

AGRICULTURAL LAND CLASSIFICATIONFALMOUTH AND PENRYN LOCAL PLANReport of Survey

1. The Agricultural Land Classification (ALC) system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on its use for agriculture.

A detailed ALC survey was requested by Carrick District Council affecting over 600 hectares adjacent to the urban fringe of Falmouth and Penryn. The work formed part of MAFF's input to the preparation of the Local Plan.

Survey work was conducted in January 1991, by members of the Resource Planning Group, South West Region, at 1:10,000 scale (ie approximately one soil observation per hectare). A total of 341 borings and 7 soil pits were examined and described using MAFF's "Revised Guidelines and Criteria for Grading Agricultural Land" operational since 1 January 1989.

Details of the distribution of grades and sub-grades are given below and illustrated on the accompanying ALC map. Together, these show that significant areas of best and most versatile land lie adjacent to the current urban fringe; the areas of 3B land and poorer are mostly mapped to reflect locally steep gradients, and much of the flatter land is high quality. Careful planning is therefore required to minimise the loss of good agricultural land and to reduce the urban fringe effects on adjacent agricultural areas.

Table 1: Distribution of Grades and Sub-Grades (Full Survey Area)

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Survey Area</u>	<u>% of Agricultural land</u>
2	239.2	39.1	43.6
3A	127.7	20.9	23.3
	366.9*	(60.0)	(66.9)
3B	122.0	20.0	22.2
4	46.7	7.6	8.5
5	13.4	2.2	2.4
Non-Agric	30.3	5.0	
Farm Buildings	9.8	1.6	
Urban	22.0	3.6	
	<u>611.1 ha</u>	<u>100%</u>	<u>100% (549 ha)</u>

* Grade 2 and Sub-Grade 3A are considered 'best and most versatile' land in Cornwall.

The results of this survey supercede any previous ALC information for this area at 1:25,000 or 1:63,360 scale.

Appendix I presents the ALC statistics for 41 agricultural blocks that have been measured separately; a key map is also attached.

A general indication of the amount of high quality land in Cornwall compared to the South West Region and the national situation is attached, as is a general description of the main ALC grades.

The ALC map has been drawn at 1:8,000 scale and is accurate at this level. Any enlargement from this base, however, would be misleading.

2. Climate has an important effect on potential grades throughout the survey area, and the climatic criteria are considered first when classifying land. The main parameters used in the assessment of the climatic limitation are average annual rainfall (AAR), as a measure of overall wetness and accumulated temperature (AT \emptyset) as a measure of the relative warmth of a locality. As rainfall increases and average temperature decreases the degree of limitation to agricultural use generally increases. Around Falmouth and Penryn there is an important climatic boundary at approximately 90 metres. Land below, does not suffer from any overall climatic limitation; land above can be graded no better than Grade 2.

This boundary also represents the approximate point at which the local Field Capacity Day value equals 225 days. The value represents the duration of the period when the soil moisture deficit is zero (ie when rainfall exceeds evapotranspiration) and, in combination with the soil's topsoil texture, affects the workability of the land. Below 225 FC Days, for medium clay loam topsoils (in Wetness Class I), Grade 2 is the best possible ALC grade; above 225 FC Days, for similar soils, the restricted workability limits the ALC to Sub-Grade 3A at best.

No additional local climatic factor such as exposure is an active limiting factor across the survey area. The Grade 2 land is, at very worst, slightly exposed, and should easily support sensitive horticultural crops such as strawberries and lettuces together with bulbs and flowers.

The assessment of the effect of climate has been based upon interpolation from a Met Office/MAFF 5 km grid dataset for representative locations spread throughout the survey area. Results of these interpolations are attached in Appendix II.

3. The assessment of site factors is concerned with the way in which topography influences the use of agricultural machinery and, hence, the cropping potential of the land. Gradient has a significant effect on mechanised farm operations since most conventional machines perform best on level ground.

