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Bude and Stratton

Agricultural Land Classification

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Resource Planning Team
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BUDE AND STRATTON

AGRICULTURAL LAND CLASSIFICATION SURVEY

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BUDE AND STRATTON

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 243.2 ha of land at Bude and Stratton, North Cornwall. Field survey was based on 106 auger borings and four soil profile pits, and was completed in September 1997. During the survey one sample was analysed for particle size distribution (PSD). PSD results from the previous surveys were also taken into account during the recent survey.

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 revised North Cornwall Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant sections. The published regional ALC map (MAFF 1977) shows the site at a reconnaissance scale. Grade 4 is mapped along the River Neet, with Grade 2 to the East of Townsend and around Bagbury. The rest of the site is mapped as Grade 3. Land that is adjacent to the current site was previously surveyed in 1994 and 1996 (ADAS 1994, 1996). The current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) and therefore supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.

4. The 1994 survey mapped three areas of land in between Bude and Stratton at King's Hill Industrial Estate, Cleavelands and Broadclose. These small sites are coincident and interlock with the current survey. The land at the industrial estate and at Broadclose was mainly mapped as Grade 2 with a minor workability limitation. Land at Cleavelands was mapped as Subgrade 3a with a moderate wetness limitations. During the recent survey evidence suggests that the quality of the surrounding land for all of these small sites is similar. However, in places the quality of the land was found to change on, or very close to, a survey boundaries.

5. At the time of survey land cover was mainly permanent and ley grassland. There were a few fields of winter wheat and barley in the southern part of the site. An area of 21.0 ha of agricultural land within the survey area was not surveyed because of access restrictions.

6. Other land that was not surveyed included agricultural buildings and farmsteads, and residential areas.

SUMMARY

7. 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: Bude and Stratton

Grade	Area (ha)	% Surveyed Area (182.7 ha)
2	60.2	33
3a	92.0	50
3b	26.0	14
4	4.5	3
Agricultural land not surveyed	21.0	-
Other land	39.5	-
Total site area	243.2	100

8. Of the surveyed land 83% has been mapped as best and most versatile. This includes 33% of Grade 2 (very good quality) land where the profiles have a minor workability limitation. The rest of the best and most versatile land consists of the various areas of Subgrade 3a (good quality) land which has moderate drought and wetness limitations.

9. The Subgrade 3b (moderate quality) land has moderate wetness and gradient limitations while the Grade 4 (poor quality) has a severe gradient limitation.

CLIMATE

10. 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.

11. Since the ALC grade of land is determined by the most limiting factor present, overall climate is considered first. This is 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 no overall climatic limitation.

Table 2: Climatic Interpolations: Bude and Stratton

Grid Reference		SS 202 050	SS 225 061	SS 209 077
Altitude (m)		50	64	10
Accumulated Temperature (day °C)		1554	1537	1598
Average Annual Rainfall (mm)		854	889	865
Overall Climatic Grade		1	1	1
Field Capacity Days		175	182	180
Moisture deficit (mm):	Wheat	99	98	106
	Potatoes	89	89	98

12. Climatic variables also affect ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity (FC) days and potential Moisture Deficits (MD) which are calculated for wheat and potatoes. The FC days are used in assessing soil wetness, while the MDs are compared with the moisture available in each profile to assess soil droughtiness limitations. These are described in later sections. The data in Table 2 shows that the isolated part of the site near Lynstone is drier than the main survey site and that a potentially critical boundary of 175/176 FCD exists in between the two parts of the site.

RELIEF

13. Altitude ranges from 10 metres near Flexbury, to 85 metres near Townsend. The gradients within the survey area are mostly level, and gently and moderately sloping. There are some strongly, moderately steeply and steeply sloping gradients in the valley of the River Neet. These will limit the ALC grades to Subgrade 3b and Grade 4. There are also a few isolated areas elsewhere in the survey area where the ALC grade is limited to Subgrade 3b by the gradient.

GEOLOGY AND SOILS

14. The underlying geology of the site is shown on the published geology maps (IGS 1969, 1974 and 1980). The whole site is underlain by the Bude Formation from the Upper Carboniferous era. This is mainly sandstone, with small areas of shale along local fault lines. There are some more recent deposits of alluvium in the valley bottoms and terrace deposits to the east of Stratton. The recent survey found that the geology is largely as indicated with the depth to the sandstone being variable.

15. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983). This shows the whole site as being the Neath Association except for a band of soils from the Manod Association along the River Neet. Both associations are described as being well-drained fine loamy soils over rock. In places the Neath soils may have slowly permeable subsoils and suffer from slight seasonal waterlogging. The Manod soils may sometimes be fine silty and can also be shallow.

16. Soils found during the recent survey were similar to those of the Neath Association. The depth to the sandstone was found to vary across the site and in places the subsoils were slowly permeable.

AGRICULTURAL LAND CLASSIFICATION

17. 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.

