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MEDWAY TOWNS LOCAL PLAN
Site 45, Hoo St Werburgh

Agricultural Land Classification
February 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

MEDWAY TOWNS LOCAL PLAN, SITE 45, WOO ST WERBURGH

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 8 ha of land on the south-eastern side of the village of Hoo St Werburgh, Kent. The site is bounded to the north and west by residential development and by open farmland and orchards to the east and south. The survey was carried out in February 1996.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Reading in connection with the Medway Towns Local Plan. This survey supersedes any previous ALC surveys on this land.

3. The work was carried out under sub-contracting arrangements by NA Duncan & Associates and was supervised 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.

4. At the time of survey, the whole site had been sown to winter cereals.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10000 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)	% agricultural area
2	2.7	32.9
3a	4.1	50.0
3b	1.4	17.1
Total site area	8.2	100.0

7. The fieldwork was conducted at an average density of one auger boring per hectare. A total of 10 borings and 1 soil pit was described.

quality agricultural land on the lower lying flat land at the southern edge of the site. The areas of Grade 2 and Subgrade 3a have slight and moderate droughtiness limitations respectively, whilst the land classified as Subgrade 3b comprises poorly drained clayey soils which give rise to a moderately severe wetness and workability restriction.

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	TQ 786 722
Altitude	m, AOD	8
Accumulated Temperature	day°C	1490
Average Annual Rainfall	mm	587
Field Capacity Days	days	114
Moisture Deficit, Wheat	mm	128
Moisture Deficit, Potatoes	mm	126

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 the area is relatively dry and warm. The site is not considered to be exposed or subject to any particular frost risk and as such no climatic limitation exists on this site.

Site

14. The altitude of the site ranges from 15 m AOD at the northern end to approximately 6m AOD at the south and falls very gently toward the south-east. The land is crossed by an open ditch running north-west to south-east which enters a larger ditch that forms the southern boundary of the site. The low lying land at the southern end of the site may be subject to occasional flooding at times of very high rainfall, but it is considered that the soil limitations that occur in this area which are discussed later would outweigh any limitations caused by flooding.

Geology and soils

15. The published geological information (BGS, 1977), shows the northern part of the site to comprise Head Brickearth overlying London Clay, with Head Brickearth overlying River Terrace Gravels in the south.

16. There is no detailed published soil map for this district but the reconnaissance soil survey map (SSEW, 1983) shows the northern part of the site as Ratsborough association with the southern area to comprise soils of the Park Gate association. Ratsborough soils are developed on thick drift of varied origin and can be highly variable in nature. They are described as 'fine silty or fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging, with some slowly permeable seasonally waterlogged fine loamy over clayey and clayey soils' (SSEW, 1983). Park Gate soils are derived from aeolian deposits and are described as 'deep stoneless silty soils variably affected by groundwater' (SSEW, 1983).

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 III.

Grade 2

19. An area of Grade 2, very good quality agricultural land has been mapped at the northern end of the site. This area comprises well or moderately well drained fine silty and fine loamy soils overlying clay at depth. The soils typically have a medium silty clay loam topsoil over a brown heavy clay loam or silty clay loam upper subsoil. Below 60-80 cm the lower subsoil is a faintly mottled clay. These soils are assessed as Wetness Class I/II. The main limitation associated with this area is droughtiness and moisture balance calculations indicate that in this low rainfall area, these soils will be slightly droughty for both 'reference' crops restricting the land quality to Grade 2.

Subgrade 3a

20. Subgrade 3a, good quality agricultural land has been mapped on the very gently sloping land in the central part of the site. This area comprises fine loamy over clayey soils, with stony subsoil horizons. These soils typically have a medium clay loam or silty clay loam topsoil over a slightly stony, faintly mottled heavy clay loam upper subsoil, which becomes a strongly mottled very stony clay at depth. The soils are assessed as Wetness Class II and although they will have slight wetness and workability limitations, the overriding restriction to land quality associated with the area is droughtiness. Moisture balance calculations indicate that these stony soils will be moderately droughty in this low rainfall area limiting the land quality to Subgrade 3a.

Subgrade 3b

21. On the low lying flat land at the southern end of the site, moderate quality agricultural land, Subgrade 3b, has been mapped. This area has heavy textured soils developed in alluvium, which typically have clay topsoils overlying mottled, slowly permeable clay subsoils, which have been assessed as Wetness Class III. These soils therefore have a moderately severe wetness and workability limitation, restricting the versatility of the land, principally in terms of timing of cultivations and stocking, if structural damage to the soils is to be avoided.

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SOURCES OF REFERENCE

British Geological Survey (1977) *Sheet No. 272*. 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, South East England*.
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:

Sample location map

Soil abbreviations - Explanatory Note

Soil Pit Descriptions

Soil boring descriptions (boring and horizon levels)

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

- GRID REF:** national 100 km grid square and 8 figure grid reference.
- 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		
- GRDNT:** Gradient as estimated or measured by a hand-held optical clinometer.
- GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.
- AP (WHEAT/POTS):** Crop-adjusted available water capacity.
- MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted MD)
- DRT:** Best grade according to soil droughtiness.
- 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		
- 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

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

<u>degree of development</u>	WK: weakly developed	MD: moderately developed
	ST: strongly developed	
<u>ped size</u>	F: fine	M: medium
	C: coarse	VC: very coarse
<u>ped shape</u>	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.

