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MEDWAY TOWNS LOCAL PLAN
Proposed Hotel Site, Gillingham,
Kent

Agricultural Land Classification
May 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

MEDWAY TOWNS LOCAL PLAN PROPOSED HOTEL SITE, GILLINGHAM

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 6.9 ha of land located on the southern side of Gillingham, adjacent to the M2 motorway. The survey was carried out in May 1996.
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 Medway Towns Local Plan. This survey supersedes 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 land use on the site was permanent grass, although the land appeared to be unused for any agricultural purpose..

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
3a	1.1	15.9
3b	5.8	84.1
Total survey area	6.9	100.0
Total site area	6.9	100.0

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

8. A small area of good quality agricultural land, Subgrade 3a, has been mapped on the slightly steeper land at the western end of the site. The soils in this area are typically less stony than over the remaining land to the east and comprise slightly stony heavy silty clay loam topsoils overlying mottled, stoneless heavy silty clay loam subsoil horizons. The major limitation associated with these soils is the amount of topsoil stone, which typically amounts to 10-15% flints larger than 2 cm diameter. The presence of these large hard stones may result in increased production costs caused by extra wear and tear to equipment and a reduction in crop quality of root crops. Furthermore, stones may also impair crop establishment especially in the case of precision drilled crops.

9. The majority of the site comprises moderate quality agricultural land, and has been mapped as Subgrade 3b. The principle limitation associated with this land is caused by the amount of large, hard stones in the topsoils, which results in increased production costs caused by extra wear and tear to equipment and a reduction in crop quality of root crops. Furthermore, such stones may also impair crop establishment especially in the case of precision drilled crops. Typical soils in this area have moderately stony (15-25% flints > 2cm) heavy silty clay loam topsoils over slightly less stony, red clay subsoils. The quantity of large flints in the topsoil horizon therefore limits the land quality to Subgrade 3b.

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 797 629
Altitude	m, AOD	125
Accumulated Temperature	day°C	1361
Average Annual Rainfall	mm	670
Field Capacity Days	days	136
Moisture Deficit, Wheat	mm	106
Moisture Deficit, Potatoes	mm	97

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; the site is climatically Grade 1.

Site

14. The site lies at an altitude of approximately 125 m AOD and slopes very gently toward the south west. Gradients on the site are mainly in the order of 1°, although at the western end the land falls more steeply and slopes of 4° were measured. There are therefore no site limitations that will affect the grading of the site.

Geology and soils

15. The published geological information (BGS, 1977), shows the whole site to be underlain by Clay-with-flints.

16. There is no detailed published soil map for the area, but the reconnaissance soil survey map (SSEW, 1983) for the area shows the site to comprise soils of the Batcombe association. These soils are described as variably flinty, fine silty or fine loamy over clayey, with slowly permeable subsoils and slight seasonal waterlogging, developed in Plateau drift and Clay-with-flints.

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 3a

19. A small area of good quality agricultural land, Subgrade 3a, has been mapped on the slightly steeper land at the western end of the site. The soils in this area are typically less stony than over the remaining land to the east and comprise slightly stony medium or heavy silty clay loam topsoils overlying mottled, stoneless heavy silty clay loam subsoil horizons. The major limitation associated with these soils is the amount of topsoil stone which, typically, amounts to 10-15% flints larger than 2 cm diameter. The presence of these large hard stones may result in increased production costs caused by extra wear and tear to equipment and a reduction in crop quality of root crops. Furthermore, stones may also impair crop establishment especially in the case of precision drilled crops.

Subgrade 3b

20. The majority of the site comprises moderate quality agricultural land, and has been mapped as Subgrade 3b. Typical soils in this area have moderately stony (15-25% flints >2 cm) medium or heavy silty clay loam topsoils over slightly less stony, red clay subsoils. The red subsoil horizons show faint ochreous mottling, but were found not to be slowly permeable and, hence, the soils are assessed as Wetness Class I/II (see Appendix II). The major limitation associated with this land therefore is caused by the amount of large, hard stones in the topsoil horizon, which results in increased production costs caused by extra wear and tear to equipment and a reduction in crop quality of root crops. Furthermore, such stones may also impair crop establishment especially in the case of precision drilled crops. The severity of the limitation therefore limits the land to Subgrade 3b.

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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)
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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 sandston	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:

<u>degree of development</u>	WK: weakly developed	MD: moderately developed
<u>ped size</u>	ST: strongly developed	M: medium
<u>ped shape</u>	F: fine	VC: very coarse
	C: coarse	M: massive
	S : single grain	AB: angular blocky
	GR: granular	PR: prismatic
	SAB: sub-angular blocky	
	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		--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT		
1	TQ797 630	PGR SW	01	022		2	81	-25	88	-9	3B				ST	3B	IMP 60
1P	TQ7990630	PGR SW	01	000		2	2	000	0	000	0				TS	3B	
2	TQ798 630	PGR SW	01	000		1	2	94	-12	101	4	3A			ST	3B	IMP 80
3	TQ799 630	PGR W	01	000				44	-62	44	-53	4			ST	3B	IMP 30
4	TQ796 629	PGR SW	04	024		2	3A	169	63	117	20	1			ST	3A	WE
5	TQ797 629	PGR W	01	028		2	3A	83	-23	91	-6	3B			ST	3B	IMP 60
6	TQ798 629	PGR SW	01	000	000			42	-64	42	-55	4				3B	
7	TQ796 630	PGR SW	02	000				42	-64	42	-55	4			ST	3B	IMP 30

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		
1	0-22	mzc1	75YR43 00					20	4	HR	23					
	22-60	c	75YR56 00	05YR56	73	C	Y	0	0	HR	10		M			
1P	0-27	mzc1	75yr43-00					17	2	hr	20					
	27-90	c	05yr46-56	75yr56-		c		0	0	hr	25	mcpr	fm	M	N	N
2	0-27	hzc1	75YR43 00					17	2	HR	20					
	27-80	c	05YR56 00					0	0	HR	15		M			
3	0-30	hzc1	75YR43 00					20	3	HR	25					
4	0-24	hc1	10YR43 00					10	0	HR	12					
	24-80	hzc1	10YR64 00	75YR66	63	C	Y	0	0		0		M			
	80-120	z1	10YR66 00	00MN00	00	F	Y	0	0		0		M			
5	0-28	hzc1	75YR43 00					13	2	HR	16					
	28-60	c	05YR56 00	00MN00	00	F	S	0	0	HR	12		M			
6	0-28	mzc1	10YR44 00					18	2	HR	22					
7	0-30	mzc1	75YR44 00					20	6	HR	27					

SOIL PIT DESCRIPTION

Site Name : HOTEL SITE, GILLINGHAM Pit Number : 1P

Grid Reference: TQ7990630 Average Annual Rainfall : 670 mm
 Accumulated Temperature : 1361 degree days
 Field Capacity Level : 136 days
 Land Use : Permanent Grass
 Slope and Aspect : 01 degrees SW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 27	MZCL	75yr43-00	17	20	hr					
27- 90	C	05yr46-56	0	25	hr	c	mcpr	fm	M	

Wetness Grade : 2 Wetness Class : II
 Gleying : 000 cm
 SPL : No SPL

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

FINAL ALC GRADE : 3B
 MAIN LIMITATION : Topsoil Stoniness