EFC 4997 11/93

# THE COTSWOLD COMMUNITY, SOMERFORD KEYNES, WILTS

## AGRICULTURAL LAND CLASSIFICATION

Report of Survey

### 1. INTRODUCTION

Forty two hectares of land at the Cotswold Community were graded using the Agricultural Land Classification (ALC) System in February 1993. The survey was carried out for MAFF as part of its statutory role in connection with a proposed minerals planning application by Wiltshire County Council.

The fieldwork was carried out by ADAS's Resource Planning Team (Taunton Statutory Unit) at a scale of 1:10,000 (approximately one sample point every hectare). The information is correct at this scale but any enlargement would be misleading. A total of 42 auger borings and 6 soil profile pits were examined.

The published Provisional 1" to the mile ALC map of this area (MAFF 1973) shows the site to be Grades 2 and 3. The recent survey supercedes this map having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988).

The Agricultural Land Classification provides 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 120cm of the soil profile. A description of the grades used in the ALC System can be found in the appendix.

**Table 1 Distribution of ALC grades: Cotswold Community**

| Grade | Area (ha) | % of Survey Area | % of Agricultural Land |
|---|---|---|---|
| 3A | 15.5 | 37.6 | 37.6 |
| 3B | 25.7 | 62.4 | 62.4 |
| TOTAL | 41.2 | 100% | 100% |

## 2. CLIMATE

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.

Estimates of climatic variables were obtained for the site by interpolation from the 5km grid Meteorolgical Office Database (Meteorological Office 1989) and are shown in Table 2.

The parameters used for assessing overall climatic limitation are accumulated temperature, (a measure of the relative warmth of a locality) and average annual rainfall, (a measure of overall wetness). The values shown in Table 2 reveal that there is no overall climatic limitation.

No locally limiting 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. These data are used in assessing the soil wetness and droughtiness limitations referred to in Section 5.

Table 2 Climatic Interpolations: Cotswold Community

| Grid Reference | SU 033 958 | SU 036 959 |
|---|---|---|
| Height (m) | 90 | 95 |
| Accumulated Temperature (day deg) | 1426 | 1420 |
| Average Annual Rainfall (mm) | 747 | 752 |
| Overall Climatic Grade | 1 | 1 |
| Field Capacity (Days) | 171 | 172 |
| Moisture Deficit, Wheat (mm) | 98 | 98 |
| Potatoes (mm) | 88 | 87 |

## 3. RELIEF

The site is virtually flat and lies adjacent to the the hill Ashton Down. The site is at about 90m OAD.

## 4. GEOLOGY AND SOILS

The published 1:50,000 scale solid and drift geology map, sheet 252 (Geological Survey of England and Wales 1974), shows the majority of the site to be underlain by First Terrace river deposits whilst the area adjacent to Ashton Down has Kellaway Clays.

The Soil Survey of England and Wales mapped the soils of the area in 1983, at a reconnaisance scale of 1:250,000. This map shows the soils to be of a single association within the survey area. These soils of the Badsey 2 Association are

well drained calcareous fine loamy soils over limestone gravel.

Several different types of soil were identified in the area during the recent ALC survey. All the soils were droughty to varying extents because of high stone contents in the lower horizons. Some of the soils in the east also showed evidence of restricted drainage. These soils have clay topsoils whilst in the west the topsoils are heavy clay loams as confirmed by particle size distribution analysis.

## 5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades identified in the survey area is detailed in Section 1 and shown on the accompanying ALC map. The information is correct at the scale shown but any enlargement would be misleading.

### Subgrade 3a

Several areas of Subgrade 3a were identified in the survey area. These soils have heavy clay loam topsoils with 15-20% stones (>2mm). The soils become lighter in texture with depth and the stone content increases, but not significantly until deeper in the profile than soils described under Subgrade 3b. This means that there is a greater amount of available water in the profile and the soils are only limited to 3a on droughtiness. Stone contents were measured by sieving and displacement in water from horizons in a soil pit.

