

SFCs 5045

15/93

Killiw Golf Park  
Kea, near Truro, Cornwall

**AGRICULTURAL LAND CLASSIFICATION  
REPORT OF SURVEY**

Resource Planning Team  
Taunton Statutory Unit

April 1993

# AGRICULTURAL LAND CLASSIFICATION

## KILLIOW GOLF PARK, KEA, NEAR TRURO, CORNWALL

### REPORT OF SURVEY

#### 1. INTRODUCTION

- 1.1 The site, an area of 68 ha of Killiow Estate, is located to the west of the A39 at Playing Place. The survey work was completed on behalf of MAFF as part of its statutory role in response to an ad hoc planning application to Carrick District Council. The survey work was carried out in April 1993 by ADAS's Resource Planning Team (Taunton Statutory Unit) using the Agricultural Land Classification system. The field work was carried out at a scale of 1:10,000 (approximately one sample point every hectare of agricultural land). These borings were supplemented by 4 soil inspection pits in order to assess subsoil conditions. The information is correct at the scale shown but any enlargement would be misleading.
- 1.2 The published Provisional 1" to the mile ALC map of this area (MAFF 1961) shows much of the site to be Grade 2, with some Grade 3 in the southern part. The site comprises part of an area which was surveyed in 1982 using the original guidelines. This indicates that Grade 2 land was found in the central part of the site with 3a and 3b on the land to the east and west. The current survey was undertaken to provide a more detailed representation of the agricultural land quality using the Revised Guidelines and Criteria (MAFF 1988) and this supersedes any previous surveys. These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The grading takes account of the top 120 cm of the soil profile.
- 1.3 The proportion of ALC grades are shown in the table below and are illustrated on the accompanying map. A description of the grades used in the ALC system can be found in the Appendix.

Table 1 Distribution of ALC grades: Killiow

| GRADE            | AREA<br>(ha) | % OF SURVEY<br>AREA | % OF AGRICULTURAL<br>LAND |
|------------------|--------------|---------------------|---------------------------|
| 2                | 14.6         | 22.0                | 29.9                      |
| 3a               | 17.2         | 26.0                | 35.2                      |
| 3b               | 12.1         | 18.3                | 24.7                      |
| 4                | 5.0          | 7.5                 | 10.2                      |
| Urban            | 1.6          | 2.4                 |                           |
| Non-agricultural | 15.8         | 23.8                |                           |
| TOTAL            | 66.3         | 100%<br>(66.3 ha)   | 100%<br>(48.9 ha)         |

## 2.0 CLIMATE

- 2.1 The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to lower grades despite other favourable conditions.
- 2.2 Climatic data for the site was interpolated from the published Agricultural Climate Dataset ( Meteorological Office 1989). The parameters used for assessing climate are accumulated temperature (a measure of relative warmth of a locality) and average annual rainfall (a measure of overall wetness). The results shown in Table 2 indicate that there is no climatic limitation.

Table 2 Climatic interpolations: Killiow

|                                  |           |           |
|----------------------------------|-----------|-----------|
| Grid Reference                   | SW 806413 | SW 812423 |
| Height (m)                       | 95        | 25        |
| Accumulated Temperature (° days) | 1540      | 1619      |
| Average Annual Rainfall (mm)     | 1103      | 1023      |
| Overall Climatic Grade           | 1         | 1         |
| Field Capacity (days)            | 215       | 203       |
| Moisture Deficit - Wheat (mm)    | 89        | 101       |
| Potatoes (mm)                    | 76        | 94        |

- 2.3 No local climatic factors such as exposure were noted in the survey area. Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. This data is used in assessing the soil wetness and droughtiness limitations referred to in Section 5.

## 3. RELIEF

- 3.1 The site occupies a valley which rises from 25 m AOD at the most northerly point to 95 m AOD on the southern boundary. The north-east and north-west facing slopes are moderately steep in places imposing 3b and 4 slope limitations.

## 4. GEOLOGY AND SOILS

- 4.1 The published 1:50,000 scale solid and drift geology map sheet 352 (Geological Survey of England and Wales, 1974) shows the majority of the site to be underlain by Devonian sandstone and shales. A narrow strip of alluvium occupies the valley floor.
- 4.2 The Soil Survey of England and Wales mapped the soils of the area in 1983, at a reconnaissance scale of 1:250,000. This map shows the soils to comprise the Denbigh 2 Association\*.