Grade 2

18. The areas of Grade 2 land, mapped throughout the site, have a minor workability limitation. The profiles typically consist of medium clay loam topsoils over heavy clay loam upper subsoils and clay lower subsoils. The profiles are well drained and were assessed as Wetness Class I (see Appendix II). Pit 3 is an example of these mapping units. PSD results from the 1994 survey (ADAS 1994) show that the topsoil texture is a medium clay loam. In places the fractured sandstone bedrock is found within 120 cm and there is 20-30% in the subsoil. Here the amount of available moisture in the profile is reduced and there may also be a minor droughtiness limitation. Coincident Grade 2 mapping units were found by the 1994 survey (ADAS 1994) at the King's Hill Industrial Estate and near the Stratton Footpath, at Broadclose.

Subgrade 3a

19. There are two types of profile within these mapping units. The higher land to the south and south-east of Stratton has a moderate droughtiness limitation. These profiles are well drained and were assessed as Wetness Class I. However, the fractured bedrock is closer to the surface with as much as 69% stone in the lower subsoil, as is shown by Pit 1 near West Grove Farm. This will again limit the amount of moisture in the profile causing a moderate droughtiness limitation.

20. On the northern edge of Flexbury and around Stratton itself the profiles are deeper. They typically have medium clay loam topsoils over heavy clay loam upper subsoils and clay lower subsoils. Although there are colour variations with manganese in the upper subsoils this is associated with the rotting sandstone rather than being caused by impeded drainage. In the lower subsoils, which are gleyed, the porosity is variable across the site and some of the profiles have a slowly permeable layer. The profiles without a slowly permeable layer were assessed as Wetness Class II and those that have a slowly permeable layer were assessed as Wetness Class III. With a medium clay loam topsoil both types of profile have a moderate wetness limitation. Coincident Subgrade 3a mapping units were found by the 1994 survey (ADAS 1994) at Cleavelands.

Subgrade 3b

21. Most of the isolated areas of Subgrade 3b have a moderate wetness limitation. As elsewhere the profiles consist of medium clay loam topsoils over heavy clay loam upper subsoils and clay lower subsoils. These profiles are gleyed from below the topsoil and have slowly permeable layers that start higher up the profile than the Subgrade 3a land. They were assessed as Wetness Classes IV. With a medium clay loam topsoil this is a moderate wetness limitation. Pit 1 from the 1996 survey (ADAS, 1996) on Kings Hill is representative of these mapping units.

22. Areas of sloping land around Stratton have been mapped as Subgrade 3b with a moderate gradient limitation. The land is strongly sloping with gradients of 8-11°. This will restrict the safe and accurate use of some agricultural machinery, thus restricting arable cropping practises.

Grade 4

23. In the River Neet valley, to the north and south of Townsend the land has a severe limitation due to the gradient. The land is moderately steeply and steeply sloping with gradients between 12° and 18°.

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November 1997

REFERENCES

ADAS RESOURCE PLANNING TEAM, (1994) Agricultural Land Classification Survey of Bude. Scale 1: 10 000, Reference 33/94. ADAS Bristol.

ADAS RESOURCE PLANNING TEAM, (1996) Agricultural Land Classification Survey of Kingshill Scale 1: 10 000, Reference 4/96. ADAS Bristol.

INSTITUTE OF GEOLOGICAL SCIENCES (1969) Sheet 322 Boscastle 1:63 000 series Solid and Drift edition. IGS, London.

INSTITUTE OF GEOLOGICAL SCIENCES (1974) Sheet 323 Holsworthy 1:50 000 series Solid and Drift edition. IGS, London.

INSTITUTE OF GEOLOGICAL SCIENCES (1974) Sheet 307/8 Bude 1:50 000 series Solid and Drift edition. IGS, London.

HODGSON, J M (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical Monograph No 5. SSLRC, Cranfield University.

MAFF (1977) 1:250 000 series Agricultural Land Classification, South West Region. MAFF Publications, Alnwick.

MAFF (1988) Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for grading the quality of agricultural land. MAFF Publications, Alnwick.

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification. Meteorological Office, Bracknell.

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5, Soils of South West England, 1:250 000 scale. SSEW, Harpenden.

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and Their Use in South West England, Bulletin No 14. SSEW, Harpenden..

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 that 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 that can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land

Land with severe limitations that significantly restrict the range of crops and/or 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 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 that 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, SSLRC, Cranfield.

