A1

West Sussex Minerals Plan
Site 25: Minsted

Agricultural Land Classification
Revised February 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

WEST SUSSEX MINERALS PLAN
SITE 25: MINSTED (REVISED FEBRUARY 1996)

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey on approximately 13 ha of land at Minsted, near Midhurst, West Sussex. The site was re-surveyed in October 1995 as a result of queries raised regarding the ALC grading, originally carried out in September 1993.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading, in connection with the West Sussex Minerals Plan. All of this site was surveyed in September 1993 in connection with the Plan. However, the results were re-evaluated February 1996 following the re-survey of the site in October 1995 to collect soil samples for laboratory analysis. Following this 1996 re-evaluation the ALC grades were amended and a new map and this report was produced. Consequently, this report and map supersede the earlier 1993 ALC data.

3. The revised grading takes into account the results of laboratory analysis of twelve soil samples (topsoil for six locations plus subsoil for five locations). The revised grading also allows for the availability of irrigation water on the site. During the 1993 survey there was no evidence to suggest that the land could be irrigated. However, during the re-visit in 1995 new information regarding the use of irrigation water became available. This information was used during February 1996 to arrive at a revised ALC grading for the site.

4. The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. 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.

5. At the time of the October 1995 survey the majority of the western field was in maize stubble, with a smaller area in set-aside. The eastern field was in permanent grass. A small area in the north-east of the site has been mapped as Woodland.

Summary

6. The findings of the 1996 re-evaluation of the site are shown on the enclosed ALC map. The map has been drawn at a scale of 1:5,000. It is accurate at this scale but any enlargement would be misleading. This map supersedes the 1993 ALC map.

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

8. The fieldwork for the 1993 survey was conducted at an average density of one boring per hectare. A total of 13 borings and 2 soil pits were described; this information has been supplemented by 9 additional borings carried out in October 1995.

Table 1: Area of grades and other land (as revised February 1996)

Grade/Other land	Area (hectares)	% Total site area	% Surveyed Area
2	8.5	64	66
3b	2.3	17	18
4	2.1	16	16
Woodland	0.4	3	-
Total surveyed area	12.8		100
Total site area	13.2	100	-

9. As a result of a re-evaluation of the ALC grading on this site the majority of the land has been classified as Grade 2 (very good quality), on the basis of soil droughtiness limitations. Land in the east of the site is of lower quality, Subgrade 3b (moderate quality) and Grade 4 (poor quality). This land is limited by soil wetness and workability.

10. The larger field on this site is currently irrigated and an adequate water supply is available for agricultural use. As irrigation can significantly enhance the potential of agricultural land, especially in drier areas, it is taken into account in ALC grading where it is current or recent practice. The land classified as Grade 2 comprises sandy textured soils. Topsoils comprise medium sandy loams which tend to be sandier, loamy medium sands, along the northern boundary of the site. These are underlain by similarly textured, or medium sand, subsoils. These profiles are virtually stoneless and are either well or moderately well drained. A combination of the light soil textures and prevailing climate reduces the amount of water available for crops. However, irrigation partially offsets these effects to give only a slight soil droughtiness limitation. Consequently, this land will suffer from slightly lower and less consistent crop yields.

11. Where the land is classified as Subgrade 3b, the topsoils comprise medium sandy loams, which are directly underlain by clay subsoils. These subsoils are poorly structured, slowly permeable and act to impart poor soil drainage conditions. The interaction between these drainage conditions and the relatively wet local climate is partially offset by the sandy textured topsoils, such that Subgrade 3b is appropriate. This land is subject to significant restrictions in terms of flexibility of cropping, stocking and cultivations. Where heavier topsoils occur the land is subject to more severe restrictions; this land is thus classified as Grade 4. Some of the Grade 4 land is subject to wet flushes, due to water seepage caused by a high groundwater table. This has resulted in pockets of wet peaty soils. The Grade 4 land is mainly suitable for seasonal grazing.

Factors Influencing ALC Grade

Climate

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

13. 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 863 210
Altitude	m, AOD	30
Accumulated Temperature	day°C (Jan-June)	1509
Average Annual Rainfall	mm	900
Field Capacity Days	days	197
Moisture Deficit, Wheat	mm	102
Moisture Deficit, Potatoes	mm	95

14. 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.

