moisture Balance	Wheat: +28 mm	
		Potatoes: +37 mm	
	Droughtiness Grade: 2	(Calculated to 100 cm)	Remarks:

SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE	Av Rainfall: 1261 mm	PARENT MATERIAL
Bodmin		Pit 2 (ASP 41)	7° SW	Ley	ATO: 1477 day °C	Staddon Grit
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 238	PSD SAMPLES TAKEN
37/97		12/6/97	SX 064 658	GMS/PB	Climatic Grade: 2	-
					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	30	MCL	10YR43	20% HR (VIS)	None	None	-	-	-	-	MF, VF	-	Abrupt wavy
2a	40	HZCL	10YR64	30% HR (VIS)	None	None	WMAB and SAB	Friable	Mod	Poor	MF, VF	-	Clear smooth
2b	40	HZCL	2.5Y63	30% HR (VIS)	CDMO 7.5YR56	None	WMAB and SAB	Friable	Mod	Poor	CF, VF	-	Abrupt wavy
3	85+	ZC	2.5Y74	40% HR (VIS)	None	Few	M/WCAB	Friable	Mod	Poor	FVF	-	-

Profile Gleyed From:	Profile B 30 cm	Profile A no gleying	Available Water	Wheat: 90 mm	Final ALC Grade: Profile A = 3a Profile B = 3b
Depth to Slowly Permeable Horizon:	No SPL	No SPL	Moisture Deficit	Potatoes: 84 mm	
Wetness Class:	III	I	Moisture Deficit	Wheat: 72 mm	Main Limiting Factor(s): Wetness Wk (Profile A)
Wetness Grade:	3b	3a	Moisture Deficit	Potatoes: 55 mm	
			Moisture Balance	Wheat: +18 mm	Remarks: Stone is quartz and hard shale. Within pit two profiles observed, one exhibiting wetness, other not. Typical of borings found in the area. H3 no evidence of wetness, so not considered on SPL and 3a most likely Grade.
			Moisture Balance	Potatoes: +29 mm	
			Droughtiness Grade: 2	(Calculated to 100 cm)	

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 1261 mm		PARENT MATERIAL			
Bodmin		Pit 3 (Nr ASP 24)	7° S		PGR		ATO: 1477 day °C		Staddon Grit			
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 238		PSD SAMPLES TAKEN			
37/97		12/6/97	SX 063 660		GMS/PB		Climatic Grade: 2		TS 0-25 cm MCL: S:27, Z:51, C:22			
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	23	MCL	10YR42	20% HR (VIS)	FDFO	None	-	-	-	-	MF, VF	-	Abrupt smooth
2	30	HZCL	10YR64	40% HR (VIS)	CDFO particularly at boundary of H1/H2	None	WMFSAB	Friable	Mod	Poor (few large)	CVF	-	Gradual wavy
3	85+	ZC	10YR73	50% HR/ZR (VIS)	FDMO 7.5YR56 CDMG 5Y73	None	Too stony	Friable	Mod	Poor	FVF	-	

Profile Gleyed From: 23 cm to 30 cm	Available Water	Wheat: 110 mm	Final ALC Grade: 3b
Depth to Slowly Permeable Horizon: No SPL		Potatoes: 87 mm	Main Limiting Factor(s): Wetness
Wetness Class: III	Moisture Deficit	Wheat: 72 mm	
Wetness Grade: 3b		Potatoes: 55 mm	
	Moisture Balance	Wheat: +38 mm	
		Potatoes: +32 mm	
	Droughtiness Grade: 1	(Calculated to 120 cm)	Remarks: Stone is hard shale. H2 is intermittent within pit: H2 less distinctly mottled than H2 Pit 2. H3 unlikely to be SPL, but mottling continues down profile.

SITE NAME		PROFILE NO.		SLOPE AND ASPECT		LAND USE		Av Rainfall: 1261 mm		PARENT MATERIAL			
Bodmin		Pit 4 (Nr ASP 47)		3 ° W		CER		ATO: 1477 day °C		Slate			
JOB NO.		DATE		GRID REFERENCE		DESCRIBED BY		FC Days: 227		PSD SAMPLES TAKEN			
37/97		17/6/97		SX 058 678		PB		Climatic Grade: 2		TS 0-25 cm MCL S:27, Z: 47, C:26			
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	30	MCL	10YR44	20% HR (VIS)	None	None	-	-	-	-	MF, VF	-	* Diffuse smooth
2	85+	HZCL	2.5Y74	40% HR, ZR (VIS)	FDFO 10YR56	None	WCSAB	Friable	Mod	Good	FVF	-	-

Profile Gleyed From: Not gleyed	Available Water	Wheat: 96 mm	Final ALC Grade: 3a
Depth to Slowly Permeable Horizon: No SPL		Potatoes: 86 mm	Main Limiting Factor(s): Wk
Wetness Class: I	Moisture Deficit	Wheat: 72 mm	
Wetness Grade: 3a		Potatoes: 55 mm	
	Moisture Balance	Wheat: +24 mm	Remarks: *Boundary H1/H2 25-40cm; extensive topsoil mixing
		Potatoes: +31 mm	
	Droughtiness Grade: 2	(Calculated to 100 cm)	

SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE	Av Rainfall: 1261 mm	PARENT MATERIAL
Bodmin		Pit 5 (Nr ASP 119)	3° N	PGR	ATO: 1477 day °C	Staddon Grit
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 253	PSD SAMPLES TAKEN
37/97		17/6/97	SX 0855 6600	PB	Climatic Grade: 3a	TS 0-25 cm HCL S:23, Z:47, C:30
					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	26	HCL	10YR43	10%HR (VIS)	0	0	-	-	-	-	MVF	-	Clear smooth
2	44	HCL	10YR53 2.5Y63	20% HR (VIS)	FDFO 10YR46	0	MM, FSAB	Fr	G	G	CVF	-	Grad wavy
3	83+	ZC	5Y73	40%HR, ZR (VIS)	0	0	WCSAB	Fm	P	P	FVF	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3b

Available Water Wheat: 100 mm

Potatoes: 93 mm

Moisture Deficit Wheat: 72 mm

Potatoes: 55 mm

Moisture Balance Wheat: +28 mm

Potatoes: +38 mm

Droughtiness Grade: 2 (Calculated to 100 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks: H3 too stony to be SPL. The PSD result for the top 25 cm shows the variation in the clay content in these soils. This pit is included within 3a recognising that there may be some poorer land in the unit.