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Horsham District Local Plan
Land at Hornbrook farm
Agricultural Land Classification
ALC Map and Report
March 1995

AGRICULTURAL LAND CLASSIFICATION REPORT

HORSHAM DISTRICT LOCAL PLAN
LAND AT HORNBROOK FARM, HORSHAM.

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 Horsham district of West Sussex. This forms part of MAFF's input to the preparation of the Horsham District Local Plan.

1.2 Approximately 4 hectares of land at Hornbrook Farm, on the A281, south of Horsham, West Sussex was surveyed during March 1995. The Agricultural Land Classification (ALC) survey was undertaken at a detailed level of approximately one boring per hectare. A total of 5 auger borings and one soil inspection pit were assessed 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 long-term limitations on its use for agriculture.

1.3 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 At the time of survey all of the agricultural land on this site was under permanent grassland.

1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in Table 1 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	2.5	61.0	71.4
3b	0.5	12.2	14.3
4	0.5	12.2	14.3
Urban	0.3	7.3	100% (3.5 ha)
Farm-Buildings	0.2	4.9	
Non-Agricultural	0.1	2.4	
Total area of site	4.1	100%	

1.6 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.

1.7 The majority of the site has been classified as very good quality, Grade 2, the principal limitation being soil droughtiness. These soils are derived from Tunbridge Wells Sands and as such comprise relatively deep and freely draining, slightly to moderately stony, sandy silt loams and silty clay loams over sandstone. To the north west of the site, adjacent to the

Horn Brook itself, an area of low lying land, containing hydrophilic vegetation such as Juncus spp., has been assessed as poor quality (Grade 4) on the basis of groundwater seepage. In addition a small area of the site has been classified as Subgrade 3b and 4 due to a severe gradient restriction.

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 (day degrees Celsius, 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. However; climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations.

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

Table 2 : Climatic Interpolations

Grid Reference	TQ187 298	TQ188 298
Altitude (m)	50	60
Accumulated Temperature (day degrees Celsius, Jan-June)	1474	1463
Average Annual Rainfall (mm)	784	788
Field Capacity (days)	166	167
Moisture Deficit, Wheat (mm)	108	107
Moisture Deficit, Potatoes (mm)	102	100
Overall Climatic Grade	1	1

3. Relief

3.1 The majority of this site is comparatively flat and lies at an altitude 55-60m AOD. However, in the north west of the site the land falls steeply (7.5°- >11 0°) towards the Horn Brook thus giving rises to a gradient limitation consistent with Subgrade 3b and Grade 4.

4. Geology and Soil

4.1 The British Geological Survey (1972), sheet 302, Horsham (Solid & Drift Edition) shows the majority of the site to be underlain by Upper Tunbridge Wells Sand with two small areas of Sandstone and Clay mapped in the south east corner and around the sloping land towards the north west of the site.

4.2 The Soil Survey of England and Wales (1983) has mapped soils of the South Petherton association across the site. These are described as 'Deep, well drained silty soils, some over soft rock. Risk of water erosion.' (SSEW, 1983).

4.3 Detailed field examination broadly confirmed the existence of soils similar to those described in paragraph 4.2., comprising well drained silty soils over sandstone.

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.

5.3 Grade 2

The majority of the site has been classified as very good quality, Grade 2, land. The soil profiles are relatively deep and free draining comprising fine sandy silt loam or medium silty clay loam topsoils over similar textured subsoils. The stone content in the topsoil is low (1% >2cm and 4-5% total fine soft sandstone by volume), however, in the subsoil it increases to between 5-50% total stone (by volume) before the sandstone bedrock is encountered at 70-95cm from the surface. The subsoil stone content and bedrock act to reduce profile available water for plants and thus increasing the risk of drought to limit the level and consistency of crop yields. However, at this location drought risk is partially offset by the porous nature of the soft sandstone and the good subsoil structural conditions present in the fine sandy silt loam subsoil. The resulting soil droughtiness limitation has therefore been assessed as being consistent with Grade 2.

5.4 Subgrade 3b

A small area of the site has been classified as moderate quality, Subgrade 3b, due to a significant gradient restriction. The angle of slope in this area measures 7.5 and 9 degrees thus limiting the safe and effective use of agricultural machinery and thereby limiting the nature in which mechanised operations can be carried out.

