NORTH DEVON LOCAL PLAN: BARNSTAPLE

AGRICULTURAL LAND CLASSIFICATION

Report of Survey

1. SUMMARY

Thirty eight hectares of land at five sites around Barnstaple were surveyed using the Agricultural Land Classifiaction (ALC) System in January 1994. The survey was carried out for MAFF as part of its statutory input into the North Devon Local Plan. The five sites surveyed were Old Torrington Road, Larkbear, Waytown, Silver Leat and Northfield Lane.

The fieldwork was carried out by ADAS (Resource Planning Team, Taunton Statutory Unit) at a scale of 1:10,000. The information is correct at this scale but any enlargement would be misleading. The distribution of grades identified in the survey areas is detailed below and illustrated on the accompanying ALC maps.

Distribution of ALC grades: Barnstaple (all sites)

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	8.7	23.3	23.3
3b	27.3	73	73.3
4	0.8	2.2	2.1
5	0.5	1.3	1.3
Urban	0.05	0.1	100%
Agric Bdgs	0.05	0.1	(37.3ha)
TOTAL	37.4	100%	

Distribution of ALC grades: Old Torrington Road

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	5.4	99.1	100.0
Agric Bdgs	0.05	0.9	100%
TOTAL	5.45	100%	(5.4ha)

All of this site has poorly drained soils and is mapped as Subgrade 3b.

Distribution of ALC grades: Larkbear

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	1.1	5.9	5.9
3b	17.6	93.8	94.1
Urban	0.05	0.3	100%
TOTAL	18.75	100%	(18.7ha)

The majority of this site has poorly drained soils and is mapped as Subgrade 3b. There is a small area which has better drained soils and is Subgrade 3a.

Distribution of ALC grades: Waytown

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	5.7	76.0	76.0
3b	1.8	24.0	24.0
TOTAL	7.5	100%	100%

The soils at this site are well drained and have heavy clay loam topsoils and are mapped as Subgrade 3a except for a small area which has gradients over 7 degrees which is downgraded to Subgrade 3b.

Distribution of ALC grades: Silver Leat

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	2.5	65.8	65.8
4	0.8	21.1	21.1
5	0.5	13.1	13.1
TOTAL	3.8	100%	100%

All of the land at this site is downgraded because of steep gradients. The versatility of the land is reduced the greater the gradient.

Distribution of ALC grades: Northfield Lane

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	1.9	100.0	100.0
TOTAL	1.9	100%	100%

All of this site is mapped as Subgrade 3a. The soils are well drained and have heavy clay loam topsoils.

2. INTRODUCTION

Thirty eight hectares of land at five sites around Barnstaple were surveyed using the Agricultural Land Classifiaction (ALC) System in January 1994. The survey was carried out for MAFF as part of its statutory input into the North Devon Local Plan. The five sites surveyed were Old Torrington Road, Larkbear, Waytown, Silver Leat and Northfield Lane.

The fieldwork was carried out by ADAS (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 34 auger sample points and three soil profile pits were examined.

The published provisional one inch to the mile ALC map of this area (MAFF 1972) shows the sites to be Grades 3 and 4. The two southern sites are predominantly shown as Grade 4 with a small area of Grade 3 in the south west corner of the Old Torrington Road site. The Northfield Lane site is shown as all Grade 3 as is the Waytown site except for the east end shown as Grade 4. The southern half of the Silver Leat site is shown as Grade 4 and the northern half as Grade 3. All the sites have been surveyed in the past but under the original Guidelines for grading land. The information obtained during these surveys was inadequate to make an accurate assessment of the land quality using the Revised Guidelines. The recent survey supersedes all the previous maps and surveys having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of Agricultural Land (MAFF1988).

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 120cm of the soil profile. A description of the grades used in the ALC System can be found in Appendix 2.

3. 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 a lower grade despite other favourable conditions.

Estimates of climatic variables were interpolated for each site from the Agricultural Climate Dataset (Meteorological Office 1989). The data are shown in Table 1.

The parameters used for assessing overall climatic conditions are accumulated temperature, (a measure of the relative warmth of a locality) and average annual rainfall, (a measure of overall wetness). 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 later sections. A description of the Wetness Classes used in quantifying the degree of wetness can be found in Appendix 3.

Table 1 Climatic Interpolations: Barnstaple

Grid Reference	SS 559 345	SS 570 337
Altitude (m)	45	60
Accumulated Temperature (day deg)	1538	1521
Average Annual Rainfall (mm)	1003	1035
Overall Climatic Grade	1	1
Field Capacity Days	209	214
Moisture Deficit, Wheat (mm)	92	90
Moisture Deficit, Potatoes (mm)	81	79

Grid Reference	SS 576 333	SS 543 313
Altitude (m)	60	40
Accumulated Temperature (day deg)	1521	1546
Average Annual Rainfall (mm)	1040	935
Overall Climatic Grade	1	1
Field Capacity Days	214	194
Moisture Deficit, Wheat (mm)	90	95
Moisture Deficit, Potatoes (mm)	80	85

No local Climatic limitations were noted in the survey areas.

