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DEVON STRUCTURE PLAN: SOUTH HAMS

LAND AT HEMERDON, PLYMPTON

AGRICULTURAL LAND CLASSIFICATION

CONTENTS

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AGRICULTURAL LAND CLASSIFICATION SURVEY

SUMMARY

The reconnaissance scale survey was carried out by ADAS on behalf of MAFF as part of its statutory role in the preparation of the Devon Structure Plan. The fieldwork at Hemerdon was completed in November 1994 at a scale of 1:25,000. Data on climate, soils, geology and from previous Agricultural Land Classification (ALC) Surveys was used and is presented in the report. The distribution of grades is shown on the accompany ALC map and summarised below. Information is correct at this scale but could be misleading if enlarged.

Distribution of ALC grades: Hemerdon

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	47.9	46.2	82.9	
4	9.1	8.8	15.7	
5	0.8	0.8	1.4	
Urban	17.7	17.1	0.0	
Non Agricultural	27.4	26.4	0.0	
Agricultural Buildings	0.7	0.7	0.0	
TOTAL	103.6	100.0	100.0	(57.8 ha)

Over 80% of the site had either a moderate workability or a moderate wetness limitation and these soils are restricted to Subgrade 3b. The area of Grade 4 land to the west of Hemerdon Farm is poorly drained and has a severe wetness limitation. The other areas of Grade 4 land and the area of Grade 5 land have severe restrictions to their versatility because of their steep graidents. None of the site is best and most versatile.

1. INTRODUCTION

A reconnaissance scale Agricultural Land Classification (ALC) Survey was carried out in November 1994 at Hemerdon, near Plympton, on behalf of MAFF as part of its statutory role in the preparation of the Devon Structure Plan. The fieldwork covering 103.6 ha of land was conducted by ADAS at a scale of 1:10,000 (approximately one boring per four hectares of agricultural land). A total of 30 auger borings were examined and 2 soil profile pits used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1973) shows the grades of the site at a reconnaissance scale. Most of the site was mapped as Grade 3, with the steeper slopes in the southern part of the site and the valley floor near Old Newnham being mapped as Grade 4.

The area was also surveyed in 1975 at a scale of 1:50,000 and partly in 1985 at a scale of 1:5,000. Most of the land was mapped as Subgrade 3a with some of the steeper area being mapped as Subgrades 3b and 3c. The steep slopes and valley floor near Old Newnham were mapped as Grade 4 with a small area of Grade 5 land.

The recent survey supersedes previous surveys having been carried out using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988). 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. A description of the grades used in the ALC system can be found in Appendix 2.

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 a lower grade despite other favourable conditions.

Estimates of climatic variables were interpolated from the published agricultural climate dataset (Meteorological Office 1989). The parameters used for assessing overall climate 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 1 indicate there is an overall climatic limitation which restricts the land to Grade 2 above Old Newnham and Subgrade 3a above Hemerdon.

Table 1: Climatic Interpolations: Hemerdon

Grid Reference		SX 550 524	SX 558 572	SX 570 576
Altitude (m)		20	55	135
Accumulated Temperature (day °)		1602	1561	1470
Average Annual Rainfall (mm)		1143	1232	1399
Overall Climatic Grade		1	2	3a
Field Capacity Days		228	243	267
Moisture deficit (mm):	Wheat	95	86	68
	Potatoes	86	74	51

Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat and potatoes are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections.

3. RELIEF AND LANDCOVER

The survey area is on the southern edge of Dartmoor rising from 20-135 m AOD. There are limited areas of steep slopes. At the time of survey all of the land was under pasture and ley grass.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:50,000 scale drift geology map, sheet 349, Institute of Geological Sciences 1974.

This shows the majority of the site to be underlain by Upper Devonian slate. There are two small areas of igneous Schalsteins near West Park Hill. The valley bottoms at Skerwell, Old Newnham, Furzeacre and along the southern edge of the site contain alluvium, and river gravel and head deposits.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000.

This shows that the whole site consists of soils from the Denbigh 1 Association. They are described as being well drained fine loamy and fine silty soils over rock, with some similar soils having slowly permeable subsoils and slight seasonal waterlogging. There may be shallow soils and some bare rock locally.

The soils found during the recent survey are similar to those described above. The majority were deep well drained clay loams or clay loam over clay with weathered slate in the subsoils. There are also small areas of poorly drained soils in the valley bottoms. All of the topsoils were found to have heavy textures (heavy clay loams).

5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades is shown in Table 2 and on the accompanying ALC map. The information could be misleading if shown at a larger scale.