### Subgrade 3b

A larger area of Subgrade 3b was found. To the east of the track the soils have clay topsoils, whilst to the west the topsoils are heavy clay loams. The topsoil stone content is variable within this unit as measured at eight locations by sieving. The soils in the east are droughty but are limited to 3b by a combination of wetness and clay topsoils. These soils show evidence of restictions in drainage in the form of gleying. This is present within the top 40cm of the profile. There is no slowley permeable layer in the profile. The soils are therefore asigned to Wetness Class II. The remaining 3b soils are limited by droughtiness. These soils have variable topsoil stone contents (measured to be 3-32%). The subsoil textures and stone contents are also variable. However in each case the combination of these two variables limits the available water in the profile such that the soils can be graded no better than Subgrade 3b.

## REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1974) Solid and Drift edition. Sheet 252 Swindon, Provisional 1:50,000 scale

MAFF (1973) Agricultural Land Classification Map Sheet 157 Provisional 1:63,360 scale

MAFF(1988) Agricultural Land Classification of England and Wales (Revised guidelines and criteria fro grading the quality of agricultural 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 an 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 NUMBER | SLOPE AND ASPECT | LAND USE | Av Rainfall :- 752 | PARENT MATERIAL |
|---|---|---|---|---|---|
| Cotswold Community | 1 | 0 | OSR | ATO :- 1420 | Kellaways Clay |
| | | | | FC Days :- 171 | |
| JOB NO | DATE | GRID REFERENCE | DESCRIBED BY | Climatic grade :- 1 | |
| 11/93 | 12/2/93 | SU 035 960 | GMS | | |

| 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 | 29 | 10YR43 | HCL | 0 Sieved | - | WMSAB | Good | - | Friable | Med + fine many | | - | Abrupt smooth |
| 2 | 60 | 10YR58 | MSL | 0 Sieved | - | MCAB | Low | Moderate | Friable | Fine + many | | - | Clear smooth |
| 3 | 73 | 10YR52 | C | 0 Sieved | 10YR58 common | MCSAB | Low | Moderate | Firm | Fine + many | | - | Abrupt smooth |
| 4 | 90 | 10YR53 | C | 27% Sieved HR | 10YR68 common | MCSAB | Low | Moderate | Friable | Fine common | | - | Clear smooth |
| 5 | Dug to 100 cm | 10YR54 | LMS | 59% wet sieved HR | - | WMG | Good | Good | Friable | A few | | - | |

Profile Gleyed From:- 60 cm

Depth to Slowly Permeable Horizon:- None

Wetness Class :- 1

Wetness Grade :- 2

Available Water Wheat :- 125

Potatoes :- 115

Moisture Deficit Wheat :- 98

Potatoes :- 87

Moisture Balance Wheat :- +27 )LMS assumed to 120

Potatoes :- +28 )

Droughtiness Grade :- 2

Final ALC Grade :- 2

Main Limiting Factor(s) :- Droughtiness

Remarks :-

Pit dug to 100 cm

| SITE NAME | PROFILE NUMBER | SLOPE AND ASPECT | LAND USE | Av Rainfall :- 752 | PARENT MATERIAL |
|---|---|---|---|---|---|
| Cotswold Community | 2 | 0 | Set aside | ATO :- 1420 | First River Terrace Deposits |
| | | | | FC Days :- 171 | |
| JOB NO | DATE | GRID REFERENCE | DESCRIBED BY | Climatic grade :- 1 | |
| 11/93 | 12/2/93 | SU 033 963 | NAD | | |

| 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 | 19 | 10YR42 | HCL | 32% HR | - | WCSAB | Good | - | Friable | Fine many | | - | Abrupt smooth |
| 2 | 35 | 10YR54 | C | 43% HR | - | MCSAB | Good | Mod | Friable | Fine many | | - | Clear smooth |
| 3 | 48 | 10YR53 | LMS | 52% HR | Weathering colours round stones (rusty) | WMSAB | Good | Good | V Friable | V fine common | | - | Clear smooth |
| 4 | 58 | 10YR82 | MS | 66% HR (Compacted) | - | - | Good | Good | V Friable | Few | | - | |
| 5 | 94 | 10YR76 | MS | 73% GH (99% used in calc to get stone) | - | - | Good | Good | V Friable | Few | | - | |

Profile Gleyed From:- None

Depth to Slowly Permeable Horizon:- None

Wetness Class :- I

Wetness Grade :- 2

Available Water Wheat :- 53

Potatoes :- 50

Moisture Deficit Wheat :- 98

Potatoes :- 87

Moisture Balance Wheat :- -45

Potatoes :- -37

Droughtiness Grade :- 3B

Final ALC Grade :- 3B

Main Limiting Factor(s) :- Dr

Remarks :-

Pit dug to 90 cm.

