A1

Chichester District Local Plan

H6: Land north of Birdham Road, Donnington.

Agricultural Land Classification

ALC Map and Report

November 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

CHICHESTER DISTRICT LOCAL PLAN.
H6: LAND NORTH OF BIRDHAM ROAD, DONNINGTON.

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the district of Chichester in West Sussex. The work forms part of MAFF's statutory input to the preparation of the Chichester District Local Plan.

1.2 Site H6 comprises approximately 2 hectares of land to the north of Birdham Road on the edge of Stockbridge. An Agricultural Land Classification (ALC) survey was carried out in November 1994. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land. A total of 3 borings and one soil inspection pit were described in accordance with MAFF's 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 a long term limitation on its use for agriculture.

1.3 At the time of the survey the agricultural land on the site comprised permanent grassland. Areas marked as non-agricultural include scrub in the west of the site, woodland being mapped in the east and north of the site. The area marked as urban includes a hardcore track and building foundations.

1.4 The distribution of grades and subgrades is shown on the attached ALC map and the areas and extent are given in the table below. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Land
2	1.0	58.8	100%
Non- agricultural land	0.1	5.9	
Woodland	0.5	29.4	
Urban	0.1	5.9	
Total area of Site	1.7	100%	

1.5 Appendix I gives a general description of the grades, subgrades and land use categories identified in the survey. The main classes are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.6 All of the agricultural land on the site has been classified as Grade 2, very good quality land, with soil wetness and droughtiness as the main limitations. Soil profiles typically comprise a medium silty clay loam which becomes heavier with depth. Profiles tend to be very slightly stony in the topsoils and stoneless in the subsoils. Subsoils commonly show signs of wetness in the form of gleying, and the silty clay lower subsoil is slowly permeable, causing a drainage impedance. Such drainage characteristics equate these soils to Wetness Class II, with a resultant classification of Grade 2. Furthermore, the combination of soil textures, structures and the local climatic regime means that there is a slight restriction on the amount of profile available water for plant growth, such that a classification of grade 2 due to droughtiness is also appropriate.

2. Climate

2.1 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

2.2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature (degree days Jan-June), as a measure of the relative warmth of a locality.

2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site.

2.4 No local climatic factors such as exposure or frost risk are believed to affect the site.

Table 2 : Climatic Interpolation

Grid Reference	SU 852 033
Altitude (m)	6
Accumulated Temperature (degree days, Jan-June)	1544
Average Annual Rainfall (mm)	761
Field Capacity (days)	155
Moisture Deficit, Wheat (mm)	120
Moisture Deficit, Potatoes (mm)	117
Overall Climatic Grade	1

3. Relief

3.1 The site is flat, lying at an altitude of approximately 6m AOD.

4. Geology and Soils

4.1 The relevant geological sheet (BGS, 1975) shows the entire site to be underlain by valley gravel.

4.2 The published Soil Survey map (SSGB, 1967) shows the soils on the site to comprise those of the Hook series. These are described as 'slightly gleyed silt loams and silty clay loams over calcareous silt loam at 77cm depth, possible slowly permeable layer at 40cm.' (SSGB, 1967).

4.3 Detailed field examination on the site found much of the soils to comprise silty clay loams, with a slowly permeable silty clay at depths of between 55-70cm.

5. Agricultural Land Classification

5.1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map.

5.2 The location of the soil observation points are shown on the attached sample point map.

Grade 2

5.3 Very good quality Grade 2 agricultural land has been mapped on the site. Soil profiles tend to be either very slightly stony or stoneless, typically comprising a medium silty clay loam topsoil which becomes heavier with depth, the lower subsoil commonly consisting of a silty clay at depths of between 55-70cm. A soil inspection pit on the site showed this lower subsoil to be slowly permeable and poorly structured. Accordingly, evidence of soil wetness in the form of gleying was observed within the profiles over much of the site. Where profiles show signs of gleying and a slowly permeable layer, wetness is the overriding limitation. Such drainage characteristics equate such soils to Wetness Class II, with a resultant classification of Grade 2 due to this slight wetness limitation. Poorly drained wet soils can inhibit plant and root development and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock. Furthermore, profiles across the entire site show signs of a slight restriction on the amount of profile available water for plant growth. This arises due to the combination of soil textures, structures and the local climatic regime, such that a classification of Grade 2 is appropriate on the basis of minor soil droughtiness in addition to the slight soil wetness restriction which exists.

