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Swale Borough Local Plan
Objector Site Sitt 7,
Land to the North West of Bredgar

Agricultural Land Classification
October 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

ADAS Reference 2011/150/96
MAFF Reference EL 20/0245
LUPU Commission 02563

AGRICULTURAL LAND CLASSIFICATION REPORT

SWALE BOROUGH LOCAL PLAN OBJECTOR SITE SITT 7, LAND TO THE NORTH WEST OF BREDGAR

Introduction

1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 10 ha of land on the north western side of the village of Bredgar which is located south of the M2 motorway near Sittingbourne. The survey was carried out in October 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 Swale Borough Local Plan. This survey supersedes any previous ALC surveys on this land.

3 The work was conducted under sub-contracting arrangements by NA Duncan and 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 The site which was formerly an orchard and currently supports grass and docks following a crop of linseed.

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)	% Total site area	% Surveyed Area
1	9.6	93.2	93.2
3a	0.7	6.8	6.8
Total surveyed area	10.3		100.0
Total site area	10.3	100.0	

7 The fieldwork was conducted at an average density of 1 boring per hectare. A total of 11 borings were described which were backed up by data from one soil inspection pit.

8 The majority of the site has been mapped as Grade 1 excellent quality agricultural land and comprises deep silty and fine silty soils which are variably stony at depth. The soils are free draining and easily worked and moisture balance calculations indicate that in this area of moderately high moisture deficits even the more stony variants have sufficient moisture reserves to prevent any significant droughtiness limitation. The area therefore has no overriding limitation to agricultural use and has been classified as Grade 1. At the north east corner of the site the land rises significantly and chalk was encountered within 40 cm depth. The soils in this area will therefore be moderately droughty restricting the land to Subgrade 3a, good quality agricultural land.

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 879 607
Altitude	m, AOD	80
Accumulated Temperature	day°C (Jan June)	1410
Average Annual Rainfall	mm	704
Field Capacity Days	days	142
Moisture Deficit, Wheat	mm	107
Moisture Deficit, Potatoes	mm	100

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 under this warm and relatively dry climate soils will require a moderately high available water capacity to avoid droughtiness limitations. There is however no overall climatic limitation in this area.

Site

14 The site which lies at an altitude of approximately 80 m AOD falls very gently to the north. Nowhere on the site does gradient or micro relief impose any limitation on the agricultural use of the area.

Geology and soils

15 The published geological information for the area (BGS 1974) shows all of the site to be underlain by Upper Chalk. Drift deposits of clay with flints, a dark reddish brown clay containing many nodular flints which rests irregularly on chalk, is mapped on the eastern and western site boundaries.

16 There is no detailed soil survey map for the area, but the reconnaissance soil map (SSEW 1983) shows the area to comprise soils of the Coombe 1 association. These soils are described as Well drained calcareous fine silty soils, deep in valley bottoms, shallow to chalk on valley sides in places. Slight risk of water erosion (SSEW 1983). Soils of this association are developed in chalky drift and comprise brown calcareous, more or less flinty fine silty soils with a distinct brownish subsoil overlying chalk or chalk rubble.

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 1

19 The majority of the site has been mapped as Grade 1, excellent quality agricultural land. The soils in this area are deep, free draining, silty and fine silty and are variably stony. A typical soil profile has a silt loam or medium silty clay loam topsoil which is very slightly stony (containing 2-6% total flints by volume). Upper subsoils comprise moderately structured medium silty clay loams which are slightly stony (containing 5-15% total flints by volume). Below 50-70 cm depth the soils comprise moderately structured silty clay loams which are moderately stony (containing 25-35% total flints by volume). In some profiles however the soils were almost stoneless. Moisture balance calculations indicate that under the prevailing climatic conditions even the more stony variants have sufficient available water to meet the demands of a growing crop throughout the year. There are therefore no limitations to the agricultural use of the area and consequently the land has been included in Grade 1.

Subgrade 3a

20 Subgrade 3a, good quality agricultural land, has been mapped in a small area on the slightly higher land at the north east corner of the site. This land is limited by soil droughtiness. In this area, the underlying chalk was encountered at relatively shallow depths. Soils in this area typically have a medium silty clay loam topsoil overlying a moderately structured, brown, heavy silty clay loam subsoil. Fissured chalk was encountered within 40cm and the rooting into this medium is anticipated to be somewhat restricted (see Objector Site SITT 6 ADAS Ref 2011/149/96). The interaction between these soil characteristics and the prevailing climate causes the profile available water to be slightly restricted as indicated by moisture balance calculations for the soils on the site. Hence the soils will be moderately droughty, especially for deeper rooting crops and Subgrade 3a is appropriate.

