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**Maidstone Borough Local Plan
Site 14 Land south of Forstal Lane,
Coxheath
Agricultural Land Classification
ALC Map and Report
September 1994**

AGRICULTURAL LAND CLASSIFICATION REPORT

MAIDSTONE BOROUGH LOCAL PLAN

SITE 14 LAND SOUTH OF FORSTAL LANE, COXHEATH

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 Maidstone Borough of Kent. The work forms part of MAFF's statutory input to the Maidstone Borough Local Plan.
- 1.2 Site 14 comprises 7.8 hectares of land to the north east of Coxheath in Kent. An Agricultural Land Classification (ALC) survey was carried out during July 1994. The survey was undertaken at a detailed level with a total of 11 borings and one soil inspection pit being 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. The work was undertaken by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.
- 1.3 At the time of survey the agricultural land was under permanent grass being grazed by horses.
- 1.4 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. This map supersedes any previous ALC survey information for this site.

Table 1 Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site
2	1.2	15.4
3a	4.9	62.8
3b	1.7	21.8
Total area of site	<u>7.8ha</u>	<u>100%</u>

- 1.5 The land at this site has been classified very good (Grade 2) to moderate quality (Subgrade 3b) with a substantial proportion classed as good quality (Subgrade 3a). Principal limitations include soil droughtiness and slope. Droughtiness limitations occur where variable hard stone contents in the soil profile restricting available water capacity such that there is a slight to significant risk of drought stress affecting plant growth and yield. Land of moderate quality is also mapped where slope gradients measured using an optical reading clinometer between 7.5° and 10.5° act to restrict the safe and efficient use of farm machinery.

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 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 However climatic and soil factors interact to influence soil wetness and droughtiness limitations

Table 2 Climatic Interpolation

Grid Reference	TQ749514
Altitude (m AOD)	100
Accumulated Temperature (°days Jan -June)	1395
Average Annual Rainfall (mm)	700
Field Capacity Days	141
Moisture deficit wheat (mm)	112
Moisture deficit potatoes (mm)	107
Overall Climatic Grade	1

3 Relief

- 3 1 The site lies between 100 and 110m AOD The majority of the site to the west is relatively flat However towards the east a dry valley feature is evident where the land is lower lying the slope between these features is significant in terms of land quality The gradient is sufficient to restrict land quality to Subgrade 3b on the basis of slope gradients which were between 7.5° and 10.5° as measured with an optical reading clinometer

4 Geology and Soils

- 4 1 The published geological information (BGS 1976) shows the majority of the site to be underlain by Head drift deposits towards the south and west of the site The remaining area is underlain by Cretaceous Hythe Beds These are described as sandy limestone and calcareous sand (BGS 1976)

- 4 2 The published soils information (SSEW 1983) shows the site to be underlain by soils of the Marlow and Malling Associations. Marlow Association soils are most prevalent and are described as well drained fine loamy over clayey and clayey soils (SSEW 1983). The remaining area of the site towards the northern and eastern boundaries is shown as being underlain by the Malling Association. These soils are described as well drained non calcareous soils over limestone at variable depths (SSEW 1983). The soils encountered at the site were of two main types. The most prevalent on the higher land comprised stony medium sandy silt loams over gleyed clay. On the lower land towards the east of the site slightly stony silt loams over stony medium sandy silt loams were encountered.

5 Agricultural Land Classification

- 5 1 Paragraph 1.4 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 Land of very good quality has been mapped at the base of the dry valley feature towards the east of the site. The principal limitation is slight soil droughtiness. Soil profiles typically comprise a stoneless or very slightly stony silt loam topsoil overlying a similarly stony silt loam or medium silty clay loam upper subsoil. Between 50 and 70cm this passes to a moderately stony (c. 30% v/v flints) medium silty clay loam or medium sandy silt loam lower subsoil horizon which became impenetrable to the soil auger between 60 and 80cm. The flints in the soil profile restrict water availability to plants such that within local climatic parameters Grade 2 is appropriate.

Subgrade 3a

- 5 4 Land of good quality is shown over the majority of the site on the land of greatest altitude. The principal limitation in these areas is soil droughtiness. Typically soil profiles comprise a slightly to moderately stony (10-20% v/v flints up to 8% > 2cm) medium sandy silt loam topsoil. This overlies a moderately stony (c. 30% v/v flints) medium sandy silt loam upper subsoil which was commonly impenetrable to the soil auger. However penetration through this horizon was achieved in the pit observation 1p (see Appendix III). The upper subsoil was found to pass to a very stony (45% v/v flints) medium sandy silt loam horizon to around 56cm. Beneath this the lower subsoil horizons were found to comprise a very slightly stony (3% v/v flints) clay to around 85cm when the stone content increased to approximately 10% and the clay became gleyed to depth. The flints in the soil profile have the effect of reducing available water to crops such that within the prevalent local climate Subgrade 3a is appropriate.

Subgrade 3b

- 5 5 Land of moderate quality is shown towards the east of the site in the area between the higher good quality land and the lower very good quality land. The principal restriction on land quality is slope. Gradients between 7.5° and 10.5° measured using an optical reading clinometer act to restrict the range of agricultural machinery that may be safely and efficiently operated such that this land may be classified no higher than Subgrade 3b. Furthermore, on the southern edge of the site, droughtiness limitations are sufficiently significant to restrict this land to Subgrade 3b. It should be noted that the extent of such land is limited, being restricted to the crest of the slope.

ADAS Ref 2007/150/94
MAFF Ref EL20/328

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1976) Sheet 288 Maidstone 1 50 000 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) Climatic datasets for Agricultural Land Classification

Soil Survey of England and Wales (1983) Sheet No 6 Soils of South East England 1 250 000 and Accompanying Legend

Soil Survey of England and Wales (1984) Soils and their use in South East England Bulletin No 15

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.

¹The number of days specified is not necessarily a continuous period

²In most years is defined as more than 10 out of 20 years

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents

	Soil Abbreviations - Explanatory Note
	Soil Pit Descriptions
	Database Printout - Boring Level Information
	Database Printout - Horizon Level Information

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 **GLEYSPL** 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 subdivided 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 **GLEYS** 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 **MD** moderately developed
ST strongly developed

ped size **F** fine **M** medium
C coarse **VC** very 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 **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

SOIL PIT DESCRIPTION

Site Name MAIDSTONE LP SITE 14 Pit Number 1P

Grid Reference TQ74835148 Average Annual Rainfall 0 mm
 Accumulated Temperature 0 degree days
 Field Capacity Level 141 days
 Land Use Permanent Grass
 Slope and Aspect 01 degrees NE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 18	MSZL	10YR42 00	8	20	HR					
18- 35	MSZL	10YR42 43	15	33	HR			FR	M	
35- 56	MSZL	10YR44 54	20	45	HR	F		FR	M	
56- 85	C	05YR46 00	0	3	HR		MDMAB	FM	M	
85-120	C	05YR46 00	0	10	HR	C		FM	P	

Wetness Grade 1 Wetness Class I
 Gleying 85 cm
 SPL 85 cm

Drought Grade 3A APW 111mm MBW -1 mm
 APP 90 mm MBP -17 mm

FINAL ALC GRADE 3A
 MAIN LIMITATION Droughtiness

SAMPLE NO	GRID REF	ASPECT USE	- WETNESS--		-WHEAT-		POTS-		M REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	TQ74805150	PGR NE	01		1	1	49	-63	49	-58	4			DR 3A	IMP 30 SEE 1P
1P	TQ74835148	PGR NE	01	85 85	1	1	111	1	90	-17	3A			DR 3A	PIT 70 AUG 120
2	TQ74905150	PGR SE	01		1	1	52	60	52	-55	4			DR 3A	IMP 30 SEE 1P
3	TQ74805140	PGR NE	01		1	1	51	61	51	-56	4			DR 3A	IMP 30 SEE 1P
4	TQ74905140	PGR SE	03	30	2	1	66	46	66	-41	3B			DR 3A	IMP 40 SEE 1P
5	TQ75005140	PGR NW	03		1	1	95	17	100	-7	3A			DR 3A	IMP 60 SEE 1P
6	TQ74805130	PGR SE	01		1	1	31	81	31	-76	4			DR 3A	IMP 20 SEE 1P
7	TQ74905130	PGR E	02	80	1	1	184	72	151	44	1			1	
8	TQ75005130	PGR W	04	25	2	1	68	44	68	-39	3B			DR 3A	IMP 45 SEE 1P
9	TQ74925123	PGR N	04		1	1	63	49	63	-44	3B			DR 3B	IMP 45 H2 HR
10	TQ74965137	PGR N	01		1	1	117	5	121	14	2			DR 2	IMP 60 SEE 1P
11	TQ74955133	PGR N	01		1	1	130	18	137	30	2			DR 2	IMP 80 SEE 1P

SAMPLE	DEPTH	TEXTURE	COLOUR	--- MOTTLES---			PED COL	---STONES---			STRUCT/ CONSIST	SUBS			CALC
				COL	ABUN	CONT		GLE Y	>2	>6		LITH	TOT	STR	
1	0 30	msz1	10YR43 00					7	0	HR	15				IMP STONES 30
1P	0-18	msz1	10YR42 00					8	0	HR	20				
	18-35	msz1	10YR42 43					15	0	HR	33		FR	M	2mm SIEVED
	35-56	msz1	10YR44 54 75YR56 00 F					20	0	HR	45		FR	M	2mm SIEVED
	56-85	c	05YR46 00					0	0	HR	3	MDMAB	FM	M	
	85-120	c	05YR46 00 10YR52 6B C					Y	0	0	HR	10		FM	P Y Y
2	0-30	msz1	10YR43 00					3	0	HR	10				IMP STONES 30
3	0 30	msz1	10YR43 00					6	0	HR	12				IMP STONES 30
4	0-30	msz1	10YR43 00					6	0	HR	12				
	30-40	mc1	10YR53 62 75YR56 00 C					Y	0	0	HR	5		M	IMP STONES 40
5	0 25	msz1	10YR42 00					0	0	HR	5				
	25-40	msz1	10YR53 00 10YR66 00 F					0	0	HR	5		M		
	40-55	msz1	10YR53 00 10YR66 00 F				00MN00 00	0	0	HR	10		M		
	55-60	msz1	10YR54 00 10YR66 00 F					0	0	HR	10		M		IMP STONES 60
6	0-20	msz1	10YR42 52					0	0	HR	20				IMP STONES 20
7	0-30	z1	10YR42 00 10YR61 00 F					0	0		0				
	30-60	z1	10YR44 54 10YR56 61 F					0	0		0		M		
	60 80	hzc1	10YR46 00 10YR61 00 F					0	0	HR	5		M		
	80-120	mzc1	10YR54 52 10YR58 00 C				00MN00 00 Y	0	0	HR	5		M		
8	0-25	msz1	10YR42 00					0	0	HR	15				
	25 45	mc1	10YR62 63 10YR66 00 C					Y	0	0	HR	15		M	IMP STONES 45
9	0-20	msz1	10YR42 43					0	0	HR	15				
	20 45	msz1	10YR53 00					0	0	HR	30		M		IMP STONES 45
10	0 25	z1	10YR43 00					0	0	HR	2				
	25 50	z1	10YR44 54					0	0	HR	5		M		
	50 60	msz1	10YR44 54					0	0	HR	30		M		IMP STONES 60
11	0-30	z1	10YR42 52					0	0		0				
	30-70	mzc1	10YR46 00					0	0		0		M		
	70-80	mzc1	10YR44 00					0	0	HR	30		M		IMP STONES 80