SOURCES OF REFERENCE

British Geological Survey (1975), Sheet No. 332, Bognor, 1:50,000 Series (drift edition).

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

Meteorological Office (1989), Climatological Data for Agricultural Land Classification.

Soil Survey of Great Britain (1967), Sheet SU80, Chichester, 1:25,000 and accompanying bulletin 'Soils of the West Sussex Coastal Plain'.

APPENDIX I

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 includes 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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3 : Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

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. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

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, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years.[2]
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 only wet within 40 cm depth for 30 days in most years.
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 present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

[1]The number of days specified is not necessarily a continuous period.
[2]'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF** : national 100 km grid square and 8 figure grid reference.

2. **USE** : Land use at the time of survey. The following abbreviations are used.

ARA : Arable	**WHT** : Wheat	**BAR** : Barley
CER : Cereals	**OAT** : Oats	**MZE** : Maize
OSR : Oilseed rape	**BEN** : Field Beans	**BRA** : Brassicae
POT : Potatoes	**SBT** : Sugar Beet	**FCD** : Fodder Crops
LIN : Linseed	**FRT** : Soft and Top Fruit	**FLW** : Fallow
PGR : Permanent Pasture	**LEY** : Ley Grass	**RGR** : Rough Grazing
SCR : Scrub	**CFW** : Coniferous Woodland	**DCW** : Deciduous Wood
HTH : Heathland	**BOG** : Bog or Marsh	**FLW** : Fallow
PLO : Ploughed	**SAS** : Set aside	**OTH** : Other
HRT : Horticultural Crops		

3. **GRDNT** : Gradient as estimated or measured by a hand-held optical clinometer.

4. **GLEY/SPL** : Depth in centimetres (cm) to gleying and/or slowly permeable layers.

5. **AP (WHEAT/POTS)** : Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS)** : Moisture Balance. (Crop adjusted AP - crop adjusted MD)

7. **DRT** : Best grade according to soil droughtiness.

8. If any of the following factors are considered significant, 'Y' will be entered in the relevant column.

MREL : Microrelief limitation	**FLOOD** : Flood risk	**EROSN** : Soil erosion risk
EXP : Exposure limitation	**FROST** : Frost prone	**DIST** : Disturbed land
CHEM : Chemical limitation		

9. **LIMIT** : The main limitation to land quality. The following abbreviations are used.

OC : Overall Climate	**AE** : Aspect	**EX** : Exposure
FR : Frost Risk	**GR** : Gradient	**MR** : Microrelief
FL : Flood Risk	**TX** : Topsoil Texture	**DP** : Soil Depth
CH : Chemical	**WE** : Wetness	**WK** : Workability
DR : Drought	**ER** : Erosion Risk	**WD** : Soil Wetness/Droughtiness
ST : Topsoil Stoniness		

Soil Pits and Auger Borings

1. **TEXTURE** : soil texture classes are denoted by the following abbreviations.

S :	Sand	**LS** :	Loamy Sand	**SL** :	Sandy Loam
SZL :	Sandy Silt Loam	**CL** :	Clay Loam	**ZCL** :	Silty Clay Loam
ZL :	Silt Loam	**SCL** :	Sandy Clay Loam	**C** :	Clay
SC :	Sandy Clay	**ZC** :	Silty Clay	**OL** :	Organic Loam
P :	Peat	**SP** :	Sandy Peat	**LP** :	Loamy Peat
PL :	Peaty Loam	**PS** :	Peaty Sand	**MZ** :	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:

F : Fine (more than 66% of the sand less than 0.2mm)
M : Medium (less than 66% fine sand and less than 33% coarse sand)
C : Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content: **M** : Medium (<27% clay) **H** : Heavy (27-35% clay)

2. **MOTTLE COL** : Mottle colour using Munsell notation.

3. **MOTTLE ABUN** : Mottle abundance, expressed as a percentage of the matrix or surface described.

F : few <2% **C** : common 2-20% **M** : many 20-40% **VM** : very many 40% +

4. **MOTTLE CONT** : Mottle contrast

F : faint - indistinct mottles, evident only on close inspection
D : distinct - mottles are readily seen
P : prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. **PED. COL** : Ped face colour using Munsell notation.

6. **GLEY** : If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

7. **STONE LITH** : Stone Lithology - One of the following is used.