Stone convents by sieving.

| SITE NAME | PROFILE NUMBER | SLOPE AND ASPECT | LAND USE | Av Rainfall :- 752 | PARENT MATERIAL |
|---|---|---|---|---|---|
| Cotswold Community | 3 | 0 | OSR | ATO :- 1420 | First River Terrace Deposits/ Kellaways Clay |
| | | | | FC Days :- 171 | |
| JOB NO | DATE | GRID REFERENCE | DESCRIBED BY | Climatic grade :- 1 | |
| 11/93 | 23/2/93 | SU 034 962 | NAD | | |

| 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 | 0-23 | 10YR43 | C | 5% >2mm (Sieved) HR | None | MCSAB | Good | - | Friable | Many fine | None | None | Abrupt smooth |
| 2 | 23-33 | 10YR54 | HCL | 5% >2mm (visual) HR | Few och mottles around weathered stones | MCSAB | Good | Moderate | Friable | Many fine | None | None | |
| 3 | 33-47 | 10YR54 | HCL | 50% HR (Sieved) | " | WVCG | Good | Moderate | Friable | Many fine | Calc | None | |
| 4 | 47-60 | 10YR41 | C | 2% HR (Visual) | CDOM (10YR58) (Gleyed) | MCSAB | Good | Moderate | Friable | Common roots | None | None | |
| 5 | 60-80 | 10YR73 | MS | 23% HR (Sieved) | None | WCSAB | Good | Moderate | V Friable | Few fine | Calc | None | |
| 6 | 80-95+ | 10YR76+66 | MS | 39% HR (Sieved) | None | WCSAB | Good | Moderate | V Friable | None | Calc | None | |

Profile Gleyed From:- 47 cm

Depth to Slowly Permeable Horizon:- None

Wetness Class :- 1

Wetness Grade :- 3A

Available Water Wheat :- 96

Potatoes :- 92

Moisture Deficit Wheat :- 98

Potatoes :- 87

Moisture Balance Wheat :- -2

Potatoes :- 5

Droughtiness Grade :- 3a

Final ALC Grade :- 3a

Main Limiting Factor(s) :- Workability
Droughtiness

Remarks :-

| SITE NAME | PROFILE NUMBER | SLOPE AND ASPECT | LAND USE | Av Rainfall :- 752 | PARENT MATERIAL |
|---|---|---|---|---|---|
| Cotswold Community | 4 | 0 | OSR | ATO :- 1420 | Kellaways Clay |
| | | | | FC Days :- 171 | |
| JOB NO | DATE | GRID REFERENCE | DESCRIBED BY | Climatic grade :- 1 | |
| 11/93 | 23/2/93 | SU 035 966 | GMS | | |

| 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 | 10YR41 | C | 3% >2mm (Sieved) HR | None | MCSAB | Good | - | Friable | Common fine | Calc | None | Clear wavy |
| 2 | 20-30 | 10YR53 | C | 2% >2mm (Visual) HR | Common flint och mottles (gleyed) | MCSAB (many small peds → porosity higher) | Low MSAB | Moderate | Friable | Common fine | Calc | None | |
| 3 | 30-48 | 10YR53 | C | 34% HR (Sieved) | None | MCSAB | Good | Moderate | Friable | Common fine | Calc | None | Smooth |
| 4 | 48-75+ | 10YR73 | MS | 69% HR (Sieved) | None | - | Good | Moderate | V Friable | None | Calc | None | |