4. RELIEF AND LANDCOVER

OLD TORRINGTON ROAD: The site is virtually flat and at a height of 35m AOD. At the time of survey all the fields were being used for grazing.

LARKBEAR: The site is gently sloping to the north. The height of the site ranges from 20 to 30m AOD. All of the site has been used for cereals except for the small field beside the bypass which is in grass.

WAYTOWN: This site slopes to the south east, with 8 degree limiting slopes in the north. The height of the site is between 35 and 65m AOD. The eastern field was being used for vegetables and the other fields were being grazed by sheep.

SILVER LEAT: The site forms part of a valley and has steep slopes. The gradients in the bottom of the valley are between 7 and 11 degrees and they increase to over 20 degrees at the steepest parts. All the land was under grass. The height of the site ranges from 25m to 60m AOD.

NORTHFIELD LANE: The site is gently sloping at a height of 45m AOD. The field was under grass.

5. GEOLOGY AND SOILS

The geology of the sites is shown on the published 1:50,000 scale solid and drift geology map, sheet 293 (Geological Survey of England and Wales 1982). This map shows the Waytown, Silver Leat and Northfield Land sites to be underlain by Pilton Shale. The Old Torrington Road and Larkbear sites are underlain by Boulder Clay.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000. The Waytown, Silver Leat and Northfield Lane sites were all mapped as the Denbigh 1 Association. These soils are described as well drained fine loamy and fine silty soils over rock. The Old Torrington Road and Larkbear sites were mapped as the Hallsworth 2 Association. These soils are described as slowly permeable, seasonally waterlogged clayey, fine loamy and fine silty soils.

The recent survey found soils similar to the mapped soil associations at each site.

6. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades identified in the survey area is detailed in Tables 2-7 and shown on the accompanying ALC maps. The information is correct at the scale shown but any enlargement would be misleading.

Table 2 Distribution of ALC grades: Barnstaple (all sites)

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	8.7	23.3	23.3
3b	27.3	73	73.3
4	0.8	2.2	2.1
5	0.5	1.3	1.3
Urban	0.05	0.1	100%
Agric Bdgs	0.05	0.1	(37.3ha)
TOTAL	37.4	100%	

Table 3 Distribution of ALC grades: Old Torrington Road

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	5.4	99.1	100.0
Agric Bdgs	0.05	0.9	100%
TOTAL	5.45	100%	(5.4ha)

Table 4 Distribution of ALC grades: Larkbear

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	1.1	5.9	5.9
3b	17.6	93.8	94.1
Urban	0.05	0.3	100%
TOTAL	18.75	100%	(18.7ha)

Table 5 Distribution of ALC grades: Waytown

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	5.7	76.0	76.0
3b	1.8	24.0	24.0
TOTAL	7.5	100%	100%

Table 6 Distribution of ALC grades: Silver Leat

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	2.5	65.8	65.8
4	0.8	21.1	21.1
5	0.5	13.1	13.1
TOTAL	3.8	100%	100%

Table 7 Distribution of ALC grades: Northfield Lane

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	1.9	100.0	100.0
TOTAL	1.9	100%	100%

OLD TORRINGTON ROAD and LARKBEAR

Subgrade 3a

A small area has been mapped as Subgrade 3a. The soils in this area are poorly drained and have slowly permeable layers in the subsoils from a depth of 50 to 60cm. The soils are gleyed within the slowly permeable layer. These soils are Wetness Class III and they have a medium clay loam topsoil texture. These soils are downgraded on the basis of a wetness limitation.

Subgrade 3b

The majority of the land at these two sites has been mapped as Subgrade 3b. These soils are more poorly drained than the land described above. The soils have slowly permeable layers higher in the profile and are Wetness Class IV. These soils also have medium clay loam topsoils. Two soils pits were dug in

these areas to confirm the slowly permeable horizons. The wetness limitation is greater then in the soils described above.

WAYTOWN

Subgrade 3a

The soils at the site are well drained heavy clay loams over slate. The slate content of the soil increases with depth but there is not a droughtiness limitation. The soils are Wetness Class I. The combination of topsoil texture, Wetness Class and the number of days that the site is at field capacity makes the site Subgrade 3a on the basis of a workability limitation. A soil profile pit was dug to assess the subsoil structural condition and the stone content of the soil.

Subgrade 3b

There is an area in the north of the site where the slopes have gradients of 8 degrees. These slopes impose a slight limitation in terms of the agricultural machinery that can be safely used and the versatility of the land is therefore reduced.

SILVER LEAT

Subgrade 3b, Grades 4 and 5

All the land at this site has been downgraded on the basis of gradient. Where the gradient was measured between 7 and 11 degrees the land is mapped as Subgrade 3b, where the gradient is between 11 and 18 degees it is mapped as Grade 4 and gradients over 18 degrees, Grade 5. The greater the gradient the greater the restriction on types of agricultural machinery that can be safely used, thus reducing the versatility of the land.