15. 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 (ATO, January to June), as a measure of the relative warmth of a locality.

16. The combination of rainfall and accumulated temperature at this site mean that there is no overall climatic limitation. No local climatic factors, such as exposure and frost risk, are believed to adversely affect the land quality on the site. This site is climatically Grade 1.

Site

17. Most of the site is flat and lies at approximately 30-35 m AOD. In the most eastern field the land falls gently to the river to lie at just below 30 m AOD.

Geology and soils

18. The published geological information (BGS, 1957) shows the site to be underlain by Folkestone Beds which are overlain by alluvial deposits in the east of the site.

19. The published soils information (SSEW, 1983), shows the site to be underlain by soils of the Shirrell Heath 1 association. The legend accompanying the map describes these soils as 'Well drained with a bleached subsurface horizon. Some similar soils with slowly permeable

subsoils and slight seasonal waterlogging. Some sandy and coarse loamy soils affected by groundwater often with humose surface horizon.' (SSEW, 1983).

Agricultural Land Classification

20. 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 2.

21. 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 III. Details from the original ALC survey, carried out in 1993, are attached in Appendix IV.

Grade 2

22. Most of the site has been classified as Grade 2, very good quality. This land is limited by minor soil droughtiness. Topsoils comprise medium sandy loams or loamy medium sands. These typically overlie similarly textured upper subsoils, though occasionally they overlie medium sand upper subsoils. At approximately 75-100 cm these profiles pass into medium sand lower subsoils. All subsoils are moderately structured. These profiles are very slightly stony, containing 0-5% total flints by volume. Depending upon the depth to gleying these profiles are either well or moderately well drained, Wetness Classes I and II (see Appendix II). The interaction between these soil characteristics and the prevailing climate reduces the amount of profile available water for plants. This would normally have the effect of restricting the level and consistency of crop yields to the extent that Subgrade 3a would be appropriate. However, this land benefits from an adequate supply of irrigation water. This water has the effect of partially alleviating drought risk in this area, thus allowing Grade 2 to be mapped.

Subgrade 3b

23. A relatively narrow strip of land running along the eastern boundary of the larger flatter field has been classified as Subgrade 3b, moderate quality. Although this land can be irrigated, the key limitations are significant soil wetness and workability. Medium sandy loam topsoils, which are occasionally organic, directly overlie clay subsoils. These profiles tend to be impenetrable to a soil auger at approximately 90 cm depth because of underlying sandstone deposits. Profiles are very slightly stony, containing 0-5% total flints by volume. Some profiles become moderately stony at depth, containing approximately 20% total soft sandstone, before proving impenetrable to a soil auger. The clay subsoils are poorly structured and slowly permeable. This causes poor soil drainage as indicated by gleying within the subsoils, and these profiles are appropriately assigned to Wetness Class IV. Although these profiles have light topsoils the poor soil drainage combined with the wet prevailing climate means that this land is classified as Subgrade 3b. This land will be subject to significant restrictions on the flexibility of cropping, stocking and cultivations.

Grade 4

24. Most of the field adjacent to the river has been classified as Grade 4, poor quality, because of severe soil wetness and workability limitations. This land is subject to both groundwater and surface water problems. Where the former occur, organic textured topsoils overlie peaty subsoils. Water seepage (raised bogs) and high water tables at the time of

survey are indicative of long periods of waterlogging. This may be caused by the seepage of groundwater at the junction of two geological types, namely the free draining Folkestone Beds and underlying clayey layers, perhaps derived from Gault Clay or clayey facies of the Folkestone Beds. Given the saturation of the land for much of the year such profiles are assigned to Wetness Class V. The interaction between this drainage status, topsoil textures and the moist prevailing climate means that this land is classified as Grade 4. Such land is unlikely to benefit significantly from artificial drainage. As such, it will present severe difficulties in terms of cropping and cultivations and will be best suited to seasonal grazing. Where surface water problems occur, heavy textured topsoils directly overlie clay subsoils. In comparison to the land classified as Subgrade 3b the heavier topsoils further restrict the flexibility of cropping. Hence this land is also classified as Grade 4.