The majority of the 3B, 4 and 5 land that is shown, indicates those areas where local gradients are the most limiting factor. A record of the slopes measured is attached in map form. Gradients have been assessed with a hand-held clinometer, taking readings over a 25 m length, normal to the slope of the land.

4. Geology varies little across the site (as indicated on BGS Sheet 352, 1:50,000). Granite occurs over the western fringe, with sandstone and slate deposits to the east. Similar soils have developed over both these formations. The seven soil pit descriptions attached indicate the type and range of profiles that are common.

Typical profiles exhibit medium clay loam topsoil, an upper subsoil of similar texture developed over a soft freshly weathered clay lower subsoil. They show no evidence of wetness and are placed in Wetness Class I (ie the soil profile is not wet within 70 cm depth for more than 30 days in most years). The most-limiting factor for these soils is their workability. Given the high local Field Capacity Day value (see Section 2) the soils are limited to Grade 2. Soil droughtiness is often a factor for soils with high subsoil stone contents; subsoil structural conditions are, however, good (though occasionally moderate) and the profiles therefore contain adequate available water to qualify for Grade 2.

Minor areas of 3B have been mapped in the valley bottoms where shallow clay layers create a significant soil wetness limitation.

Falmouth and Penryn Local Plan

ALC Report: Appendix II

Climatic Interpolations

Interpolation Number	Grid Reference	Altitude (m)	ATO	AAR	FCD	MDW	MDP	Overall Climatic Grade
1	1792 0355	57	1586	1108	216	90	80	1
2	1782 0356	73	1568	1134	221	87	75	1
3	1771 0355	107	1529	1179	230	81	67	2
4	1767 0352	120	1515	1191	232	79	64	2
5	1767 0348	110	1527	1176	230	81	67	2
6	1772 0345	70	1572	1129	222	88	77	1
7	1774 0334	100	1538	1171	228	82	69	2
8	1786 0338	49	1595	1098	216	92	82	1
9	1781 0331	100	1538	1175	228	82	69	2
10	1785 0327	90	1549	1161	226	84	71	2
11	1784 0314	60	1584	1121	220	90	79	1
12	1793 0318	25	1623	1068	212	97	88	1