During the recent field survey two basic soil types were identified.

\* Denbigh 2 Association: well-drained fine loamy soils over slate or slate rubble. Some fine loamy soils variably affected by groundwater.

- 4.3 Soils on the south-east facing slopes and the gentle sloping land in the northern part of the site comprise slightly stony medium clay loam or medium silty clay loam topsoils over moderately and very stony well-drained clay loam and silty clay loam subsoils.
- 4.4 The second soil type corresponds to the less well-drained soils on the lower slopes of the site on either side of the stream and two fields to the west of Home Farm. These soils are similar in texture to the soils described in paragraph 4.3. However, lower subsoils comprise silty clay and heavy silty clay loam textures which exhibit strong mottling indicative of gleying.

## 5. AGRICULTURAL LAND CLASSIFICATION

- 5.1 The distribution of ALC grades identified in the survey area is detailed in section 1 and shown on the accompanying ALC map. This shows nearly two-thirds of the site to be best and most versatile land.

### Grade 2

- 5.2 The largest area of Grade 2 land was found immediately to the east of Killiow House and on the gentle slopes of the southern most part of the site. These soils are well drained with no evidence of wetness and have been assessed as Wetness Class I. The deep clay loam and silty clay loam profiles provide sufficient moisture for there to be no drought limitation for the indicator crops of potatoes and wheat. However, these soils are limited by an overall workability limitation due to the combination of high field capacity days (210 days) and a medium clay loam topsoil texture.

### Subgrade 3a

- 5.3 These soils relate to the soil type described in paragraph 4.4. Profiles are assessed as Wetness Classes II and III due to the presence of gleying in the subsoils. When combined with the medium clay loam topsoil and high FC days, an overall 3a wetness limitation is allocated to this land.

### Subgrade 3b and Grade 4

- 5.4 Land between 7 and 11° slope has been allocated to Subgrade 3b, whilst the steeper slopes (11-18°) are limited to Grade 4. This land has an increased risk of soil erosion and is unsuitable for the safe operation of the machinery used in some soil cultivations and crop harvests.

Non-agricultural Land and Urban Land

5.5 There was a total of 15.8 ha of non-agricultural land found in the survey area. This relates to the mature woodland and a small lake associated with Killiow Park. A total of 1.6 ha of urban land comprises roads and private houses.

## REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1974) Solid and Drift edition. Sheet 352 1:50,000 scale

MAFF (1961) Agricultural Land Classification Map Sheet 190 Provisional 1:63,360 scale

MAFF (1988) Agricultural Land Classification of England and Wales (revised guidelines and criteria for grading the quality of land) Alnwick

METEOROLOGICAL OFFICE (1989) Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office

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

## APPENDIX

### DESCRIPTION OF THE GRADES AND SUB-GRADES

#### 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 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: 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.

### 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.



| SITE NAME                     |                      | PROFILE NO.                 |         | SLOPE AND ASPECT                                   |   | LAND USE                              |  | Av Rainfall: 1103 mm |             | PARENT MATERIAL                   |                           |                  |   |
|-------------------------------|----------------------|-----------------------------|---------|--|---|---------------------------------------|--|----------------------|-------------|-----------------------------------|---------------------------|------------------|---|
| Killiow Golf Course, Cornwall |                      | Pit 2                       |         | 3° North   |   | Permanent Pasture                     |  | ATO: 1540°C          |             | Devonian Sandstone and Shale      |                           |                  |   |
| JOB NO.                       |                      | DATE                        |         | GRID REFERENCE                                     |   | DESCRIBED BY                          |  | FC Days: 210         |             | SOIL SAMPLE REFERENCE             |                           |                  |   |
| 15/93                         |                      | 21/4/93                     |         | ASP 50   |   | N Done                                |  | Climatic Grade: 1    |             |                                   |                           |                  |   |
| Horizon Number                | Lowest Av Depth (cm) | 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                             | 30                   | 10YR53                      | MCL     | 5% Sm HR   | -   | Weak dev C + M SAB                    | -                                      |                      | Friable     | Many fine and v fine, fibrous     | -                         | Few at 25 cm     | Clear/ smooth                           |
| 2                             | 45                   | 25Y64 + 72                  | HZCL    | Sieved 11% >2cm<br>28% <2cm<br>39% HR<br>(some ZR) | CDOM 10YR58                                   | WD CSAB Angular around stones         | >0.5% pores. Root + biopores           | M                    | Friable     | Common fine + v fine              | -                         | V many mang conc | Abrupt/ smooth                          |
| 3                             | 80+                  | 25Y72                       | H/MZCL  | 40% Total ZR                                       | MDOM 10YR58/68                                | WD CSAB tending to platy              | <0.5% pores but fissures around stones | P                    | Firm        | Few f. roots observed to 50cm     | -                         | V many           |   |

