

## LIZARD LOCAL PLAN: MULLION, CORNWALL

## AGRICULTURAL LAND CLASSIFICATION

## Report of Survey

1. In September 1990 a detailed Agricultural Land Classification (ALC) survey was conducted around the fringe of Mullion in Cornwall. The survey was requested by Kerrier District Council as part of MAFF's input to the revision of the Lizard Local Plan.

The field work was carried out by members of the Resource Planning Group (SW Region) at an approximate auger sampling density of one boring per hectare; a total of 65 hectares was surveyed and 55 borings and 5 soil pits described.

The location of the soil pits and the auger sample points is shown on the Auger Sample Point map, and the distribution of the ALC grades and sub-grades is shown on the ALC map. Table 1 provides the statistics on land quality.

Table 1: Distribution of Grades and Sub-grades

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Survey Area</u>	<u>% of Agricultural Area</u>
2	32.7	50.0	56.4
3A	15.6	23.9	26.9
3B	8.5	13.0	14.7
4	0.8	1.2	1.4
5	0.3	0.5	0.6
Non-Agric	5.3	8.1	
Urban	1.6	2.4	
Farm Buildings	0.6	0.9	
	65.4 ha	100%	100% (57.9 ha)

2. Climate: Detailed estimates of the prevailing climate were obtained by interpolation from a Met. Office/MAFF 5 km grid dataset for three representative locations (see Table 2). The two parameters used to assess the effect of overall climate are average annual rainfall (a measure of overall wetness), and accumulated temperature (a measure of the relative warmth of a locality). The three assessments show that there is no overall climatic limitation affecting the site.

Table 2: Climatic Interpolations

Grid Reference:	SW669182	SW674192	SW683191
Altitude (m):	68	40	75
Average Annual Rainfall (mm):	1032	1014	1056
Accumulated Temperature (° days)	1583	1615	1575
Field Capacity (days)	202	199	206
Moisture Deficit, Wheat (mm)	102	106	100
Moisture Deficit, Potatoes (mm)	94	99	91
Overall Climatic Grade:	1	1	1

A slight exposure risk occurs on the upper crest slopes adjacent to Pit No. 2, where the land is south west facing. Grade 2, however, is still possible at this site.

3. Grade 2: Much of the eastern and southern fringes have been placed in this grade. Pits 2 and 5 are representative of these soils - deep medium clay loams which are stone-free and show no evidence of wetness in the top 80cm (Wetness Class I). The soils exhibit good structural conditions to depth and contain adequate reserves of available water.

Workability is the active limiting factor. Despite the fact that the soils are in Wetness Class I, the high local FC Day values (+ 200 days) in combination with the topsoil textures limit the soils to Grade 2 (see Table 6, Revised Guidelines).

Sub-grade 3A: Land in the extreme north-east and south-west of the survey area has been mapped as 3A. Pits 1 and 4 are representative. The soils in the south-west are downgraded due to a droughtiness limitation. These profiles contain high stone contents in the subsoil which significantly restrict the water available to crops; root penetration itself is very difficult below approximately 55cm (see Pit 1).

The soils in the north-east are downgraded due to a wetness limitation. These profiles exhibit medium clay loam topsoils that grade into clay textures with clear evidence of soil wetness. These clay subsoils, however, are not slowly permeable as they contain high percentages of stone (with individual stones larger than the structural units) and, hence, a high percentage of voids in the horizon. These soils have been placed in Wetness Class III (ie soils that are wet within 70cm for more than 180 days, but only wet within 40cm for 30-90 days) and can therefore be graded no higher than 3A (see Pit 4).

Sub-grade 3B: An area of wet soils has been identified in the north-west of the survey area; Pit 3 is representative. These soils have medium clay loam topsoils with heavy clay loam subsoils that are clearly gleyed with very coarse structural units. The subsoil is thus slowly permeable and significantly restricts the drainage of rainwater through the profile, causing shallow waterlogging. These soils are placed in Wetness Class IV (ie they may be wet within 40cm for up to 210 days in most years).

All other 3B map units have slope as the most limiting factor.

Grades 4 & 5: All these map units define areas of locally steep gradients.

References: Met Office (1989), Climatological Data for Agricultural Land Classification

Agricultural Land Classification of England and Wales, Revised Guidelines, MAFF (1988)

## **DESCRIPTION OF THE GRADES AND SUBGRADES**

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

### **Grade 1 – excellent quality agricultural land**

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

### **Grade 2 – very good quality agricultural land**

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural 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 moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

#### **Grade 5 – very poor quality agricultural land**

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

### **Descriptions of other land categories used on ALC maps**

#### **Urban**

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

#### **Non-agricultural**

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: golf courses, private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

#### **Woodland**

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

#### **Agricultural buildings**

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg polythene tunnels erected for lambing) may be ignored.