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SOURCES OF REFERENCE

British Geological Survey (1957) *Sheet No. 317, Chichester, 1:50,000.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

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

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South East England, 1:250,000 and accompanying legend.*
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 WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

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.

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.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

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

APPENDIX III

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
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 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	SU86002120	STB					1	1	089	-13	070	-25	3A				DR	2	Inc irrigatio
3	SU86202120	STB			050		1	1	068	-34	065	-30	3B				DR	3A	Inc irrigatio
5	SU86332113	PGR	E	03	025		4	4		0		0					WE	4	Wet land
5A	SU86322107	PGR			0	020	4	4		0		0					WE	4	
7	SU86102110	STB			028		2	2	131	29	109	14	2				DR	1	Incl irrigati
9	SU86282120	STB			032	032	4	3B		0		0					WE	3B	Impen 90 ston
10	SU86002100	STB			030		2	2	123	21	107	12	2				WE	2	Gr 1 incl irr
12	SU86202101	PGR			030	030	4	3B		0		0					WE	3B	Impen 90 ston
14	SU85922110	SAS			030		2	2	101	-1	067	-28	3A				DR	2	Inc irrigatio

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	0-35	lms	10YR42 00						0	0		0							lab = lms
	35-55	lms	10YR44 00						0	0		0		M					lab = lms
	55-120	lms	10YR56 00						0	0	HR	3		M					lab = lms
3	0-35	lms	10YR42 00						0	0		0							lab = lms
	35-50	ms	10YR53 63						0	0	HR	3		M					lab = ms
	50-75	ms	10YR53 63	10YR56 00	C		00MN00 00	Y	0	0	HR	3		M					
	75-90	ms	10YR53 63	10YR56 00	C		00MN00 00	Y	0	0	HR	30		M					
5	0-25	oms1	10YR22 00					Y	0	0		0							lab = oms1
	25-90	ps	75YR34 00					Y	0	0		0		M					lab = ps
5A	0-20	hc1	05Y 51 00	75YR68 00	M			Y	0	0		0							
	20-120	c	05Y 61 00	75YR68 00	M			Y	0	0		0		P			Y		
7	0-28	ms1	10YR32 00						0	0	HR	2							lab = ms1
	28-68	ms1	10YR42 00	10YR58 00	C			Y	0	0	HR	2		M					
	68-85	ms1	10YR53 72	10YR58 00	M			Y	0	0	HR	2		M					clay lenses
	85-120	ms	05Y 71 00	10YR58 72	M			Y	0	0		0		M					clay lenses
9	0-32	ms1	10YR44 00						0	0	HR	4							lab = ms1
	32-50	c	10YR53 00	75YR68 61	M			Y	0	0		0		P			Y		
	50-90	c	10YR53 00	75YR68 61	M			Y	0	0	MSST	20		P			Y		
10	0-30	ms1	10YR33 00						0	0	HR	2							
	30-55	ms1	25Y 53 00	75YR68 00	M			Y	0	0	HR	5		M					
	55-70	ms1	10YR53 00	05YR46 00	M			Y	0	0	HR	5		M					
	70-75	sc1	10YR53 00	05YR46 00	M			Y	0	0		0		M					
	75-120	ms	05Y 71 00	75YR68 56	M			Y	0	0		0		M					
12	0-30	oms1	10YR22 00						0	0		0							
	30-80	c	10YR53 00	75YR58 00	M			Y	0	0		0		P			Y		
	80-90	hc1	10YR53 00	75YR58 00	M			Y	0	0	HR	5		M			Y		
14	0-30	lms	10YR42 00						0	0	HR	2							lab = lms/ms1
	30-70	lms	10YR42 00	10YR56 00	C			Y	0	0	HR	2		M					lab = lms
	70-100	ms1	10YR53 00	75YR56 00	M			Y	0	0	HR	5		M					
	100-120	ms	10YR53 00	75YR56 00	M			Y	0	0	HR	2		M					

APPENDIX IV

RESULTS FROM PREVIOUS 1993 SURVEY

Contents:

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WEST SUSSEX MINERALS PLAN
SITE 25: MINSTED
AGRICULTURAL LAND CLASSIFICATION
ALC MAP & SUMMARY REPORT
SEPTEMBER 1993

WEST SUSSEX MINERALS PLAN
SITE 25: MINSTED
AGRICULTURAL LAND CLASSIFICATION REPORT

1.0 Summary

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

1.2 Approximately 13 hectares of land relating to Site 25 at Minsted near Midhurst was surveyed during September 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 13 soil auger borings and 2 soil inspection pits 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 conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 At the time of the survey the majority of the site was cereals that had been recently harvested,with an area of pasture in the east of the site.

1.4 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in the table below. The map has been drawn at a scale of 1:5000. It is accurate at this scale, but any enlargement would be misleading. This map supersedes any previous survey information.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Area
2	10.1	76.5	79.0
3A	2.7	20.5	21.1
Woodland	0.4	3.0	100.0 (12.8 ha)
Total	13.2	100.0	

1.5 Appendix 1 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 The site has been classified as Grade 2 and Subgrade 3a, the main limitations are workability and wetness respectively. The soils in the area shown as Grade 2 are well drained and show no evidence of a droughtiness limitation, although the topsoil texture (medium clay loam) results in a workability limitation in area which has a relatively wet climate. The soils in the Subgrade 3A map unit exhibit clear evidence of impeded drainage related to the presence of poorly structured subsoils, with further wetness related to a locally high water table in the east of the site.

2.0 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 the 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 affect the site. However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations. At this locality field capacity days are high in a regional context whilst moisture deficits are correspondingly low. This means that the likelihood of soil wetness and workability problems is enhanced.

Table 2 : Climatic Interpolations

Grid Reference :	SU 863 210
Altitude (m) :	30
Accumulated Temperature (days) :	1509
Average Annual Rainfall (mm) :	900
Field Capacity (days) :	197
Moisture Deficit, Wheat (mm) :	102
Moisture Deficit, Potatoes (mm) :	95
Overall Climatic Grade :	1

3.0 Relief

3.1 The site lies at an altitude of 30 metres (A.O.D.) and is flat. On no part of the site do gradient or relief pose a limitation to agricultural use.

4.0 Geology and Soil

4.1 The relevant geological sheet for the site (BGS Sheet 317: Chichester 1957) shows the predominant underlying geology to be Folkestone Beds with a small area of alluvium in the east of the site.

4.2 The published soils information for the area (SSEW Sheet 6: Soils of South East England 1983) shows the soils as the Shirrel Heath association. These are described as well drained very acid sandy soils with slowly permeable subsoils and slight seasonal waterlogging. Detailed field examination showed the soils to be rather less sandy in some areas. There is evidence of some drainage imperfections, particularly in the east of the site.

5.0 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 Grade 2, very good quality agricultural land. Typical soil profiles are comprised of medium clay loam topsoils. A sandy subsoil of medium sandy loam texture usually commenced below 40 cm, although the depths to the sandy loams were variable. In a number of the auger samples and the soil inspection pit in this map unit, there is evidence of drainage imperfections in the form of subsoil gleying. Yet, these features tend to be deep in the profile and therefore do not pose any restrictions on agricultural use. Profiles tend to be stoneless. The combination of soil textures and structures along with the local climatic regime means that there is sufficient available water within these soils to sustain crop growth. These soils are downgraded to Grade 2 as a result of a workability limitation. This arises due to a combination of topsoil textures and the moist climate (i.e 197 field capacity days) for the site, which means there is a slight restriction on the frequency with which machinery can be used, and land can be grazed without causing structural damage.

5.4 Subgrade 3a : The remainder of the site has been graded as Subgrade 3a, good quality agricultural land. This land has been downgraded due to a soil wetness limitation, soil inspections show impeded drainage within the profiles. There is evidence of gleying, particularly in the topsoils. In the far eastern edge of the site, a high water table at approximately 55 cm was detected. Pit 2 was dug to investigate the nature of the soil wetness problem. The soil profile comprises of a medium clay loam topsoil and upper subsoil which extends to 66cm. Beneath this depth there are alternate layers of clay and loamy medium sand down to a depth of 120cm. The profile is gleyed from 33cm, and although the clay subsoils show a poor substructural condition, they are not sufficiently thick to qualify as slowly permeable layers. The extent of the gleying in the soil profile means that these soils can be placed into Wetness Class II, which in conjunction with the local climatic regime and topsoil texture gives a resultant classification of Subgrade 3a.