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SOURCES OF REFERENCE

British Geological Survey (1977) *Sheet No 272 Chatham*
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

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

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 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 **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 SWALE LP SITT 7 BREDGAR Pit Number 1P

Grid Reference TQ87906080 Average Annual Rainfall 704 mm
 Accumulated Temperature 1410 degree days
 Field Capacity Level 142 days
 Land Use Linseed
 Slope and Aspect 01 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	ZL	10YR44 00	4	5	HR					
30- 65	MZCL	75YR56 00	0	10	HR		MDCSAB	FM	M	
65- 90	MZCL	75YR46 00	0	20	HR		MDVCSB	FM	M	
90-120	ZL	10YR54 64	0	35	HR				M	

Wetness Grade 1 Wetness Class I
 Gleying cm
 SPL No SPL

Drought Grade 1 APW 158mm MBW 51 mm
 APP 127mm MBP 27 mm

FINAL ALC GRADE 1
 MAIN LIMITATION

SAMPLE NO	GRID REF	ASPECT USE	GRDNT	--WETNESS--		-WHEAT-		-POTS-		M REL		EROSN	FROST	CHEM	ALC	COMMENTS
				GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	TQ87906090	LIN N	01		1	1	95	-12	101	1	3A				1	Imp60 See Pit1
1P	TQ87906080	LIN N	01		1	1	158	51	127	27	1				1	Stony
2	TQ87806080	LIN N	01	000	1	1	103	-4	116	16	3A				1	Imp70 See Pit1
3	TQ87906080	LIN N	01		1	1	110	3	120	20	3A				1	Imp65 See Pit1
4	TQ88006080	LIN			1	1	173	66	138	38	1				1	
5	TQ88106080	LIN W	02		1	1	92	-15	98	-2	3A			DR	3A	Chalk 40
6	TQ87806070	LIN N	01	060	2	2	118	11	127	27	2			WE	2	S1 gleyed 60
7	TQ87906070	LIN			1	1	102	-5	102	2	3A				1	Imp50 See Pit1
8	TQ88006070	LIN			1	1	170	63	156	56	1				1	Stone at 100
9	TQ87806060	LIN N	01		1	1	181	74	145	45	1				1	
10	TQ87906060	LIN N	01		1	1	87	-20	87	-13	3A			DR	2	Imp45 Prob G2
11	TQ88006060	LIN N	01		1	1	156	49	136	36	1				1	S1 gleyed 80

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL	----STONES----			STRUCT/ CONSIST	SUBS				CALC	
				COL	ABUN	CONT		GLEY	>2	>6		LITH	TOT	STR	POR		IMP
1	0-30	mzc1	10YR44 00					2	0	HR	4						
	30-60	mzc1	10YR56 00					0	0	HR	10		M				Impen60 flinty
1P	0-30	z1	10YR44 00					4	0	HR	5						
	30-65	mzc1	75YR56 00					0	0	HR	10	MDCSAB	FM	M			
	65-90	mzc1	75YR46 00					0	0	HR	20	MDVCSB	FM	M			
	90-120	z1	10YR54 64					0	0	HR	35			M			
2	0-27	mzc1	10YR44 00					2	0	HR	4						Y
	27-70	mzc1	75YR46 00					0	0	HR	10		M				Y
3	0-30	z1	10YR44 00					4	0	HR	5						
	30-65	mzc1	75YR56 00					0	0	HR	10		M				Impen65 flinty
4	0-25	z1	10YR44 00					2	0	HR	4						
	25-40	z1	10YR45 00					0	0	HR	1		M				
	40-65	mzc1	10YR55 00					0	0	CH	5		M				Y
	65-120	mzc1	75YR55 00					0	0	HR	3		M				
5	0-25	mzc1	10YR34 00					2	0	HR	5						Y
	25-40	hzc1	10YR46 00					0	0	HR	5		M				Y
	40-70	ch	10YR81 00					0	0	HR	5		P				Y
																	Re 2011/149/96
6	0-30	z1	10YR44 00					2	0	HR	4						
	30-60	mzc1	10YR46 00					0	0	HR	5		M				
	60-75	c	10YR45 00	75YR56 00	C			S	0	0	HR	5		P			Y
7	0-27	z1	10YR44 00					4	0	HR	6						
	27-50	z1	75YR55 00					0	0	HR	15		M				Impen50 flinty
8	0-30	z1	10YR44 00					0	0	HR	2						
	30-70	z1	75YR45 00					0	0		0		M				
	70-100	mzc1	10YR55 00					0	0		0		M				Impen100 stone
9	0-28	z1	10YR44 00					0	0	HR	2						
	28-50	z1	10YR54 00					0	0	HR	1		M				
	50-120	mzc1	10YR55 00					0	0		0		M				
10	0-27	z1	10YR44 00					2	0	HR	3						
	27-45	mzc1	75YR45 00					0	0	HR	15		M				Impen45 flinty
11	0-30	z1	10YR44 00					0	0	HR	2						
	30-65	mzc1	10YR55 00					0	0		0		M				
	65-80	mzc1	10YR55 00	00MNO0 00	F			0	0		0		M				
	80-120	hzc1	10YR55 64	75YR56 00	C			S	0	0	0		P				