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Hayes Farm Quarry,  
Clyst Honiton  
**Agricultural Land Classification  
and Site Physical Characteristics**

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HAYES FARM QUARRY, CLYST HONITON  
AGRICULTURAL LAND CLASSIFICATION  
AND SITE PHYSICAL CHARACTERISTICS

CONTENTS

	Page
SUMMARY	1
1. INTRODUCTION	2
2. CLIMATE	2
3. RELIEF AND LANDCOVER	2
4. GEOLOGY AND SOILS	2
5. AGRICULTURAL LAND CLASSIFICATION	3
6. SOIL RESOURCES	3
APPENDIX 1      References	5
APPENDIX 2      Description of the grades and subgrades	5
APPENDIX 3      Definition of Soil Wetness Classes	8
MAP	

## HAYES FARM QUARRY, CLYST HONITON

### AGRICULTURAL LAND CLASSIFICATION SURVEY AND SITE PHYSICAL CHARACTERISTICS

#### SUMMARY

The site is part of a larger survey, centred on Broadclyst Station, which 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 Hayes Farm was completed in January 1994 at a scale of 1:10,000. Data on climate, soils, geology and previous ALC Surveys was used and is presented in the report. The distribution of grades is detailed below and illustrated on the accompanying ALC map. Information is correct at this scale but could be misleading if enlarged.

#### Distribution of ALC grades: Hayes Farm Quarry

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3a	8.3	100	100	
TOTAL	8.3	100	100	(8.3 ha)

The whole site has been mapped as Subgrade 3a and is of 'best and most versatile' quality. The profiles are coarse textured with relatively high stone contents and suffer from a moderate drought limitation.

## 1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in January 1994 at Hayes Farm, as part of the larger Broadclyst Station survey, on behalf of MAFF as part of its statutory role in the preparation of the Devon Structure Plan. The fieldwork at Hayes Farm covering 8.3 ha of land was conducted by ADAS at a scale of 1:10,000 (approximately one boring per hectare of agricultural land). A total of 10 auger borings were examined and 1 soil profile pit used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1992) shows the grades of the site at a reconnaissance scale. This shows the whole site to be Grade 3.

The recent survey supersedes 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). 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 no overall climatic limitation.

**Table 1: Climatic Interpolations: Hayes Farm Quarry**

Grid Reference	SX 994 944
Altitude (m)	18
Accumulated Temperature (day °)	1577
Average Annual Rainfall (mm)	779
Overall Climatic Grade	1
Field Capacity Days	166
Moisture deficit (mm):	
Wheat	114
Potatoes	108

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 site is relatively flat, at an average height of 18 m AOD above the Clyst Valley. At the time of survey the land was being used for winter cereals cultivation.

## 4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:63,360 scale drift geology map, sheet 325 British Geological Survey 1971. This shows the geology as being mainly valley gravels, with an area of sandstone underlying the stream along the north east edge of the site.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000 and in 1972 at a scale of 1:63,360. These show that the site consists entirely of soils from the Bridgnorth Association, which are described as being well drained sandy and coarse loamy soils over soft sandstone.

The soils found during the recent survey were similar in texture and drainage but there were noticeable gravel deposits in the lower subsoils.

## 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: Hayes Farm Quarry

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3a	8.3	100	100	
TOTAL	8.3	100	100	(8.3 ha)

### Subgrade 3a

The whole site was mapped as Subgrade 3a due to a moderate drought limitation. The profiles consist of deep, well drained medium sandy loams, with the occasional medium clay loam and loamy sand horizon and were assessed as Wetness Class I (see Appendix 3). The topsoil textures are medium sandy loams and impose no workability limitation. Typical stone contents found on the site were 5%, 30% and 40 to 70% hard rock in the topsoil, upper subsoil and lower subsoil respectively. This reduces the amount of water available for plant growth and leads to the moderate drought limitation, however the lower subsoil is still considered to be part of the agricultural soil resource.

## 6. SOIL RESOURCES

The whole of the site has been mapped as one soil resource unit.

"Topsoil" is defined as the organic rich surface horizon. The topsoils at the site are mainly medium sandy loams but there is a small area of medium clay loams. The depth of topsoil was found to vary between 30 cm and 40 cm, with 30 cm being the most common depth. The soil was well rooted and had good porosity with a weakly developed, medium, sub-angular blocky structure and a friable consistence. The topsoil contains an average 5% hard rocks by volume.

A total topsoil resource of 24900 m<sup>3</sup> is available as shown in Table 3.

Table 3 Topsoil Resource

Map Unit	Depth (cm)	Area (ha)	Texture	Stones	Volume (m <sup>3</sup> )
1	0-30	8.3	MSL, MCL	5%	24900

"Subsoil" is defined as the less organic lower horizons. The upper subsoils are medium sandy loams, with small areas of medium clay loam and loamy fine sand. The depth to the lower subsoil was found to vary between 65 cm and 80 cm, with 70 cm being the most common depth. The soil had good porosity and probably a moderately developed, medium, sub-angular blockly structure and a very friable consistence. The structure was not easily determined due to the stone content which on average was 30% hard rock by volume.