NORTHFIELD LANE

Subgrade 3a

All of the site has been mapped as Subgrade 3a. The soils are well drained and are Wetness Class I. The topsoil texture of these soils is heavy clay loam. The combination of the heavy clay loam topsoil texture, Wetness Class and the number of days that the soils are at field capacity imposes a moderate workability limitation.

APPENDIX 2

DESCRIPTION OF THE GRADES AND SUBGRADES

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 most 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 park land, 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.

Source: MAFF (1988) Agricultural Land Classification of England and Wales (Revised guidelines and criteria for grading the quality of agricultural land) Alnwick.

APPENDIX 3

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 90 days, but not wet within 40cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 180 days, but only wet within 40cm depth for between 31 and 90 days in most years.

Wetness Class IV

The soil profile is wet within 70cm depth for more than 180 days but not within 40cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 40cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (in preparation) Soil Survey Field Handbook (revised edition).

APPENDIX 1

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1982) Solid and Drift edition. Sheet 293, Barnstaple, 1:50,000 scale

MAFF (1972) Agricultural Land Classification Map sheet 163 Provisional 1:63,360 scale

MAFF (1988) Agricultural Land Classification of England and Wales (Revised guidelines and criteria for 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

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Barnstaple	Pit 1	0°	Fallow	Av Rainfall: 935 mm ATO: 1546° FC Days: 195 Climatic Grade: 1	Boulder Clay
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		TOPSOIL SAMPLE
115/92	5/1/94	ASP 15 SS 549 317	HLJ/GMS		RPT/GMS 354

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	24	10YR42	MCL	1% HR visual	None					Few fine	None	None	Abrupt smooth
2	40	10YR53	HCL	None	None	MCSAB	Good	Moderate	Firm	Few fine		None	Abrupt smooth
3	60+	2.5Y64	C	5% HR visual	Many 10YR62, 56	MCSAB around the stones, WCSAB elsewhere	Low	Moderate	Firm	Few v fine		None	

Profile Gleyed From: 40 cm

Depth to Slowly Permeable Horizon: 40 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 99 mm

Potatoes: 124 mm

Moisture Deficit Wheat: 95 mm

Potatoes: 85 mm

Moisture Balance Wheat: +4

Potatoes: +39

Droughtiness Grade: 3A (to 70 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:

Topsoil texture borderline MSZL. Gleying deeper than in surrounding borings. Placed in 3b map unit.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Barnstaple	Pit 2	0°	PGR	Av Rainfall: 935 mm ATO: 1546°	Boulder Clay
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		TOPSOIL SAMPLE
115/93	6/1/94	ASP 36 SS 544 313	GMS/HLJ	FC Days: 195 Climatic Grade: 1	RPT/GMS 355

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	23	2.5Y43	MCL	<1% HR visual	None					Common fine	None	None	Abrupt smooth
2	37	2.5Y42	C	2% HR visual	Many ochreous 10YR68, 62	Massive	Low	Poor	Firm	Few fine	None	None	Abrupt smooth
3	60	10YR62	C	<1% HR visual	Many 10YR68	WCSAB	Low	Poor	Firm	Few fine	None	None	

Profile Gleyed From: 23

Depth to Slowly Permeable Horizon: 35

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 83 mm

Potatoes: 88 mm

Moisture Deficit Wheat: 95 mm

Potatoes: 85 mm

Moisture Balance Wheat: -12 mm

Potatoes: +3 mm

Droughtiness Grade: 3A (to 60 cm)

Final ALC Grade: 3B

Main Limiting Factor(s): Wetness

Remarks:

Topsoil texture confirmed by PSD.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Barnstaple	Pit 3	4° S	Permanent grass	Av Rainfall: 1040 mm ATO: 1521° FC Days: 214 Climatic Grade: 1	Pilton Shale
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		TOPSOIL SAMPLE
115/93	6/1/94	ASP 10 SS 580 333	HLJ/GMS		RPT/GMS 348

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	25	10YR53	HCL	5% <2cm Visual ZR	None					Many fine and v fine	None	None	Clear smooth
2	55	10YR54	HCL	10% <2cm Visual ZR	None	WMSAB	Good	G	Friable	Few fine	None	None	Clear smooth
3	95+	2.5Y74	C	50% ZR visual	5YR58 associated with weathered slate: not mottles	Determined by stones		M		Few v fine	None	None	

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 126 mm

Potatoes: 121 mm

Moisture Deficit Wheat: 95 mm

Potatoes: 85 mm

Moisture Balance Wheat: +31 mm

Potatoes: +36 mm

Droughtiness Grade: 1

Final ALC Grade: 3A

Main Limiting Factor(s): Workability

Remarks:

Topsoil texture by PSD analysis.

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