Table 2: Distribution of ALC grades: Hemerdon

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	47.9	46.2	82.9	
4	9.1	8.8	15.7	
5	0.8	0.8	1.4	
Urban	17.7	17.1	0.0	
Non Agricultural	27.4	26.4	0.0	
Agricultural Buildings	0.7	0.7	0.0	
TOTAL	103.6	100.0	100.0	(57.8 ha)

Subgrade 3b

Over 80% of the agricultural land was mapped as Subgrade 3b. Most of the soils were deep well drained heavy clay loams and heavy clay loams over clay with weathered slate in the subsoils. These profiles were assessed as Wetness Class I (see Appendix 3) and have a moderate workability limitation due to the high local FCD value. There are some small areas of similar soils which have a slight drainage problem and were assessed as Wetness Class II and have a moderate wetness limitation. Other areas also had a moderate limitation to their agricultural versatility due to their gradient.

Grade 4

Several small areas of Grade 4 land have been mapped. The valley bottoms near Old Newnham and Chaddle Wood are poorly drained and gleyed above 40 cm. These areas were assessed as Wetness Class III which with the high FCD value have a severe wetness limitation. The other areas of Grade 4 land are where the gradient imposes a severe limitation on the agricultural versatility by restricting the types of machinery that can be used safely.

Grade 5

A small area of very steep land has been mapped as Grade 5 because of the restrictions on the types of machinery that can be used safely.

Other Land

Areas of woodland, allotments and non-agricultural grass have been mapped as non-agricultural land. The urban areas include the village of Hemerdon, part of Langage Industrial Estate and the new housing development opposite Old Newnham.

Resource Planning Team
Taunton Statutory Unit
December 1994

[hNL799]

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1974) Drift Edition, Sheet 349, Ivybridge 1:50,000

MAFF (1973) Agricultural Land Classification Map, Sheet 187, 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) Climatological Data for Agricultural Land Classification.

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

APPENDIX 2

DESCRIPTION OF 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 landcover types, eg buildings in large grounds, and where 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 70 cm depth for more than 30 days in most years.

Wetness Class II

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

Wetness Class III

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

Wetness Class IV

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

Wetness Class V

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

Wetness Class VI

The soil profile is wet within 40 cm 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).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hemerdon	Pit 1	2° East	Ley	Av Rainfall: 1323 mm ATO: 1516 day °C FC Days: 256 Climatic Grade: 2 Exposure Grade: 1	Upper shale
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
90/94	15/11/94	(ASP 29) SX 568 572	NAD		RPT/NAD/160

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	30	HCL	10YR44	8% ZR (vis)	none	none	-	-	-	G	Many	-	Clear/ smooth
2	55+	HCL	0.5YR53	40% ZR (vis)	none	few	WCSAB	Friable	M	G	Common F+VF	-	-

Profile Gleyed From: N/A

Depth to Slowly Permeable Horizon: N/A

Wetness Class: I

Wetness Grade: 3b

Available Water Wheat: 133 mm

Potatoes: 103 mm

Moisture Deficit Wheat: 80 mm

Potatoes: 65 mm

Moisture Balance Wheat: 53 mm

Potatoes: 38 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

NL336k

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hemerdon	Pit 2	0°	Ley	Av Rainfall: 1323 mm ATO: 1516 day °C FC Days: 256 Climatic Grade: 2 Exposure Grade: 1	Upper Slate
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
90/94	15/11/94	(ASP 27) SX 564 572	NAD & HLJ		RPT/HLJ/100

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	27	HCL	10YR44	10% ZR (vis)	-	-	-	-	-	G	Many F+VF	-	Clear/ smooth
2	70+	C	10YR64	45% ZR (vis)	none	none	Determined by stones MFSAB	Fr	G	G	Common F+VF	-	-

Profile Gleyed From: N/A

Depth to Slowly Permeable Horizon: N/A

Wetness Class: I

Wetness Grade: 3b

Available Water	Wheat:	154 mm
	Potatoes:	111 mm
Moisture Deficit	Wheat:	80 mm
	Potatoes:	65 mm
Moisture Balance	Wheat:	74 mm
	Potatoes:	46 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

NL336k

SOIL PLASTICITY RECORDING SHEET

ANNEX 2

SITE DATA

Grid Ref	SX 55 NW		Site Name	Hemerdon			LPA	Devon County	
AAR	1323	ATO 1516		FCD	256	MD (wheat)	80	MD (potatoes)	65

SOIL PIT DATA

	PIT ONE SX 568 572 SOIL SERIES Denbigh 1			PIT TWO SX 564 572 SOIL SERIES Denbigh 1			PIT THREE SOIL SERIES		
DEPTH	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS
10 cm	HCL	N		HCL	N				
20 cm	HCL	N		HCL	N				
30 cm	HCL	N		HCL	N				
40 cm	HCL	N	V stony	C	Bedrock				
50 cm	HCL	N	V stony	C	Bedrock				
60 cm	HCL	N	V stony	C	Bedrock				

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