Falmouth and Penryn Local Plan
ALC Report: Appendix I

Land Quality Statistics (see key map attached) - hectares

Area No	Grade 2	Sub-grade 3A	Sub-Grade 3B	Grade 4	Grade 5	Non-Agric	Farm Bldgs	Urban	Total
1	4.1	-	1.2	-	-	-	-	-	5.3
2	-	0.7	0.6	0.7	-	-	-	-	2.0
3	-	1.1	5.8	2.0	-	-	-	-	8.9
4	13.2	3.6	15.0	1.1	-	8.2	1.1	0.7	42.9
5	2.6	-	1.2	1.1	-	1.0	1.1	-	7.0
6	3.9	0.2	-	-	-	-	-	-	4.1
7	5.5	4.8	-	-	-	-	-	-	10.3
8	3.6	-	2.8	-	-	-	-	-	6.4
9	0.5	2.6	2.9	1.2	-	-	-	0.2	7.4
10	0.2	2.6	2.9	2.6	1.3	-	-	-	9.6
11	15.2	-	-	-	-	1.3	0.3	0.8	17.6
12	16.7	0.3	14.9	4.6	2.6	4.2	0.8	2.5	46.6
13	-	2.4	1.3	1.0	-	0.4	0.3	0.4	5.8
14	2.2	-	-	-	-	-	-	-	2.2
15	8.0	23.6	4.8	-	-	2.2	-	1.6	40.2
16	11.1	-	5.0	1.2	1.8	-	-	-	19.1
17	2.9	-	-	-	-	-	0.2	-	3.1
18	11.5	-	2.2	0.9	-	0.5	-	0.1	15.2
19	1.9	-	1.5	1.0	-	-	-	-	4.4
20	-	1.0	0.6	-	-	-	-	-	1.6
21	-	-	0.7	-	-	-	-	-	0.7
22	6.9	19.1	15.7	6.8	3.2	3.6	-	4.2	59.5
23	6.1	2.6	0.6	0.9	-	0.5	-	0.3	11.0
24	-	-	1.7	0.5	-	-	-	-	2.2
25	-	-	-	2.0	-	-	-	-	2.0
26	-	2.7	-	-	-	-	-	-	2.7
27	1.5	0.9	0.6	-	-	-	-	-	3.2
28	-	4.8	1.7	1.2	-	-	0.7	0.2	8.6
29	0.9	8.9	4.9	4.2	1.9	1.0	-	2.7	24.5
30	-	1.8	1.2	0.6	2.2	0.1	-	-	5.9
31	-	15.1	-	-	-	-	0.2	-	15.3
32	-	2.3	-	-	-	-	-	-	2.3
33	9.0	26.6	6.2	3.2	0.4	0.4	0.8	0.3	46.9
34	0.5	-	0.8	1.3	-	-	-	0.1	2.7
35	-	-	1.8	-	-	-	-	0.1	1.9
36	2.9	-	1.0	-	-	1.0	0.4	-	5.3
37	6.2	-	4.1	6.4	-	1.1	-	0.8	18.6
38	27.1	-	-	-	-	0.4	0.4	-	27.9
39	2.2	-	2.1	-	-	-	-	-	4.3
40	8.8	-	2.5	-	-	-	-	2.3	13.6
41	64.0	-	13.7	2.2	-	4.4	3.5	4.7	92.5
TOTAL	239.2	127.7	122.0	46.7	13.4	30.3	9.8	22.0	611.1

SITE NAME Falmouth/Penryn Local Plan 8FCS 4124	PROFILE NUMBER 1	SLOPE AND ASPECT 4° SW	LAND USE Permanent Grass	Av Rainfall :-	PARENT MATERIAL Slate & Sandstone (shillet at base of pit)
	DATE 16/1/91	GRID REFERENCE		ATO :-	
				FC Days :- 220	
				Climatic grade:- 1	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-25	10YR33	MCL	2% + 2 cm; 2% 2 mm-2 cm; slate; visual	None observed			Not compacted					Gradual
Sub 1	25-40	10YR53	MCL	10% 2 mm-2 cm; slate; visual	None observed	FSAB Weak	+ 0.5%	Good	Friable	Common			
Sub 2	40-85+	10YR53	C soft, micaceous	30% 2 mm-2 cm; slate; visual	None observed	Difficult to assess structure due to high stone content; assumed moderate				Common			

Depth to Slowly Permeable Horizon :- None present Not gleyed	Available Water Wheat :- 112 mm (stopping AP at 85 cm) 137 mm (AP to 120 cm) Potatoes :-	Final ALC Grade :- 2
Wetness Class :- 1	Moisture Deficit Wheat :- 90 mm Potatoes :-	Main Limiting Factor(s) :- Workability
Wetness Grade :- 2	Moisture Balance Wheat :- +22 mm (stopping AP at 85 cm) Potatoes :- +47 mm (AP to 120 cm)	Remarks :- Topsoil texture confirmed by PSD analysis
RPG-0023/WJC	Droughtiness Grade :- 1	

SITE NAME Falmouth and Penryn Local Plan 8FCS 4124	PROFILE NUMBER 2	SLOPE AND ASPECT 3° NE	LAND USE Ploughed (the previous day)	Av Rainfall :- ATO :- FC Days :- Climatic grade:-	PARENT MATERIAL Slate and sandstone
	DATE 16/1/91	GRID REFERENCE			