#### **Open water**

Includes lakes, ponds and rivers as map scale permits.

#### **Land not surveyed**

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above land cover types, eg buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.

## SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

### (i) TEXTURE:-

Soil texture classes are denoted by the following abbreviations (all Upper case\*):

S	Sand
LS	Loamy Sand
SL	Sandy Loam
SZL	Sand Silt Loam
ZL	Silt Loam
MZCL	Medium Silty Clay Loam
MCL	Medium Clay Loam
SCL	Sandy Clay Loam
HZCL	Heavy Silty Clay Loam
HCL	Heavy Clay Loam
SC	Sandy Clay
ZC	Silty Clay
C	Clay

For the sand, loamy sand, sandy loam and sandy silt loam classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

F	fine (more than $\frac{2}{3}$ of sand less than 0.2 mm)
C	coarse (more than $\frac{1}{3}$ of sand greater than 0.6 mm)
M	medium (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ coarse sand)

The sub-divisions of clay loam and silty clay loam classes according to clay content are indicated as follows:-

M	medium (less than 27% clay):
H	heavy (27-35% clay)

Other possible texture classes include:

P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts

\* There are two exceptions to the Upper Case rule:-

- The prefix "Calc" is used to identify naturally calcareous soils containing more than 1% Calcium Carbonate
- For organic mineral soils, the texture of the mineral fraction is prefixed by "Org".

(ii) STRUCTURE:-

Nature and size of structural units are denoted by the following abbreviations:

SAB      Subangular Blocky  
AB        Angular Blocky  
P         Prismatic

(single grain, granular and platy are not abbreviated)

F         Fine  
M         Medium  
C         Coarse  
VC        Very Coarse

eg Weak MSAB = Weakly developed medium subangular blocky

(iii) OTHER

f = few            = less than 2% of the matrix or surface described  
c = common        = 2-20% of the matrix or surface described  
m = many          = 20-40% of the matrix or surface described  
vm = very many    = +40% of the matrix or surface described

f = faint         = indistinct mottles, evident only on close examination  
d = distinct      = although not striking, the mottles are readily seen  
p = prominent    = the mottles are conspicuous, and the mottling is one of the outstanding features of the horizon

gm = grey mottling  
om = ochreous mottling

eg cdom = common distinct ochreous mottles

ppf = pale ped faces  
mn = manganese

st = stones 6 cm  
sst = stones 2-6 cm  
vsst = stones 2 cm

WC = Wetness Class (use Roman numerals, eg WC IV)

SPL = Slowly Permeable Layer

WT = Water Table

I = Impenetrable if used in Depth Column

IMP = Impenetrable if used in soil profile notes

(IMP 2 x 40 cm = 2 additional borings, both impenetrable at 40 cm)

ASP = Auger Sample Point

SITE NAME Mullion, Lizard Cornwall	PROFILE NUMBER 1	SLOPE AND ASPECT 2° ESE	LAND USE P. Grass	Av Rainfall :- 1032	PARENT MATERIAL Hornblende/Schist
	DATE 6.9.90	GRID REFERENCE 1671 0182		ATO :- 1583 FC Days :- 202 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	0-26	10YR43	MCL	Neglibigle	Not Mottled								Indistinct Slight colour change
Subsoil	26-55+	10YR44	MCL	Total = 50% 40% > 2 cm 10% < 2 cm (sieve; hard)	Not Mottled	Difficult to assess due to high stone content; assumed <u>Good</u>				Common roots down to at least 55cm			

Depth to Slowly Permeable Horizon :- Not gleyed No SPL	Available Water Wheat :- 77 mm (stopping AP at 55 cm; assuming good subsoil structure) Potatoes :-	Final ALC Grade :- 3A
Wetness Class :- WC1	Moisture Deficit Wheat :- 102 mm Potatoes :-	Main Limiting Factor(s) :- Droughtiness
Wetness Grade :- 2	Moisture Balance Wheat :- - 25 mm Potatoes :-	
RPG0023/WJC	Droughtiness Grade :- 3A (Assuming the roots can penetrate a further 10cm below 55cm, there is a MBW of better than -20 mm)	Remarks :- Area surveyed after prolonged dry period.

