SFCS 2869

1/89c

DEVON COUNTY STRUCTURE PLAN: ADDITIONAL LAND ALLOCATIONS, PLYMOUTH

Land East of Vinery Lane: Agricultural Land Classification

Report of Survey

1. Introduction

In September 1989, a detailed Agricultural Land Classification (ALC) survey was carried out over 67 hectares of land at Elburton on the eastern fringe of Plymouth between the A38 and the A379. This single block of land is bounded to the west by Vinery Lane and to the east by the Elburton-West Sherford road.

The survey was requested by Plymouth City Council and formed one of a number of alternative sites for future expansion of the City and incoporation into the Devon County Structure Plan.

The fieldwork was conducted by the Resource Planning Group at an approximate auger sampling density of one boring per hectare. A total of 89 borings and 3 soil pits were examined.

The ALC 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. The distribution of ALC grades is detailed below and illustrated on the accompanying ALC Map at a scale of 1:10,000. The information is accurate at the scale shown, but any enlargement of the maps would be misleading.

Table 1: Distribution of ALC Grades

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3B	55.9	83.6	90.4
4	5.9	8.8	9.6
Non-Agric	0.4	0.6	100% (60.8 ha)
Urban	3.5	5.2	
Farm Buildings	1.2	1.8	
	66.9 ha	100%	

2. Climate

Estimates of important climatic variables were obtained for three representative locations by interpolation from a 5 km grid database in order to assess any overall climatic limitation. The important parameters for assessing such a limitation are accumulated temperature (a measure of the relative warmth of a locality) and average annual rainfall (a measure of overall wetness). The results (shown in Table 2) reveal that the northern part of the site which lies over 50 metres in altitude does suffer from an overall climatic limitation and cannot be graded higher than Grade 2.

Minor evidence of wind pruning of trees was noted in the higher north-eastern section of the survey area, but this is not a significant factor in the grading process as this land is already downgraded by an overall climatic limitation.

Table 2: Climatic Interpolations

Grid Reference		SX 546541	SX544549	SX542542
Height (m)	:	50	76	42
Accumulated Temperature (°days)	:	1568	1539	1578
Average Annual Rainfall (mm)	:	1162	1220	1143
Field Capacity (days)	:	228	236	225
Moisture Deficit, Wheat (mm)	:	91	85	93
Moisture Deficit, Potatoes (mm)	:	78	71	81
Climatic Grade	:	1	2	1

The interpolations also reveal that the important FC Day isoline of 225 days runs through the site at approximately 40 metres. Similar soils above and below this line **might** therefore experience different workability limitations (see Table 6, Revised Guidelines for Heavy Clay Loam topsoils in Wetness Class I). Section 4 expands on this issue.

3. Topography and Geology

The site comprises gentle south-facing slopes where altitudes range from 76 metres to 35 metres. Gradient is not a limiting factor. A slight valley feature runs NE/SW through the site.

The higher, northern land is underlain by Slate in its characteristic weathered (shillet) form which has given rise to shallow soils with a soil depth and soil workability problem. Part of the valley feature comprises alluvium, which may have restricted drainage in places.

The southern section is underlain by limestone which has given rise to heavy but free-draining soils with a workability limitation.

4. Agricultural Land Classification

The majority of the survey area has been mapped as **sub-grade 3B.** The soils in the northern and eastern fringes on the high land are restricted to this grade by a soil workability and/or soil depth limitation. Topsoil textures reveal high clay contents (clay or heavy clay loam) which immediately limit these Wetness Class 1 soils to 3B, given the high FC Day value (+225 days) which prevails. Thin, vertically bedded slate often occurs at shallow depths (less than 30 cm) immediately below the topsoil causing a soil depth limitation and also greatly restricting observed root penetration which produces a further significant droughtiness limitation.

Topsoil texture is the critical factor in grading the lower lying land in the south, at less than 225 FC days. Soil Pit No 1 is typical of this area and reveals deep soils which have neither gleying or slowly permeable layers and are therefore placed in Wetness Class I. Several soil analyses of topsoil texture revealed a mixture of heavy clay loams

and clays and that, on balance, the dominant topsoil texture in this area is clay (ie +35% clay sized material). As a result, a 3B soil workability limitation affects this section.

A limited area of Grade 4 land has been mapped around those soils which do show clear evidence of gleying (but not necessarily with SPLs) and are therefore placed at best in Wetness Class III and Grade 4 (reflecting a more severe workability limitation than elsewhere).

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 Pit Descriptions, Vinery Lane East, Elburton, Plymouth

Soil Pit No 1

Topsoil: Heavy Clay Loam/Clay; texture grades into Clay below 30 cm
7.5YR32, dark brown
1-2% very fine stones throughout (less than 2 mm)

Subsoil: Structure below 35 cm is Medium Sub-angular Blocky; weak; friable.
There are no evident peds with clay skins despite the high clay content.
The intimate mix of soil and fine stone seems to prevent clear structural units.
Similar colour to topsoil.
No evidence of Wetness.
Common earthworm channels; porosity 0.5% 0.5 mm.

Structure below 60 cm; again difficult to obtain clear structural units.
Towards Coarse Subangular Blocky; weak; friable. Intimate mix of soil and fine stone (2 mm).

Soil continues to + 80 cm. No evidence of wetness or SPL, Wetness Class 1.

ALC grade dependent on topsoil texture (for FCD value 225); HCL = 3A
C = 3B

Soil Pit No 2

Pit Description took the form of trench inspection for building extension.

Topsoil: depth varies from 22-35 cm.
Clay
7.5YR32/34, dark brown
some rusty roots, no evidence of mottling
intimate mix of soil matrix and very fine slate (less than 2 mm mostly).

Vertically bedded slate immediately below topsoil.
Root penetration to about 40 cm, below is rock that is not penetrated.

ALC Grade = 3B (workability, depth and droughtiness).

Soil Pit No 3

Topsoil: 0-23 cm
Heavy Clay Loam/Clay
10YR43, brown
No evidence of wetness
Stone free

Subsoil: 23-55 cm
Clay, similar colour to topsoil
20-30% mix of thin, fine slate (less than 2 cm)
Penetrated by roots

Soil Pit dug to 55 cm. Slate content gradually increases with depth. Further augering reveals impenetrable layer at 65 cm (roots can penetrate to at least this depth). No evidence of wetness throughout the profile; structure assumed "good" due to high stone content.

ALC Grade = 3B (workability)

[RPG-30]SJ

Soil Profile Descriptions: Explanatory Note

Soil texture classes are denoted by the following abbreviations:

Sand **S**; Loamy Sand **LS** Sandy Loam **SL**; Sand Silt Loam **SZL**; Silt Loam **ZL**;

Medium Silty Clay Loam **MZCL**; Medium Clay Loam **MCL**; Sandy Clay Loam **SCL**;

Heavy Silty Clay Loam **HZCL**; Heavy Clay Loam **HCL**; Sandy Clay **SC**;

Silty Clay **ZC**; Clay **C**

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:

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

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**".

Other notation:

st	stones (6 cm)
sst	small stones (2 cm - 6 cm)
vsst	very small stones (2 mm - 2 cm)
Mn	manganese
cdom/cfom	common distinct/feint ochreous mottles
mpom	many prominent ochreous mottles (**VMPOM** = very many ..)

Few = 1-5%; **common** = 6-15%; **many** = 16-35%; **very many** = +35%