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-30	10YR33	MCL	Negligible	None	Good, not compacted							Gradual
Sub 1	30-58	10YR44	MCL	Negligible	None	Moderate CSAB	+ 0.5%	Moderate	Friable	Common			
Sub 2	58-120+	2.5Y52	C soft micaceous	30% sst; visual; weathered slate	None	Difficult to assess due to high stone content assumed moderate				Few fine to depth			

Depth to Slowly Permeable Horizon :- Not gleyed	None present	Available Water	Wheat :- 138 mm		Final ALC Grade :- 2
			Potatoes :- 115 mm		
Wetness Class :- WC I		Moisture Deficit	Wheat :- 90 mm		Main Limiting Factor(s) :- Workability
			Potatoes :- 79 mm		
Wetness Grade :- 2		Moisture Balance	Wheat :- +48 mm		
			Potatoes :- +36 mm		Remarks :- Topsoil texture confirmed by PSD analysis
RPG-0023/WJC		Droughtiness Grade	:- 1		

SITE NAME Falmouth Penryn Local Plan 8FCS 4124	PROFILE NUMBER 3	SLOPE AND ASPECT 0	LAND USE Grass	Av Rainfall :- 1191	PARENT MATERIAL Granite
	DATE 25/1/91	GRID REFERENCE SW 768 35 2		ATO :- 1515 FC Days :- 232 Climatic grade:- 2	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-45	10YR33	MCL	5% visual	-	-				Common			Abrupt wavy
2	45-65	10YR56	MSL	2% >2cm(sieve) 25% 2mm-2cm (displacement) Total 28%	-	WDCSAB	> .5%	Good	V Friable	Few			
3	65-80+	10YR66	MSL	Stonier (40%)	-	Too stoney to assess				None			
Pit dug to 80 cm													

Depth to Slowly Permeable Horizon :- None	Available Water Wheat :- 144 mm Potatoes :-	Final ALC Grade :- 3a
Wetness Class :- I	Moisture Deficit Wheat :- 79 mm Potatoes :- 64 mm	Main Limiting Factor(s) :- Workability
Wetness Grade :- 3a	Moisture Balance Wheat :- 65 mm Potatoes :-	
RPG-0023/WJC	Droughtiness Grade :- 1	Remarks :- Topsoil texture confirmed by PSD analysis

SITE NAME Falmouth Penryn Local Plan 8FCS 4124	PROFILE NUMBER 4	SLOPE AND ASPECT 6° East	LAND USE Grass	Av Rainfall :- 1129	PARENT MATERIAL Shale
	DATE 25/1/91	GRID REFERENCE SW 776355		ATO :- 1572 FC Days :- 222 Climatic grade:- 1	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-28	10YR33	MCL	None	None	-	Common	-	-	Common	-	None	Gradual Smooth
2	28-64	10YR34	MCL	2% visual > 2 cm	None	WDCSAB	> .5%	Moderate	Friable	Common	-	None	Gradual wavy
3	64-102	10YR53	C	5% > 2cm 10% > 2 mm visual shale and hard	Weathering colours	WDVC platy	> .5%	Poor	Friable	Few		None	
Pit dug to 102 cm augered to 120 cm													

Depth to Slowly Permeable Horizon :- No gleying	None	Available Water	Wheat :- 137 mm	Final ALC Grade :- 2
Wetness Class :- I		Potatoes :- 114 mm		Main Limiting Factor(s) :- Workability
Wetness Grade :- 2		Moisture Deficit	Wheat :- 88 mm	
		Potatoes :- 77 mm		
		Moisture Balance	Wheat :- 49 mm	Remarks :- East wind exposure risk Topsoil texture confirmed by PSD analysis
		Potatoes :- 37 mm		
RPG-0023/WJC		Droughtiness Grade :- 1		

