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LAND AT FORD AERODROME
Bognor Regis, West Sussex

Agricultural Land Classification
ALC Map and Report

October 1997

Resource Planning Team
Eastern Region
FRCA Reading

RPT Job Number:4202/120/97
MAFF Reference: EL42/1751

AGRICULTURAL LAND CLASSIFICATION REPORT

LAND AT FORD AERODROME, BOGNOR REGIS, WEST SUSSEX

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 19.8ha of land at the disused Ford Aerodrome site, south west of Ford village near Bognor Regis, West Sussex. The survey was carried out during October 1997.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with a planning application by Southern Water for a proposed wastewater treatment works and sludge recycling centre. This survey supersedes any previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey the land use on the site was cereal stubble. The areas mapped as 'Other land' include a small area of hardstanding associated with the adjacent works.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale but any enlargement would be misleading.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	19.7	100	99.5
Other land	0.1	N/A	0.5
Total surveyed area	19.7	100	99.5
Total site area	19.8	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. Twenty borings and one soil pit were described.

[1] FRCA is an executive agency of MAFF and the Welsh Office

8. The whole of this site has been mapped as Grade 2 (very good quality) agricultural land. The soils typically comprise stoneless or very slightly stony fine silty topsoils overlying similar subsoils to depth. The subsoils occasionally show evidence of minor soil wetness but, overall profiles are well drained. Given the locally relatively dry climate, these soils are classified as Grade 2 due to a minor soil droughtiness limitation. Soil droughtiness may cause the level and consistency of crop yields to be reduced and restrict the range of crops which can tolerate droughty conditions, especially in dry years.

FACTORS INFLUENCING ALC GRADE

Climate

9. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

10. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	*N/A*	*SU 995 031*
Altitude	m, AOD	5
Accumulated Temperature	day°C (Jan-June)	1542
Average Annual Rainfall	mm	750
Field Capacity Days	days	154
Moisture Deficit, Wheat	mm	120
Moisture Deficit, Potatoes	mm	117
Overall climatic grade	N/A	Grade 1

11. 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.

12. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

13. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. The land is shown as being 'rather exposed' (Met Office, unpublished data, 1969). However, no evidence of exposure is visible on the site. Frost risk also does not affect land quality at this location. The site is climatically Grade 1. However, climatic factors do interact with soil properties to influence soil wetness and soil droughtiness. At this locality the climate is relatively warm and dry, in national terms. The likelihood of soil droughtiness problems may therefore be enhanced.

Site

14. The site is flat and low lying, at an altitude of 5m AOD. The land quality is not affected by site restrictions such as gradient, micro-relief or flooding.

Geology and soils

15. The most detailed published geological information for the site (BGS, 1972 and 1975) shows the whole site to be underlain by brickearth drift deposits overlying Upper Chalk solid deposits.

16. The most detailed published soils information covering the area (SSEW, 1967) shows the site to comprise soils from three soil series. The majority of the site is shown as Hamble Series; deep phase. This gives rise to deep, well drained brown earth soils developed in silty drift. They are commonly stoneless or nearly so. In the east of the site small areas of Hamble Series; shallow phase over loamy pebbly drift and Lyminster Series are mapped. This shallow phase of the Hamble Series gives rise to similarly well drained soils but which commonly contain a significant stone content towards the base of the profile. Lyminster soils are typically well to moderately well drained and usually deep over pebbly drift. Typically soils similar to the deep phase of the Hamble Series are found across the site, being well drained fine silty topsoils over similar or clayey subsoils. Occasionally, more stony soils are found.

AGRICULTURAL LAND CLASSIFICATION

17. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

18. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Grade 2

19. This site is mapped as very good quality agricultural land on the basis of a slight soil droughtiness limitation. Soils comprise calcareous or non-calcareous medium silty clay loam topsoils. These are generally stoneless, but may be very slightly to slightly stony (1-10% total flints, up to 5%>2cm, up to 4%>6cm). Topsoils overlie similar, or medium clay loam upper subsoils which again are typically stoneless, although they may contain up to 5% total flints and/or up to 15% chalk. These upper subsoils pass to medium silty clay loam, heavy silty clay loam, sandy clay loam, silty clay or clay lower subsoils. These horizons are usually stoneless, but may contain up to 15% total flints or up to 20% chalk. Lower subsoils are typically slightly gleyed or gleyed at moderate depths (between 65-95cm), which is suggestive of a fluctuating watertable and minor seasonal waterlogging. However, the drainage status of these soils overall is such that they are assigned to Wetness Class I. Pit 1 (see Appendix II) is representative of these soils. The combination of soil textures and stone contents within this locally dry climate slightly reduces the amount of water available in the

profile for growing crops. The resulting drought stress may cause the level and consistency of yields to be slightly depressed, especially in drier years. A classification of Grade 2 is appropriate.

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SOURCES OF REFERENCE

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Met. Office (1989) *Climatological Data for Agricultural Land Classification.* Met. Office: Bracknell.

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Soil Survey of Great Britain (1967) *Soils of the West Sussex Coastal Plain.* SSEW: Harpenden.

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South-east England,* 1:250,000. SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England* SSEW: Harpenden

APPENDIX I

DESCRIPTIONS 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 (e.g. 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.

APPENDIX II

SOIL DATA

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	**OTH**	Other
DCW:	Deciduous woodland	**BOG:**	Bog or marsh	**SAS:**	Set-Aside
HTH:	Heathland	**HRT:**	Horticultural crops	**PLO:**	Ploughed

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	**ST:**	Topsoil Stoniness
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
EX:	Exposure				

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

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	**MD**:	moderately developed
	ST:	strongly developed		
Ped size	**F**:	fine	**M**:	medium
	C:	coarse		
Ped shape	**S**:	single grain	**M**:	massive
	GR:	granular	**AB**:	angular blocky
	SAB:	sub-angular blocky	**PR**:	prismatic
	PL:	platy		

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

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

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 appropriate 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

SAMPLE 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
1	SU99600340	STB		80		1	1	155	35	120	3	2				DR	2	
2	SU99700340	STB		95		1	1	147	27	111	-6	2				DR	2	QueryDist
3	SU99800340	STB		90		1	1	155	35	120	3	2				DR	2	
4	SU99900340	STB		S33		1	1	103	-17	116	-1	3A				DR	3A	ImpChalkDrift
5	SU00000340	STB		S75		1	1	126	6	122	5	2				DR	2	ImpFlints90
6	SU99600330	STB				1	1	162	42	126	9	2				DR	2	See 1P
7	SU99700330	STB				1	1	162	42	126	9	2				DR	2	See 1P
8	SU99800330	STB				1	1	140	20	133	16	2				DR	2	See 1P
9	SU99900330	STB				1	1	159	39	123	6	2				DR	2	QueryDist
10	SU99200320	STB		S70		1	1	153	33	125	8	2				DR	2	See 1P
11	SU99300320	STB		S70		1	1	161	41	125	8	2				DR	2	See 1P
12	SU99400320	STB				1	1	160	40	124	7	2				DR	2	See 1P
13	SU99500320	STB		S70		1	1	148	28	120	3	2				DR	2	See 1P
14	SU99600320	STB		S75		1	1	151	31	124	7	2				DR	2	See 1P
15	SU99700320	STB		S75		1	1	161	41	125	8	2				DR	2	See 1P
16	SU99300310	STB		S65		1	1	157	37	125	8	2				DR	2	See 1P
17	SU99400310	STB		S75		1	1	155	35	125	8	2				DR	2	See 1P
18	SU99500310	STB		S68		1	1	150	30	124	7	2				DR	2	See 1P
19	SU99600310	STB		S75		1	1	151	31	122	5	2				DR	2	See 1P
20	SU99400300	STB				1	1	161	41	125	8	2				DR	2	See 1P
1P	SU99400310	STB				1	1	161	41	125	8	2				DR	2	

				----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
1	0-30	MZCL	10YR4243						2	1	HR	5						Y	
	30-40	MZCL	10YR54						0	0	HR	3		M				Y	
	40-80	MZCL	10YR54						0	0	HR	3		M					
	80-120	HZCL	10YR5464	10YR56	C	F		Y	0	0	HR	3		M					
2	0-32	MZCL	10YR42						5	4	HR	10						Y	
	32-60	MCL	10YR4454	10YR56	F	F	00MN00		0	0	CH	15		M				Y	+5% Flints
	60-95	HZCL	10YR54	10YR56	F	F			0	0	HR	5		M					Dry Compact
	95-120	HZCL	10YR5463	10YR56	C	F		Y	0	0	HR	3		M					Dry Compact
3	0-30	MZCL	10YR43						1	0	HR	5							
	30-75	MZCL	10YR44						0	0	HR	3		M					
	75-90	MZCL	10YR54	10YR56	F	F			0	0	HR	3		M					
	90-120	MZCL	10YR5464	10YR58	C	D		Y	0	0	HR	3		M					
4	0-33	MZCL	10YR53						2	1	HR	8						Y	
	33-55	MZCL	10YR5444	10YR56	C	D		S	0	0	HR	5		M				Y	
	55-65	MZCL	10YR5666						0	0	CH	20		M				Y	Moist +3%Flints
	65-70	MZCL	10YR51	00MN00	C				0	0	CH	20		M				Y	Wet
5	0-33	MZCL	10YR43						1	0	HR	3							
	33-75	MZCL	10YR44						0	0	HR	3		M					
	75-90	SCL	10YR54	10YR68	C	D		S	0	0	HR	15		M					
6	0-35	MZCL	10YR34						0	0		0							
	35-82	MZCL	10YR44						0	0		0		M					
	82-120	HZCL	10YR54	10YR56	F	D			0	0		0		M					
7	0-35	MZCL	10YR34						0	0		0							
	35-55	MZCL	10YR44						0	0		0		M					
	55-120	HZCL	10YR46						0	0		0		M					
8	0-35	MZCL	10YR34						0	0		0							
	35-75	MZCL	10YR44						0	0		0		M					
	75-100	HZCL	10YR46						0	0		0		M					
	100-120	HZCL	10YR46	75YR46	F	D			0	0		0		M					
9	0-30	MZCL	10YR33						0	0		0						Y	
	30-50	MCL	10YR33						0	0	CH	2		M				Y	+SandyLenses
	50-85	MZCL	10YR46						0	0		0		M					
	85-120	HZCL	10YR46						0	0		0		M					
10	0-28	MZCL	10YR43						0	0		0							
	28-70	HZCL	10YR4454				00MN00		0	0		0		M					
	70-80	HZCL	10YR54	10YR58	C			S	0	0		0		M					Loose Friable
	80-120	ZC	10YR54	10YR58	C			S	0	0		0		M					Loose Friable
11	0-28	MZCL	10YR43						0	0		0							
	28-45	MZCL	10YR4454						0	0		0		M					
	45-70	HZCL	10YR54				00MN00		0	0		0		M					
	70-120	HZCL	10YR54	10YR5861	C		00MN00	S	0	0		0		M					Loose

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
12	0-30	MZCL	10YR43						0	0	HR	1							
	30-50	MZCL	10YR44						0	0		0		M					
	50-80	MZCL	10YR54						0	0		0		M					
	80-120	HZCL	10YR54						0	0		0		M					
13	0-30	MZCL	10YR42						0	0	HR	1							
	30-70	HCL	10YR44						0	0		0		M					
	70-120	C	10YR54	000C00	C			S	0	0		0		M					
14	0-30	MZCL	10YR43						0	0	HR	1							
	30-75	MZCL	10YR44						0	0		0		M					
	75-120	C	10YR54	000C00	C			S	0	0		0		M					
15	0-32	MZCL	10YR33						0	0		0							
	32-55	MZCL	10YR44						0	0		0		M					
	55-75	HZCL	10YR46				00MN00		0	0		0		M					
	75-120	HZCL	10YR54	10YR46	C	D		S	0	0		0		M					VeryCrumbly
16	0-29	MZCL	10YR43						0	0		0							
	29-65	MZCL	10YR54						0	0		0		M					
	65-100	HZCL	10YR54	10YR58	C		00MN00	S	0	0		0		M					
	100-120	ZC	10YR5456	75YR58	C		00MN00	S	0	0		0		M					
17	0-30	MZCL	10YR43						0	0		0							
	30-60	MZCL	10YR44				00MN00		0	0		0		M					
	60-75	HZCL	10YR54	75YR58	F		00MN00		0	0		0		M					
	75-90	HZCL	10YR54	75YR58	C			S	0	0		0		M					
	90-120	ZC	10YR54	75YR58	C			S	0	0		0		M					
18	0-30	MZCL	10YR43						0	0	HR	1							
	30-68	HZCL	10YR44						0	0		0		M					
	68-120	C	10YR54	000C00	C			S	0	0		0		M					
19	0-30	MZCL	10YR43						0	0	HR	1							
	30-50	MZCL	10YR44						0	0		0		M					
	50-75	HCL	10YR44						0	0		0		M					
	75-120	C	10YR54	000C00	C			S	0	0		0		M					
20	0-30	MZCL	10YR43						0	0		0							
	30-120	MZCL	10YR4454				00MN00		0	0		0		M					
1P	0-28	MZCL	10YR43						0	0		0							
	28-61	MZCL	10YR44						0	0		0	MDCSAB	FR	M				
	61-76	HZCL	10YR4454	10YR46	F				0	0		0	MDCSAB	FR	M				GoodPorRoots
	76-120	HZCL	10YR5456	75YR58	F		00MN00		0	0		0	MDCSAB	FR	M				Roots