SITE NAME Lizard Local Plan Mullion, Cornwall BFCS 3438	PROFILE NUMBER 2	SLOPE AND ASPECT 3° SW facing	LAND USE Grass, Re-seed	Av Rainfall :- 1032 ATO :- 1583 FC Days :- 202 Climatic grade:- 1	PARENT MATERIAL Hornblende/Schist
	DATE 6.9.90	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	10YR43	MCL	None	None								Indistinct
Subsoil	30-80+	10YR33	MCL	Negligible	Not mottled	Weak FSB (breaking to Granular)	> 0.5%	Good	Friable	Common	-	-	Strong brown colour to depth

Depth to Slowly Permeable Horizon :- Not Gleyed No SPL	Available Water Wheat :- Not Limited Potatoes :-	Final ALC Grade :- 2
Wetness Class :- I	Moisture Deficit Wheat :- Potatoes :-	Main Limiting Factor(s) :- Workability (and possible slight exposure)
Wetness Grade :- 2	Moisture Balance Wheat :- Potatoes :-	
RPG0023/WJC	Droughtiness Grade :- 1	Remarks :- Upper Crest Slope Possible Exposure Risk; slight Area surveyed after prolonged dry period

SITE NAME Lizard Local Plan Mullion, Cornwall BFCS 3438	PROFILE NUMBER 3	SLOPE AND ASPECT 2° S facing	LAND USE Bare Soil	Av Rainfall :- 1032	PARENT MATERIAL  Gramscatho Beds (slate/sandstone)
	DATE 7.9.90	GRID REFERENCE		ATO :- 1583 FC Days :- 202 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	10YR42	MCL	2% sst;visual	None	Slight Plough pan at base of topsoil							distinct
Subsoil	25-55+	10YR51	HCL	-	vmpom	Moderate VC Prismatic	< 0.5%	Poor	Firm				

Depth to Slowly Permeable Horizon :- Gleyed < 40 cm  
SPL from 35 cm

Wetness Class :- IV

Wetness Grade :- 3B

RPG0023/WJC

Available Water Wheat :- Not Limiting

Potatoes :-

Moisture Deficit Wheat :-

Potatoes :-

Moisture Balance Wheat :-

Potatoes :-

Droughtiness Grade :- 1

Final ALC Grade :- 3B

Main Limiting Factor(s) :- Wetness

Remarks :-

Area surveyed after prolonged dry period

SITE NAME Lizard Local Plan Mullion, Cornwall BFCS 3438	PROFILE NUMBER 4	SLOPE AND ASPECT Flat	LAND USE Temp. Grass (poor sward)	Av Rainfall :- 1056 ATO :- 1575 FC Days :- 206 Climatic grade:- 1	PARENT MATERIAL  Gramscatho Beds (slate/sandstone)
	DATE 7.9.90	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	0-20	10YR42	MCL	2% sst; visual	not mottled								Distinct
Subsoil1	20-35	2.5Y52	HCL	20% hard sst; sieve	ditto								
Subsoil2	35-55+	2.5Y52 (and ochreous weathering colours)	C	ditto	cdm	Weak MSAB (difficult to assess due to high stone content)	< 0.5%	Moderate	Firm	common to +55 cm (few roots into peds)			

Depth to Slowly Permeable Horizon :- Gleyed < 40 cm No SPL	Available Water Wheat :- 78 mm (stopping at 55cm) Potatoes :-	Final ALC Grade :- 3A
Wetness Class :- WC III	Moisture Deficit Wheat :- 100 mm Potatoes :-	Main Limiting Factor(s) :- Wetness
Wetness Grade :- 3A	Moisture Balance Wheat :- 22 mm Potatoes :-	
RPG0023/WJC	Droughtiness Grade :- at least 3A (assuming Subsoil 2 continues for at least 10cm)	Remarks :- Subsoil structure driven by high stone content; the stones are often larger than the structural units; large % of voids formed by stones. Area surveyed after prolonged dry period.

SITE NAME Lizard Local Plan Mullion, Cornwall BFCS 3438	PROFILE NUMBER 5	SLOPE AND ASPECT Flat	LAND USE Temp Grass	Av Rainfall :- 1056 ATO :- 1575 FC Days :- 206 Climatic grade:- 1	PARENT MATERIAL  Hornblende/Schist
	DATE 7.9.90	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	10YR43	MCL	Negligible	Not mottled								Distinct
Subsoil1	30-70	7.5YR44	MCL	2% hard sst; sieve	Not mottled	Weak MSAB	> 0.5%	Good	Friable				
	70-80+	hard weathering Hornblende (approx 50%; visual)											

Depth to Slowly Permeable Horizon :- Not Gleyed No SPL	Available Water Wheat :- 130 mm (stopping AP at 80cm) Potatoes :-	Final ALC Grade :- 2
Wetness Class :- I	Moisture Deficit Wheat :- 100 mm Potatoes :-	Main Limiting Factor(s) :- Workability
Wetness Grade :- 2	Moisture Balance Wheat :- +30 mm Potatoes :-	
RPG0023/WJC	Droughtiness Grade :- 1	Remarks :- Occasional subsoil stones prevented auger penetration nearby; area surveyed after prolonged dry period