SITE NAME Falmouth and Penryn Local Plan 8FCS 4124	PROFILE NUMBER 5	SLOPE AND ASPECT 0	LAND USE Ploughed (today)	Av Rainfall :- 1134	PARENT MATERIAL Shale
	DATE 25/1/91	GRID REFERENCE SW 783353		ATO :- 1568	
				FC Days :- 221	
				Climatic grade:- 1	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-25	10YR33	MCL	Negligible	None	-	> .5%	-	-	Many	-	-	Clear wavy
2	25-50	7.5YR42	MCL	7% hard (sieve)	None	WDCSAB	> .5%	Moderate	Friable	Few			Gradual wavy
3	50-90+	10YR58 10YR53	C	46% > 2 mm displacement mostly soft	Weathering colours	WDCSAB	> .5%	Moderate		Few			
Pit dug to 90 cm													

Depth to Slowly Permeable Horizon :- No gleying	None	Available Water	Wheat :- 129 mm		Final ALC Grade :- 2
			Potatoes :- 107 mm		
Wetness Class :- I		Moisture Deficit	Wheat :- 87 mm		Main Limiting Factor(s) :- Workability/Droughtiness
			Potatoes :- 75 mm		
Wetness Grade :- 2		Moisture Balance	Wheat :- 22 mm		
			Potatoes :- 32 mm		Remarks :- Topsoil texture confirmed by PSD analysis
RPG-0023/WJC		Droughtiness Grade	:- 2		

SITE NAME Falmouth and Penryn Local Plan	PROFILE NUMBER 6	SLOPE AND ASPECT 0°	LAND USE Cabbage	Av Rainfall :- 1134	PARENT MATERIAL Slate
	DATE 19/2/91	GRID REFERENCE SW 779365		ATO :- 1568 FC Days :- 221 Climatic grade:- 1	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-20	10YR33	MCL	<1%	None								
2	20-35	10YR43	MCL	5% shale (sieve)	None	WDCSAB	> .5%	Moderate	Friable	Common		None	
3	35-80+	10YR56	HCL	30% >2cm (sieve) 34% <2cm (displacement) 54% total	None	Too stoney to assess structure	> .5%	Assume moderate		Few		None	

Depth to Slowly Permeable Horizon :- None No gleying	Available Water	Wheat :- 128 mm	Final ALC Grade :- 2
	Potatoes :- 100 mm		
Wetness Class :- I	Moisture Deficit	Wheat :- 87 mm	Main Limiting Factor(s) :- Workability
	Potatoes :- 75 mm		
Wetness Grade :- 2	Moisture Balance	Wheat :- 41 mm	Remarks :-
	Potatoes :- 25 mm		
RPG-0023/WJC	Droughtiness Grade	:- 1	

SITE NAME Falmouth and Penryn Local Plan	PROFILE NUMBER 7	SLOPE AND ASPECT 4°	LAND USE Cereals	Av Rainfall :- 1098	PARENT MATERIAL Slate
	DATE 20/2/91	GRID REFERENCE SW 792348		ATO :- 1595	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-30	10YR33	MCL	<1%	-					Common			Smooth abrupt
2	30-40	10YR43	MZCL	5% >2cm (sieve)	-	MDCSAB	>.5%	Moderate	Friable	Common			Smooth abrupt
3	40-80	10YR54	HCL	15% >2cm (sieve)	-	MDCSAB	>.5%	Moderate	Friable	Few			
4	80+	2.5Y54	MSCL	20% > 2mm (displacement)	-								
Pit dug to 90 cm													

Depth to Slowly Permeable Horizon :- None No gleying	Available Water	Wheat :- 149 mm	Final ALC Grade :- 2
Wetness Class :- I	Moisture Deficit	Wheat :- 92 mm	Main Limiting Factor(s) :- Workability
	Potatoes :- 115 mm	Potatoes :- 82 mm	
Wetness Grade :- 2	Moisture Balance	Wheat :- 57 mm	Remarks :-
	Potatoes :- 33 mm	Potatoes :- 33 mm	
RPG-0023/WJC	Droughtiness Grade :- 1		