Impossible to auger at 100 cm

Not SPL due to high stone content and fissures round stones.

|                                      |                     |                  |  |
|--------------------------------------|---------------------|------------------|--|
| Profile Gleyed From: 30              | Available Water     | Wheat: 117 mm    | Final ALC Grade: 3a                                    |
| Depth to Slowly Permeable Horizon: - |                     | Potatoes: 99 mm  | Main Limiting Factor(s): Wetness                       |
| Wetness Class: III                   | Moisture Deficit    | Wheat: 95 mm     |  |
| Wetness Grade: 3a                    |                     | Potatoes: 85 mm  | Remarks:<br>Calculated using 29% HR - H2, 40% ZR - H3. |
|                                      | Moisture Balance    | Wheat: +22 mm    |  |
|                                      |                     | Potatoes: +14 mm |  |
| VP336-9                              | Droughtiness Grade: | 3a               |  |

| SITE NAME<br>Killiow Golf Course,<br>Cornwall |                      | PROFILE NO.<br>Pit 1        |            | SLOPE AND ASPECT<br>5° NE                        |   | LAND USE<br>Permanent Grazing              |                    | Av Rainfall: 1103 mm<br>ATO: 1540°C<br>FC Days: 210<br>Climatic Grade: 1 |             |   | PARENT MATERIAL<br>Devonian Sandstone and Shale |                  |   |
|---|----------------------|-----------------------------|------------|--|---|--|--------------------|--|-------------|---|---|------------------|---|
| JOB NO.<br>15/93                              |                      | DATE<br>21/4/93             |            | GRID REFERENCE<br>ASP 23                         |   | DESCRIBED BY<br>GSI                        |                    |  |             |   | SOIL SAMPLE REFERENCE                           |                  |   |
| Horizon Number                                | Lowest Av Depth (cm) | 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   | 20                   | Matrix = 10YR43             | MCL        | 5% HR  | None  | -  | Good               | -  | -           | Many fine and v fine, fibrous                       | Non calc  | None             | Smooth abrupt                           |
| 2   | 70                   | 10YR44                      | HCL (HZCL) | 23% HR   | None  | WCSAB (slightly better developed at depth) | Good               | Moderate   | Friable     | Many to 38 cm, few to 70 cm. Fine + v fine, fibrous | Non calc  | None             | Clear wavy                              |
| 3   | 120                  | 10YR56                      | HZCL       | 15% HR and ZR (>2mm, <2cm)<br>8% MSST >2cm (est) | None  | MCSAB                                      | Good               | Moderate   | Friable     |   |   |                  |   |

Profile Gleyed From: None

Depth to Slowly Permeable Horizon: None

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 127 mm

Potatoes: 97 mm

Moisture Deficit Wheat: 95 mm

Potatoes: 85 mm

Moisture Balance Wheat: +32 mm

Potatoes: +12 mm

Droughtiness Grade: 1

Final ALC Grade: 2

Main Limiting Factor(s): Workability

Remarks:

Pit dug to 110 cm.