5.5 The area marked as Non-agricultural includes an area of woodland in the east of the site.

ADAS REFERENCE :4203/176/93
MAFF REFERENCE : EL 42/00228

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 25 Pit Number : 1P

Grid Reference: SU86042105 Average Annual Rainfall : 900 mm
Accumulated Temperature : 1509 degree days
Field Capacity Level : 197 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 30	MCL	10YR32 00	0	0		MDCSAB
30- 45	MCL	10YR42 00	0	1		MDCSAB
45- 70	MCL	10YR53 00	0	4	M	WDCSAB
70- 85	MSL	10YR53 00	0	2	M	MDCSAB
85-120	C	10YR61 00	0	0	M	

Wetness Grade : 2 Wetness Class : I
Gleying :045 cm
SPL : No SPL

Drought Grade : 1 APW : 149mm MBW : 47 mm
APP : 116mm MBP : 21 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Workability

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 25 Pit Number : 2P

Grid Reference: SU86302118 Average Annual Rainfall : 900 mm
Accumulated Temperature : 1509 degree days
Field Capacity Level : 197 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 33	MCL	10YR32 00	2	4		MDCSAB
33- 66	MCL	10YR32 00	0	8	C	MCSAB
66- 80	C	10YR61 00	0	0	M	WDAM
80-100	LMS	10YR51 00	0	0	C	
100-110	C	10YR41 00	0	0	M	
110-120	LMS	25Y 73 00	0	0		

Wetness Grade : 3A Wetness Class : II
Gleying :033 cm
SPL : No SPL

Drought Grade : APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

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	SU86002120	STB					1	1	136	34	111	16	1					1	
1P	SU86042105	STB		045			1	2	149	47	116	21	1				WK	2	PIT 100
2	SU86102120	STB		090			1	1	151	49	112	17	1					1	
2P	SU86302118	PGR		033			2	3A	000	0	000	0					WE	3A	NO SPL
3	SU86202120	STB					1	1	130	28	110	15	2				DR	2	
4	SU86302120	PGR		035	075		3	3A	000	0	000	0					WE	3A	
5	SU86352115	PGR		0			1	2	161	59	123	28	1				WK	2	WETAT55
6	SU86002110	STB		040			1	2	145	43	117	22	1				WK	2	
7	SU86102110	STB		068			1	2	159	57	118	23	1				WK	2	
8	SU86202110	PGR		055			1	2	139	37	117	22	1				WK	2	
9	SU86302110	PGR		035			2	3A	097	-5	103	8	3A				WE	3A	
10	SU86002110	PGR		040			1	2	161	59	115	20	1				WK	2	
11	SU86102100	STB		065			1	2	153	51	113	18	1				WE	2	
12	SU86202100	PGR		055			1	2	121	19	118	23	2				WK	2	
13	SU86202005	PGR		0			2	3A	076	-26	076	-19	3B				WE	3A	