5.5 Grade 4

Toward the north west of the site the land has been classified as poor quality, Grade 4, due both a severe gradient and soil wetness limitation. The slope at this point measures in excess of 11 degrees which significantly limits the safe use of agricultural machinery. From the base of this hillside springs drain onto the flatter, lower lying land, adjacent to the Horn Brook. The land here cannot easily be drained and is therefore subject to severe seepage or soil wetness which is considered to be consistent with Wetness Class V, Grade 4.

SOURCES OF REFERENCE

British Geological Survey (1972), Sheet No. 302, Horsham, 1: 63360 Scale (solid & 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 England and Wales (1983), Sheet 6, The Soils of South East England (Map and accompanying legend).

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, religous buildings, cemetries. 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

MPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
	TQ18802990	PGR	NW		0		5	4	168	61	150	50	1				WE	4	Ground Water
P	TQ18682972	PGR	W	03	045		1	1	121	14	125	25	2				DR	2	Imp 75 Sst
2	TQ18662982	PGR	NW		038		2	2	094	-13	098	-2	3A				DR	3A	Near seepage
3	TQ18802980	PGR	W	01	038		2	2	138	31	111	11	1				WE	2	T/S root mots
	TQ18802970	PGR	W	02	068		1	1	117	10	110	10	2				DR	2	Imp 90 Sst
5	TQ18682972	PGR	NW	03	047		1	1	115	8	123	23	2				DR	2	Imp 70 Sst

SOIL PIT DESCRIPTION

Site Name : HORSHAM DLP,HORNBROOK FM Pit Number : 1P

Grid Reference: TQ18682972 Average Annual Rainfall : 788 mm
Accumulated Temperature : 1463 degree days
Field Capacity Level : 167 days
Land Use : Permanent Grass
Slope and Aspect : 03 degrees W

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	FSZL	10YR53 00	1	4	FSST	C				
25- 45	FSZL	10YR53 63	0	25	FSST	F	WKCSAB	FR	G	
45- 75	FSZL	25Y 72 00	0	45	FSST	C	WKCSAB	FR	G	

Wetness Grade : 1 Wetness Class : I
Gleying :045 cm
SPL : cm

Drought Grade : 2 APW : 121mm MBW : 14 mm
APP : 125mm MBP : 25 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

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	0-30	fszl	10YR53 63	10YR58 00	M			Y	0	0		0							
	30-90	fszl	10YR53 00	10YR58 00	C			Y	0	0		0		M					Wet
1P	0-25	fszl	10YR53 00	10YR58 00	C				1	0	FSST	4							Root Mottles
	25-45	fszl	10YR53 63	10YR58 00	F				0	0	FSST	25	WKCSAB FR	G					
	45-75	fszl	25Y 72 00	10YR58 00	C			Y	0	0	FSST	45	WKCSAB FR	G					Imp Sst 75
2	0-25	mzcl	10YR43 00	10YR58 00	F				0	0	FSST	2							
	25-38	mzcl	10YR54 00	10YR58 00	F				0	0	FSST	5		M					
	38-48	mzcl	25Y 64 00	75YR58 00	C			Y	0	0	FSST	10		M					Wet
	48-58	fszl	25Y 72 00	10YR58 00	M			Y	0	0	FSST	45		G					Imp Sst 58
3	0-28	mzcl	10YR53 00	10YR58 00	C				0	0	FSST	4							Root Mottles
	28-38	mzcl	10YR54 00						0	0	FSST	5		M					
	38-58	fszl	10YR53 00	10YR58 00	M			Y	0	0	FSST	50		G					
	58-85	fsl	10YR62 00	10YR58 00	M			Y	0	0	FSST	50		G					
	85-120	zc	10YR62 00	10YR58 00	M			Y	0	0	FSST	50		M					
4	0-30	mzcl	10YR42 43						0	0	FSST	5							
	30-68	mzcl	10YR53 53						0	0	FSST	25		M					
	68-90	mzcl	10YR62 00	10YR58 00	M			Y	0	0	FSST	45		M					
	90-95	fszl	25Y 72 00	10YR58 00	M			Y	0	0	FSST	50		G					Imp Sst 95
5	0-25	fszl	10YR53 00	10YR58 00	C				1	0	FSST	4							Root Mottles
	25-47	fszl	10YR63 00	10YR58 00	F				0	0	FSST	25		G					
	47-70	fszl	25Y 72 00	10YR58 00	M			Y	0	0	FSST	50		G					Imp Sst 70