A total upper subsoil resource of 33200 m<sup>3</sup> is available as shown in Table 4.

The lower subsoils are medium sandy loams with small areas of medium clay loam. They had good porosity and probably a moderately developed, medium, sub-angular blockly structure with a very friable consistence. The structure was not easily determined due to the high stone content which varies between 40% and 70% hard rocks by volume. There are small areas of loamy sand and sand which were virtually stoneless and had a good porosity. Their structure was weakly developed, medium, angular blockly with a very friable consistence. Due to the size and distribution of these areas it is not practical to map them as a second soil unit.

A total lower subsoil resource of 41500 m<sup>3</sup> is available as shown in Table 4.

**Table 4 Subsoil Resource**

Map Unit	Depth (cm)	Area (ha)	Texture	Stones	Volume (m <sup>3</sup> )
1	30-70	8.3	MSL, MCL	30%	33200
1	70-120	8.3	MSL, LS, MS	40-70%	<u>41500</u> 74700

**Abbreviations**

- MSL Medium sandy loam
- MCL Medium clay loam
- LS Loamy sand
- MS Medium sandy

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## APPENDIX 1

### REFERENCES

BRITISH GEOLOGICAL SURVEY (1971) Drift Edition, Sheet 325, Exeter 1:50,000

MAFF (1972) Agricultural Land Classification Map, Sheet 176, 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.

SOIL SURVEY OF ENGLAND AND WALES (1972), Sheets 325 and 339, Exeter and Newton Abbot, 1:63,360 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		Av Rainfall: 781 mm			PARENT MATERIAL		
Broadclyst Station		Pit 5		0°		Winter cereals		ATO: 1569°			Valley Gravels		
JOB NO.		DATE		GRID REFERENCE		DESCRIBED BY		FC Days: 166			Topsoil Sample Ref:		
107/93		12/1/94		Near ASP 333 SX 9930 9442		PRW/HLJ		Climatic Grade: 1			PRW/93 + 98		
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	32 cm	5YR4/4	MSL	3% >2cm	None	-	Many	Mod	Friable	Many fine & v. fine	none	none	Abrupt smooth
2	66 cm	2.5YR3/6	MSL	12% >2cm 16% <2cm 28% Total	None	Not easily determined due to stone content - probably moderately developed medium subangular blocky	Many	Good	V. Friable	Few fine	none	none	Abrupt smooth
3	95 cm	2.5YR4/6	MSL (but coarser)	18% >2cm 51% <2cm 69% Total	None		Many	Moderate	V. Friable	Few fine	none	none	Abrupt smooth
4	110 cm (assumed to 120)	2.5YR4/8	LMS	0%	None	Weakly developed medium angular blocky	Many	Moderate	V. Friable	None seen	None	None	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: I

Available Water Wheat: 114 mm

Potatoes: 98 mm

Moisture Deficit Wheat: 113 mm

Potatoes: 107 mm

Moisture Balance Wheat: 1 mm

Potatoes: 9 mm

Droughtiness Grade: 3a (to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks:

Horizon 3 almost gravel layer (70% st) which would swing grade more into 3a.

SITE NAME		PROFILE NO.		SLOPE AND ASPECT		LAND USE		Av Rainfall: 780 mm			PARENT MATERIAL		
Broadclyst Station		Pit 7		0°		Cereals		ATO: 1586°			Valley Gravels		
JOB NO.		DATE		GRID REFERENCE		DESCRIBED BY		FC Days: 166			Soil Sample Ref:		
107/93		12/1/94		ASP 360 SX 992 942		PRW/HLJ		Climatic Grade: 1			PRW/95 + 99		
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	28 cm	5YR34	MSL	3% >2cm HR visual	none	-	-	-	-	V. few fine	none	none	Clear/ smooth
2	58 cm	2.5YR36	MSL	3% >2cm HR visual	none	MCSAB	>0.5%	M	Firm	Few fine	none	none	Clear/ smooth
3	110 cm	2.5YR56	GR (MSL)	25% >2cm 45% >2 mm 70% HR sieve + displacement	none	none (determined by stones)	-	M	-	none	none	none	

Profile Gleyed From: None

Depth to Slowly Permeable Horizon: None

Wetness Class: I

Wetness Grade: I

Available Water Wheat: 100 mm

Potatoes: 94 mm

Moisture Deficit Wheat: 113 mm

Potatoes: 107 mm

Moisture Balance Wheat: -13 mm

Potatoes: -13 mm

Droughtiness Grade: 3a (to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks:

Gravel from 58 cm