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
1	0-30	msl	10YR32 00						0	0		0						
	30-50	msl	10YR44 00						0	0		0		M				
	50-85	msl	10YR46 00						0	0		0		M				
	85-120	lms	10YR56 00						0	0		0		M				
1P	0-30	mcl	10YR32 00						0	0		0	MDCSAB	FR		Y		
	30-45	mcl	10YR42 00						0	0	HR	1	MDCSAB	FR	M	Y		
	45-70	mcl	10YR53 00	75YR46	56	M		Y	0	0	HR	4	WDCSAB	FR	M			
	70-85	msl	10YR53 00	75YR46	56	M		Y	0	0	HR	2	MDCSAB	FR	M	Y		
	85-120	c	10YR61 00	10YR56	00	M	00MN00 00	Y	0	0		0		M		Y		
2	0-35	msl	10YR32 00						0	0		0						
	35-65	scl	10YR43 00						0	0		0		M				
	65-90	scl	10YR54 00						0	0		0		M				
	90-120	scl	10YR53 00	000C00	00	C		Y	0	0	HR	2		M				
2P	0-33	mcl	10YR32 00						2	0	HR	4	MDCSAB	FR		Y		
	33-66	mcl	10YR32 00	10YR58	00	C		Y	0	0	HR	8	MCSAB	FR	M			
	66-80	c	10YR61 00	10YR58	68	M		Y	0	0		0	WDAM	VM	P	Y		
	80-100	lms	10YR51 00	10YR58	00	C		Y	0	0		0			M			
	100-110	c	10YR41 00	10YR58	00	M		Y	0	0		0			P			
	110-120	lms	25Y 73 00						0	0		0			M			
3	0-35	msl	10YR32 00						0	0		0						
	35-60	msl	10YR42 00	75YR46	00	C			0	0	HR	5			M	Y		
	60-80	msl	10YR41 52	75YR46	00	M			0	0		0			M	Y		
	80-90	lms	10YR62 00						0	0		0			M			
	90-120	ms	10YR63 00						0	0		0			M			
4	0-35	mcl	10YR31 00						0	0		0						
	35-75	hcl	10YR42 00	10YR58	00	C		Y	0	0		0			M			
	75-120	c	10YR51 00	10YR58	00	C	00MN00 00	Y	0	0		0			P	Y		Y
5	0-35	mzcl	10YR31 00					Y	0	0		0						
	35-55	mcl	10YR31 43					Y	0	0		0			M			
	55-120	hcl	10YR51 00					Y	0	0		0			M			
6	0-30	mcl	10YR32 00						0	0		0						
	30-40	mcl	10YR44 00	000C00	00	F			0	0	HR	1			M			
	40-70	mcl	10YR53 00	10YR58	00	M		Y	0	0	HR	1			M			
	70-90	lms	10YR56 00					Y	0	0		0			M			
	90-120	scl	10YR53 00	75YR46	00	M		Y	0	0		0			M			
7	0-28	mcl	10YR32 00						0	0		0						
	28-40	mcl	10YR43 00						0	0		0			M			
	40-68	mcl	10YR53 00						0	0		0			M			
	68-90	mcl	10YR63 00	000C00	00	C		Y	0	0		0			M			
	90-120	msl	10YR53 00	000C00	00	C		Y	0	0		0			M			

				----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
8	0-30	mcl	10YR42 00						0	0		0						
	30-55	mcl	10YR44 00						0	0		0		M				
	55-75	scl	10YR53 00	10YR58	62	C		Y	0	0		0		M				
	75-100	msl	10YR54 00	10YR58	00	C		Y	0	0		0		M				
9	0-35	mcl	10YR43 00						0	0		0						
	35-45	hcl	10YR42 00	10YR58	00	C		Y	0	0		0		M				
	45-60	hcl	10YR52 00	10YR58	00	C	00MN00	00 Y	0	0		0		M				
10	0-40	mcl	10YR32 00						0	0	HR	1						
	40-60	msl	10YR53 00	10YR56	58	M		Y	0	0	HR	2		M				
	60-85	msl	10YR52 00	75YR46	56	M		Y	0	0	HR	5		M				
	85-120	msl	10YR52 00	10YR56	00	M		Y	0	0	HR	2		M				
11	0-30	mcl	10YR32 00						0	0	HR	2						
	30-40	mcl	10YR44 00						0	0	HR	1		M				
	40-65	scl	10YR54 00	000C00	00	C			0	0	HR	1		M				
	65-120	scl	10YR62 00	000C00	00	C		Y	0	0	HR	1		M				
12	0-30	mcl	10YR43 00						0	0		0						
	30-55	mcl	10YR53 00	10YR58	00	F			0	0		0		M				
	55-85	hcl	10YR53 00	10YR58	62	C		Y	0	0		0		M				
13	0-20	mcl	10YR43 00	10YR58	62	C		Y	0	0		0						
	20-45	hcl	10YR43 00	10YR58	61	M		Y	0	0		0		M				