Profile Gleyed From:- 20 cm

Depth to Slowly Permeable Horizon:- None

Wetness Class :- II

Wetness Grade :- 3a

Available Water Wheat :- 81

Potatoes :- 75

Moisture Deficit Wheat :- 98

Potatoes :- 87

Moisture Balance Wheat :- -17

Potatoes :- -12

Droughtiness Grade :- 3a

Final ALC Grade :- 3a

Main Limiting Factor(s) :- Workability
Droughtiness

Remarks :-

| SITE NAME | PROFILE NUMBER | SLOPE AND ASPECT | LAND USE | Av Rainfall :- 752 | PARENT MATERIAL |
|---|---|---|---|---|---|
| Cotswold Community | 5 | 0 | Cereal | ATO :- 1402 | First River Terrace Deposits |
| | | | | FC Days :- 171 | |
| JOB NO | DATE | GRID REFERENCE | DESCRIBED BY | Climatic grade :- 1 | |
| 11/93 | 24/2/93 | SU 030 957 | | | |

| 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 | 0-27 | 10YR43 | HCL | 32% >2mm (Sieved) HR | None | WDCSAB | Good | - | Friable | Many fine | / | X | Sharp wavy |
| 2 | 27-50 | 10YR66 | MS | 68% HR (Sieved) | None | WMSAB | Good | Moderate | V Friable | Common V Fine | / | X | Gradual wavy |
| 3 | 50-70 | 10YR76 | MS | 77% GH (Sieved) (99% used in Calc to get stone) | None | - | Good | Moderate | V Friable | Few V Fine (to 65cm) | / | X | Gradual wavy |
| 4 | 70-90+ | 10YR66 | MS | 68% HR (Sieved) | None | - | Good | Moderate | V Friable | | / | X | |

Profile Gleyed From:- None

Depth to Slowly Permeable Horizon:- None

Wetness Class :- I

Wetness Grade :- 2

Available Water Wheat :- 49

Potatoes :- 43

Moisture Deficit Wheat :- 98

Potatoes :- 87

Moisture Balance Wheat :- -49

Potatoes :- -44

Droughtiness Grade :- 3b

Final ALC Grade :- 3b

Main Limiting Factor(s) :- Droughtiness

Remarks :-

Pit dug to 90cm.

No water table.

| SITE NAME | PROFILE NUMBER | SLOPE AND ASPECT | LAND USE | Av Rainfall :- 752 | PARENT MATERIAL |
|---|---|---|---|---|---|
| Cotswold Community | 6 | 0 | Cereal | ATO :- 1402 | First River Terrace Deposits |
| | | | | FC Days :- 171 | |
| JOB NO | DATE | GRID REFERENCE | DESCRIBED BY | Climatic grade :- 1 | |
| 11/93 | 24/2/93 | SU 031 961 | GWS | | |

| 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 | 30 | 10YR43 | HCL | 16% HR (Sieved) | None | WCSAB | Good | - | Friable | Many fine | Slightly | X | Abrupt Smooth |
| 2 | 50 | 75YR34 | HCL | 7% HR (Sieved) | None | MCSAB | Good | Moderate | Friable | Common fine | None | X | Abrupt Smooth |
| 3 | 58 | 10YR44 | HCL | 34% HR (Sieved) | None | WCSAB | Good | Moderate | Friable | Common fine | Yes | X | Abrupt smooth |
| 4 | 80 | 10YR66 | LMS | 64% HR (Sieved) | None | - | Good | Moderate | V Friable | None visible | Yes | X | Clear wavy |
| 5 | 80+ | 10YR34 | MS | 77% GH (Sieved) | None | - | Good | Moderate | V Friable | | Yes | | |

Profile Gleyed From:- None

Depth to Slowly Permeable Horizon:- None

Wetness Class :- I

Wetness Grade :- 2

Available Water Wheat :- 89

Potatoes :- 88

Moisture Deficit Wheat :- 98

Potatoes :- 87

Moisture Balance Wheat :- -9

Potatoes :- 1

Droughtiness Grade :- 3a

Final ALC Grade :- 3a

Main Limiting Factor(s) :- Droughtiness

Remarks :-