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
Bude/Stratton	Pit 1 (ASP 106)	3° North	Ploughed	Av Rainfall: 889 mm ATO: 1537 day °C	Bude Formation (Upper Carboniferous Sandstone)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 182 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN
38/97	8/7/97	SS 2220 0530	GMS/HLJ		None

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	20	MCL	10YR34	<1% HR (VIS)	None	None	-	-	-	-	FF + VF	-	Clear smooth
2	40 (av)	HCL	10YR43	<1% HR (VIS)	None	None	WC + MSAB	Friable	Mod to Good	Good	FVF	-	Clear wavy
3	80+	SCL	2.5Y64	50% HR > 2cm (S) 19% MSST < 2cm (S+D) 69% Total	Only inside and on outside of stones, no mottles in soil itself	Only inside stones	Too stony	-	Assume Mod	-	FVF between stones	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 97 mm

Potatoes: 83 mm

Moisture Deficit Wheat: 98 mm

Potatoes: 89 mm

Moisture Balance Wheat: -1 mm

Potatoes: -6 mm

Droughtiness Grade: 3a (taking H3 stones as HR) (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks: H3 stone is sandstone, large ones are harder hence HR, smaller are softer hence MSST

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Bude/Stratton	Pit 2 (ASP 115)	2° West	Permanent Grass	Av Rainfall:	889 mm	Bude Formation (Upper Carboniferous Sandstone)
				ATO:	1537 day °C	
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days:	182	PSD SAMPLES TAKEN
38/97	8/7/97	SS 2205 0520	GMS/HLJ	Climatic Grade:	1	None
				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	10YR33	<1% HR (VIS)	None	None	-	-	-	Good	CF + VF	-	Abrupt smooth
2	31	HCL	10YR53/54	<1% HR (VIS)	FFFO (7.5YR46)	None	MMSAB	Friable	Good	Good	CF + VF	-	Clear smooth
3	45	C	2.5Y63	5% HR (VIS)	CDFO (7.5YR56)	Common*[1]	WCPr breaking to MCSAB	Firm	Poor	Good	CF + VF	-	Clear smooth
4	85+	C	2.5Y62/63	<1% HR (VIS)	CDFO (7.5YR56)	Few	WCPr breaking to MCSAB	Firm	Poor	Good	CF + VF	-	-

Profile Gleyed From: 31 cm

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: II

Wetness Grade: 3a

Available Water	Wheat:	131 mm
	Potatoes:	108 mm
Moisture Deficit	Wheat:	98 mm
	Potatoes:	89 mm
Moisture Balance	Wheat:	33 mm
	Potatoes:	19 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: *[1] These are on rotting stones

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Bude/Stratton	Pit 3 (ASP 62)	2° South West	Permanent Grass	Av Rainfall:	889 mm	Bude Formation (Upper Carboniferous Sandstone)
				ATO:	1537 day °C	
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days:	182	PSD SAMPLES TAKEN
38/97	11/7/97	SS 2245 0640	GMS/HLJ	Climatic Grade:	1	None
				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	10YR33	<1% HR (VIS)	None	None	-	-	-	Good	CF + VF	-	Clear smooth
2	40	HCL	10YR43	<1% HR (VIS)	None	Few	WCSAB (some medium)	Friable	Moderate	Good	CVF	-	Clear smooth
3*[1]	50	HCL	2.5Y54	20% HR (VIS)	FFFO (10YR56)	Common*[2]	MCSAB	Friable	Moderate	Good	CVF	-	Clear smooth
4	85+	C	2.5Y54 (some 2.5Y54)	30% HR (VIS)	CDFO*[4] (7.5YR56,68) 2.5Y72*[5]	Common*[3]	MCSAB	Firm	Moderate	Low (borderline)	CVF	-	-

Profile Gleyed From: 50 cm

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 2

Available Water	Wheat:	121 mm
	Potatoes:	103 mm
Moisture Deficit	Wheat:	98 mm
	Potatoes:	89 mm
Moisture Balance	Wheat:	23 mm
	Potatoes:	14 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Workability and Drought

Remarks: *[1] transitional?, may be more pronounced in other profiles. *[2] patchy
*[3] obviously associated with rotting stones
*[4] many associated with stones
*[5] also associated with stones
NB stones which are not weathered show ochreous colours with large black patches

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bude/Stratton	Pit 4 (ASP 5)	4° North	Permanent Grass	Av Rainfall: 889 mm ATO: 1537 day °C	Bude Formation (Upper Carboniferous Sandstone)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 183 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN
38/97	11/7/97	SS 2135 0750	GMS/HLJ		None

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	25	MCL	10YR33	1% HR (VIS)	None	None	-	-	-	Good	CF + VF	-	Clear wavy
2	38	HCL	10YR43	1% HR (VIS)	None	None	WCSAB	Friable	Moderate	Good	CVF, F	-	Clear smooth
3	54	HCL	10YR53	5% HR (VIS)	FFDO 10YR56 + some larger associated with rotten stones	Common associated with rotten stones	MCSAB	Friable	Moderate	Poor	CVF	-	Gradual smooth
4	80+	C	2.5Y73 5Y72 10Y71	1% HR (VIS)	CDFO,10YR56 + some larger assoc. with rotten stones	Few	WCPr breaking to MCSAB	Firm	Poor	Poor except where sandier	CVF	-	-

Profile Gleyed From: 54 cm

Depth to Slowly Permeable Horizon: 54 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 133 mm

Potatoes: 110 mm

Moisture Deficit Wheat: 98 mm

Potatoes: 89 mm

Moisture Balance Wheat: 35 mm

Potatoes: 21 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: SPL is not conclusive but greenish/grey colours could be indicative of this SPL in borings.