| SITE NAME<br>Killiow Golf Course,<br>Cornwall |                      | PROFILE NO.<br>Pit 4        |           | SLOPE AND ASPECT<br>6° NE                             |   | LAND USE<br>Barley                    |                    | Av Rainfall: 1103 mm<br>ATO: 1540°C |             | PARENT MATERIAL<br>Devonian Sandstone and Shale |                           |                  |   |
|---|----------------------|-----------------------------|-----------|---|---|---------------------------------------|--------------------|-------------------------------------|-------------|---|---------------------------|------------------|---|
| JOB NO.<br>15/93                              |                      | DATE<br>22/4/93             |           | GRID REFERENCE<br>ASP 65                              |   | DESCRIBED BY<br>GSI and N A Done      |                    | FC Days: 210<br>Climatic Grade: 1   |             | SOIL SAMPLE REFERENCE                           |                           |                  |   |
| Horizon Number                                | Lowest Av Depth (cm) | 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   | 35                   | 10YR43                      | MCL (HCL) | 15% HR <2cm (sieved)                                  | None  | -                                     | Good               | -                                   | -           | Many fine + v fine                              | Non calc                  | None             | Smooth abrupt                           |
| 2   | 65                   | 75YR56                      | HZCL      | 18% >2cm<br>45% <2cm<br>63% Total silty rock (sieved) | None  | V coarse platy - determined by stones | Well fissured      | Poor                                | Friable     | Few fine + v fine to 56 cm                      | Non calc                  | None             | Clear/wavy                              |
| 3   | 90+                  | 10YR54                      | ZL        | 20% >2cm<br>50% <2cm<br>70% ZR                        | None  | As above                              | Well fissured      | Poor                                | Friable     | None observed                                   | Non calc                  | None             |   |

Profile Gleyed From: None

Depth to Slowly Permeable Horizon: None

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 111 mm

Potatoes: 88 mm

Moisture Deficit Wheat: 95 mm

Potatoes: 85 mm

Moisture Balance Wheat: +16 mm

Potatoes: +3 mm

Droughtiness Grade: 2

Final ALC Grade: 2

Main Limiting Factor(s): Workability

Remarks:

Pit dug to 90 cm.

VP336-9

| SITE NAME<br>Killiow Golf Course,<br>Cornwall |                      | PROFILE NO.<br>Pit 3        |              | SLOPE AND ASPECT<br>2° North                   |   | LAND USE<br>OSR  |                                       | Av Rainfall: 1103 mm<br>ATO: 1540°C<br>FC Days: 215<br>Climatic Grade: 1 |             | PARENT MATERIAL<br>Devonian Sandstone and Shale |                           |                  |   |
|---|----------------------|-----------------------------|--------------|--|---|--|---------------------------------------|--|-------------|---|---------------------------|------------------|---|
| JOB NO.<br>15/93                              |                      | DATE<br>22/4/931            |              | GRID REFERENCE<br>ASP 12                       |   | DESCRIBED BY<br>N A Done                                     |                                       | SOIL SAMPLE REFERENCE  |             |   |                           |                  |   |
| Horizon Number                                | Lowest Av Depth (cm) | 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   | 20 cm                | 10YR42                      | MCL          | 5% <2cm<br>5% >2cm<br>10% HR Total             | -   | -  | >0.5% earthworms                      | -  | -           | Many fine + v fine, fibrous                     | -                         | -                | Clear/ smooth                           |
| 2   | 42 cm                | 10YR33                      | MCL/<br>MZCL | 12% est HR,<br>few ZR                          | -   | WD CSAB  | >0.5% P+F                             | M  | Friable     | Many fine + v fine                              | -                         | -                | Clear/ smooth                           |
| 3   | 90+                  | 25Y72 + 80                  | MCL          | 12% HR   | MDOM<br>10YR58                                | Difficult to assess - probably WD CSAB. Angular round stones | >0.5% P+F earthworm channels observed | P  | Firm        | Common roots partially in pores                 | -                         | -                | -                                       |

Profile Gleyed From: 42  
Depth to Slowly Permeable Horizon: 42  
Wetness Class: III  
Wetness Grade: 3a

Available Water Wheat:  
Potatoes:  
Moisture Deficit Wheat: 95 mm  
Potatoes: 85 mm  
Moisture Balance Wheat:  
Potatoes:  
Droughtiness Grade:

Final ALC Grade: 3a  
Main Limiting Factor(s): Workability

Remarks:

VP336-9