HR :	all hard rocks and stones	**SLST** :	soft oolitic or dolimitic limestone
CH :	chalk	**FSST** :	soft, fine grained sandstone
ZR :	soft, argillaceous, or silty rocks	**GH** :	gravel with non-porous (hard) stones
MSST :	soft, medium grained sandstone	**GS** :	gravel with porous (soft) stones
SI :	soft weathered igneous/metamorphic rock		

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **STRUCT** : the degree of development, size and shape of soil peds are described using the following notation:

degree of development	**WK** : weakly developed **ST** : strongly developed	**MD** : moderately developed
ped size	**F** : fine **C** : coarse	**M** : medium **VC** : very coarse
ped shape	**S** : single grain **GR** : granular **SAB** : sub-angular blocky **PL** : platy	**M** : massive **AB** : angular blocky **PR** : prismatic

9. **CONSIST** : Soil consistence is described using the following notation:

L : loose **VF** : very friable **FR** : friable **FM** : firm **VM** : very firm
EM : extremely firm **EH** : extremely hard

10. **SUBS STR** : Subsoil structural condition recorded for the purpose of calculating profile droughtiness : **G** : good **M** : moderate **P** : poor

11. **POR** : Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

12. **IMP** : If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropiate horizon.

13. **SPL** : Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

14. **CALC** : If the soil horizon is calcareous, a 'Y' will appear in this column.

15. Other notations
APW : available water capacity (in mm) adjusted for wheat
APP : available water capacity (in mm) adjusted for potatoes
MBW : moisture balance, wheat
MBP : moisture balance, potatoes

SOIL PIT DESCRIPTION

Site Name : CHICHESTER LP DONNINGTON Pit Number : 1P

Grid Reference: SU85200330 Average Annual Rainfall : 761 mm
Accumulated Temperature : 1544 degree days
Field Capacity Level : 155 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	MZCL	75YR53 00	0	3	HR					
28- 38	MZCL	10YR53 00	0	5	HR		MDCSAB	FR	M	
38- 55	HZCL	10YR53 00	0	0			MDCSAB	FR	M	
55-120	ZC	75YR53 63	0	0		C	MDCPR	FM	P	

Wetness Grade : 2 Wetness Class : II
Gleying :055 cm
SPL :055 cm

Drought Grade : 2 APW : 139mm MBW : 19 mm
APP : 115mm MBP : -2 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Soil Wetness/Droughtiness

SAMPLE NO.	GRID REF	USE	ASPECT		--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	EROSN FLOOD	FROST EXP	CHEM DIST	ALC LIMIT		COMMENTS
1	SU85150335	PGR	000	065	3	3A	143	23	121	4	2				WE	3A	
1P	SU85200330	PGR	055	055	2	2	139	19	115	-2	2				WD	2	
2	SU85200330	PGR	056	070	2	2	145	25	124	7	2				WD	2	
3	SU85150327	PGR	070		1	1	159	39	123	6	2				DR	2	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	-----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
1	0-27	mzcl	10YR52 53	10YR58 00	C			Y	0	0	HR	2						
	27-55	hzcl	10YR52 53	10YR58 00	C		00MN00 00	Y	0	0		0		M				
	55-65	hzcl	10YR53 63	10YR58 00	C			Y	0	0		0		M				
	65-120	zc	10YR63 62	10YR58 61	C		00MN00 00	Y	0	0		0		P				Y
1P	0-28	mzcl	75YR53 00						0	0	HR	3						
	28-38	mzcl	10YR53 00						0	0	HR	5	MDCSAB FR	M				
	38-55	hzcl	10YR53 00						0	0		0	MDCSAB FR	M				
	55-120	zc	75YR53 63	10YR68 00	C		00MN00 00	Y	0	0		0	MDCPR FM	P	Y			Y
2	0-28	mzcl	75YR43 00						0	0	HR	2						
	28-56	hzcl	75YR53 00	10YR56 00	F				0	0		0		M				
	56-70	hzcl	75YR53 00	10YR58 00	C		00MN00 00	Y	0	0		0		M				
	70-120	zc	75YR63 00	10YR68 72	C			Y	0	0		0		P				Y
3	0-25	mzcl	75YR53 00						0	0	HR	2						
	25-38	mzcl	75YR53 00						0	0		0		M				
	38-70	hzcl	75YR53 00	00MN00 00	F				0	0		0		M				
	70-120	hzcl	75YR63 00	10YR68 00	C			Y	0	0		0		M				