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEYS	--WETNESS--		-WHEAT-		-POTS-		M.REL DRT	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
						CLASS	GRADE	AP	MB	AP	MB							
1	TQ78607240	CER	SE	02	000	1	1	150	22	121	-5	2				DR	2	
1P	TQ78707220	CER	SE	01	055	2	2	130	2	111	-15	3A				DR	3A	
2	TQ78607230	CER	SE	02	060 060	2	2	139	11	116	-10	2				DR	2	
3	TQ78707230	CER	SE	02	075 075	2	2	144	16	119	-7	2				DR	2	
4	TQ78507220	CER	SE	01	065 080	2	3A	138	10	112	-14	3A				WE	3A	DROUGHT
5	TQ78607220	CER	SE	02	030 070	2	2	000	0	000	0					DR	2	REPEAT
6	TQ78707220	CER	SE	01	055	2	2	000	0	000	0					DR	3A	
7	TQ78507210	CER	SE	01	000	1	2	093	-35	099	-27	3B				DR	3A	
8	TQ78607210	CER	SE	01	035 080	2	3A	131	3	115	-11	3A				WE	3A	
9	TQ78707210	CER	SE		030 030	3	3B	123	-5	099	-27	3A				WE	3B	
10	TQ78807210	CER	SE		030 030	3	3B	000	0	000	0					WE	3B	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED		----STONES----			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR	IMP	SPL
1	0-30	mzc1	75YR43 00						0	0	HR	2					
	30-60	hzc1	75YR54 00						0	0	HR	3		M			
	60-80	hc1	75YR55 00						0	0	HR	2		M			
	80-120	sc	10YR66 00	00MN00	00	F			0	0		0		P			
1P	0-32	mzc1	75YR43 00						2	0	HR	3					
	32-55	hc1	75YR54 00						0	0	HR	8	MDCSB	FR	M		
	55-120	c	75YR54 00	75YR56	00	C	75YR53	00	Y	0	0	HR	25	WKVCSB	FM	M	
2	0-35	mzc1	75YR43 00						3	0	HR	3					
	35-60	hc1	75YR54 00						0	0	HR	4		M			
	60-120	c	10YR65 00	10YR67	00	C			Y	0	0		0	P			Y
3	0-33	mzc1	75YR43 00						1	0	HR	2					
	33-75	hc1	75YR54 00						0	0	HR	3		M			
	75-120	c	10YR64 00	75YR56	00	C			Y	0	0		0	P			Y
4	0-30	hc1	10YR32 00						3	0	HR	4					
	30-65	hc1	10YR54 00						0	0	HR	5		M			
	65-80	hc1	75YR54 00	75YR56	00	F			S	0	0	HR	15		M		
	80-120	c	10YR54 00	75YR56	00	C	00MN00	00	Y	0	0		0	P			Y
5	0-30	mzc1	75YR33 00						2	0	HR	2					
	30-55	hc1	75YR53 00	75YR55	00	F			S	0	0	HR	3				
	55-70	hc1	10YR63 00	75YR56	00	C			Y	0	0	HR	10				
	70-120	c	10YR63 00	10YR56	00	M			Y	0	0		0				Y
6	0-30	mc1	10YR43 00						2	0	HR	3					
	30-55	hc1	10YR54 00						0	0	HR	4					
	55-70	c	10YR53 00	75YR58	00	C			Y	0	0	HR	15				
7	0-32	hc1	10YR32 00						2	0	HR	3					
	32-60	hc1	10YR54 00						0	0	HR	4		M			
	60-70	hc1	10YR54 00						0	0	HR	25		M			
8	0-35	hc1	10YR35 00						1	0	HR	3					
	35-60	hc1	75YR53 52	75YR46	56	C			Y	0	0	HR	4		M		
	60-80	hc1	10YR64 00	75YR56	00	C	00MN00	00	Y	0	0	HR	4		M		
	80-105	c	10YR62 63	75YR58	00	M			Y	0	0		0	P			Y
9	0-30	c	10YR43 00						0	0	HR	1					
	30-55	hc1	25Y 62 00	75YR46	56	M			Y	0	0	HR	2		P		Y
	55-120	c	10YR62 63	75YR56	00	M			Y	0	0		0	P			Y
10	0-30	c	75YR43 00						0	0		0					
	30-80	c	25Y 62 63	75YR58	00	M			Y	0	0		0	P			Y
	80-90	c	10YR52 00	75YR56	00	M			Y	0	0		0	P			Y
	90-120	c	75YR54 00	75YR56	00	M			Y	0	0		0	P			Y

SOIL PIT DESCRIPTION

Site Name : MEDWAY TOWNS LP SITE 45 Pit Number : 1P

Grid Reference: TQ78707220 Average Annual Rainfall : 587 mm
 Accumulated Temperature : 1490 degree days
 Field Capacity Level : 114 days
 Land Use : Cereals
 Slope and Aspect : 01 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 32	MZCL	75YR43 00	2	3	HR					
32- 55	HCL	75YR54 00	0	8	HR		MDCS8	FR	M	
55-120	C	75YR54 00	0	25	HR	C	WKVCSB	FM	M	

Wetness Grade : 2 Wetness Class : II
 Gleying : 055 cm
 SPL : No SPL

Drought Grade : 3A APW : 130mm MBW : 2 mm
 APP : 111mm MBP : -15 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness