

AGRICULTURAL LAND CLASSIFICATION REPORT

SWALE BOROUGH LOCAL PLAN SITE 41, STICKFAST LANE, BOBBING AGRICULTURAL LAND CLASSIFICATION RECONNAISSANCE SURVEY*

Summary

- 1 1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality at Site 41 Stickfast Lane Bobbing This work was in connection with the Swale Borough Local Plan
- 1 2 Approximately 17 0 hectares of land relating to this site was surveyed in October 1994 The survey was undertaken at a level of approximately one boring per four hectares More borings were concentrated where the better quality land occurred A total of 8 borings and one soil inspection pit 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 carried out by members of the Resource Planning Team in the Huntingdon Statutory Group of ADAS
- 1 4 At the time of survey the agricultural land use was oilseed rape A small copse was identified but was too small to be delineated at this mapping scale
- 1 5 1985 field survey work carried out adjacent to the site identified a small area of 3a land along its northern boundary Ref (2011/081/85) However using the Revised ALC Guidelines (MAFF 1988) this area would now be graded 3b and corresponds with the land (to the north) graded 3b in the current survey

Table 1 Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Area
1	2 5	15	15
3b	14 5	85	85
Total	17 0 ha	100%	100% (17 0 ha)

* Reconnaissance Survey The current reconnaissance survey gives a general indication of the distribution of ALC grades Due to the density of auger borings the exact location of ALC grades may vary if further detailed work is carried out on site

- 1 6 The distribution of the 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 1:10 000. It is accurate at this scale but any enlargement would be misleading. This map supersedes any previous survey information for this site.
- 1 7 A general description of the grades, subgrades and land use categories is provided in Appendix 1. 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 8 The land quality on the site has been classified as grade 1 and subgrade 3b (excellent and moderate quality land). The grade 1 land has little or no limitations to agricultural use, while the subgrade 3b land is restricted by significant wetness and workability limitations.

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 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. The combination of rainfall and temperature at this site mean an overall climatic grade of 1.

Table 2 Climatic Interpolation

Grid Reference	TQ889658
Altitude (m, AOD)	30
Accumulated Temperature (° days Jan-June)	1465
Average Annual Rainfall (mm)	605
Field Capacity Days	119
Moisture Deficit wheat (mm)	120
Moisture Deficit potatoes (mm)	116
Overall Climatic Grade	1

3 0 Relief

- 3 1 The site undulates gently around 30 m AOD with the highest land (around 33 m AOD) occurring in the central and western part of the site. *Neither gashen nor altitude impose a limitation to the grade.*

4 0 Geology and Soils

- 4 1 The published geology map for the site area, (BGS Sheet 272 1977) shows the majority of the site to be underlain by London Clay. In the western corner a small area of Woolwich Beds and Head Brickearth has been mapped.

4 2 The published soils information for the area (SSEW Sheet 6 1983 1 250 000) shows the site to comprise the Essendon Association, described as slowly permeable seasonally waterlogged coarse loamy over clayey soils Associated with similar fine loamy over clayey and fine silty over clayey soils

5 0 **Agricultural Land Classification**

5 1 The ALC classification of the site is shown on the attached ALC map

5 2 The location of the soil observation points is shown on the attached sample point map

5 3 **Reconnaissance Survey** The current reconnaissance survey gives a general indication of the distribution of ALC grades Due to the density of auger borings the exact location of ALC grades may vary if further detailed work is carried out on site

Grade 1

5 4 Grade 1 land has been mapped in the western corner of the site in association with the Woolwich Beds and Head Brickearth deposits Soils are typically non calcareous and comprise deep stoneless silt loam topsoils which overlie medium silty clay loams at depth in the profile Soils are well drained and assessed as wetness class I The high moisture reserves of these silty soils ensures that available water is more than adequate to meet the demands of a growing crop throughout the year Consequently this land has no limitation to agricultural use and has been graded 1 (excellent quality agricultural land)

5 5 At the boundary of the grade 1 land transitional borings of grade 2 quality (slightly droughty) occur A more detailed survey would delineate the exact location and extent of the best and most versatile land on site (i.e. grades 1 2 and 3a) However, this survey is likely to confirm that only a small proportion of the site comprises better quality agricultural land

Subgrade 3b

5 6 Subgrade 3b land has been mapped over the majority of the site where significant wetness and workability constraints affect the flexibility of the land Soils typically comprise non calcareous (occasionally limed) very slightly stony heavy clay loam (occasionally clay) topsoils over non calcareous stoneless slowly permeable clays from typically 25/30 cms Wetness class has been assessed as III due to the presence of impeded drainage layers directly below the topsoil Wetness class together with the relatively heavy textured non calcareous topsoils combine to exclude the land from a higher grade

Woodland

- 5 7 A very small copse exists on site but is too small to be delineated at this mapping scale

ADAS Reference 2011/241/94
MAFF Reference EL20/245B

Resource Planning Team
Huntingdon Statutory Group
ADAS Cambridge

REFERENCES

- GEOLOGICAL SURVEY OF ENGLAND AND WALES 1977 Sheet 272
Chatham Drift edition 1 50 000 scale
- MAFF 1968 Agricultural Land Classification Map Sheet 172 Provisional 1 63 360
scale
- MAFF 1988 Agricultural Land Classification of England and Wales (Revised
guidelines and criteria for the grading of agricultural land) Alnwick
- METEOROLOGICAL OFFICE 1989 Published data extracted from the 5 km
agroclimatic dataset
- SOIL SURVEY OF ENGLAND AND WALES 1983 Sheet 6 Soil of South East
England 1 250 000 scale
- SOIL SURVEY OF ENGLAND AND WALES 1984 Soils and their use in South
East England by M G Jarvis *et al* Harpenden

Appendix 1

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur typical cropping range and the expected level of consistency of yield. In practice the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls in Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where farmland predominates. The remainder is very poor quality land in Grade 5 which most occurs in the uplands.

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 include 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 and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where 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 levels of yields It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yield of which are variable In most 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 very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

Descriptions of other land categories used on ALC maps

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/airfields 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 (e.g. polythene tunnels erected for lambing) may be ignored

Open water

Includes lakes ponds and rivers as map scale permits

Land not surveyed

Where the land use includes more than one of the above land cover types e.g. buildings in large grounds and where map scale permits the cover types may be shown separately Otherwise the most extensive cover type will usually be shown

Appendix 2

FIELD ASSESSMENT OF SOIL WETNESS CLASS

Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging¹
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 <u>or</u> if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 90 days but not wet within 40 cm depth for more than 30 days in most years
III	The soil profile is wet within 70 cm depth for 91-180 days in most years <u>or</u> , if there is no slowly permeable layer 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 and 90 days in most years
IV	The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years <u>or</u> , if there is no slowly permeable layer 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

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

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

Appendix 3

SOIL BORING AND SOIL PIT DESCRIPTIONS

Contents

- * Soil boring descriptions
- * Soil pit description
- * Soil Abbreviations Explanatory Note

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	TQ89906600	OSR N	01	030 030	3	3B	128	8	105	11	3A			WE	3B MN 60
2	TQ98706580	OSR N		000	1	1	177	57	141	25	1			1	
3	TQ89806580	OSR		070 070	2	2	140	20	117	1	2			DR	2 WE
4	TQ89906580	OSR W	01	030 030	3	3B	128	8	105	11	3A			WE	3B
5	TQ90106580	OSR W		025 025	3	3B	124	4	101	-15	3A			W	3B
6	TQ90006560	OSR SW	01	030 030	3	3B	128	8	105	-11	3A			W	3B
7	TQ89806570	OSR SW	01	035 035	3	3B	130	10	107	-9	2			W	3B
8	TQ89756590	OSR SW		000	1	1	160	40	124	8	2			DR	2

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES-			PED COL	--- STONES			STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	SIR		
1	0-30	hcl	10YR43 00						0	0	HR	1				
	30-120	c	10YR52 00	10YR56 00	M			Y	0	0		0	P	Y		Y
2	0-30	z1	10YR43 00						1	0	HR	1				Y
	30-50	z1	10YR54 00						0	0		0	M	Y		
	50-120	mzcl	10YR54 00						0	0		0	M	Y		
3	0-30	mcl	10YR43 00						1	0	HR	1				
	30-50	hcl	10YR54 00						0	0		0	M	Y		
	50-70	hcl	10YR54 00						0	0	CH	5	M	Y		Y
	70-120	hcl	25 Y52 00	10YR66 00	M			Y	0	0		0	P	Y		Y
4	0-30	hcl	10YR42 00						0	0	HR	1				Y
	30-120	c	25 Y61 00	10YR56 00	M			Y	0	0		0	P	Y		Y
5	0-25	c	10YR42 00						1	0	HR	1				
	25-120	c	10YR51 00	10YR66 00	M			Y	0	0		0	P	Y		Y
6	0-30	hcl	10YR42 00						1	0	HR	1				
	30-120	c	10YR52 00	10YR66 00	M			Y	0	0		0	P	Y		Y
7	0-30	hcl	10YR42 00						1	0	HR	1				
	30-35	c	10YR54 00						0	0		0	M			
	35-120	c	25YR52 00	10YR66 00	M			Y	0	0		0	P	Y		Y
8	0-30	mzcl	10YR43 00						1	0	HR	1				
	30-120	mzcl	10YR54 00						0	0		0	M			

Appendix 3

SOIL PIT DESCRIPTION

SITE NAME SITE 41 STICKFAST LANE BOBBING PIT 1 (near AB2)

Grid Reference	TQ987658	Average Annual Rainfall	605
		Accumulated Temperature	1465
		Field Capacity Days	119
		Land Use	Oilseed rape
		Slope & Aspect	Flat

Horizon	Texture	Colour	Stones >2	Tot Stone	Mottles	Structure
0 30	ZL	10YR4/3	1	1		-
30 50	ZL	10YR5/4	0	0	None	MDCAB
50 120	MZCL	10YR5/4 & 10YR4/4	0	0	None	MDCAB

Wetness Grade	1	Wetness class	1
		Gleying	None
		SPL	None

Drought Grade	1	APW = 177 mm	MBW = 57 mm
		APP = 141 mm	MBP = 25 mm

Final ALC grade 1
Main Limitation None

Appendix 3 (Cont)

SOIL PROFILE DESCRIPTIONS EXPLANATORY NOTE

Soil profile and pit information obtained during ALC surveys is held on a database
This has commonly used notations and abbreviations as set out below

BORING HEADERS

1 GRID REF National grid square followed by 8 figure grid reference

2 USE Land use at the time of survey
The following abbreviations are used

ARA	arable	PAS/PGR	- permanent pasture
WHT	wheat	RGR	rough grazing
BAR	- barley	LEY	ley grassland
CER	cereals	CFW	- coniferous woodland
OAT	- oats	DCW	- deciduous woodland
MZE	maize	SCR	- scrub
OSR	- oilseed rape	HTH	- heathland
BEN	field beans	BOG	- bog or marsh
BRA	brassicae	FLW	- fallow
POT	- potatoes	PLO	- ploughed
SBT	- sugar beet	SAS	set aside
FDC	- fodder crops	OTH	- other
FRT	- soft and top fruit	LIN	- linseed
HOR/HRT	- horticultural crops		

3 GRDNT Gradient as measured by optical reading clinometer

4 GLEY/SPL Depth in centimetres (cm) to gleyed and/or slowly permeable horizons

5 AP (WHEAT/POTS) Crop-adjusted available water capacity The amount of soil water (in millimetres) held in the soil profile that is available to a growing crop (wheat and potatoes are used as reference crops)

6 MB (WHEAT/POTS) The moisture balance for wheat and potatoes obtained by subtracting the soil moisture deficit from the crop adjusted available water capacity

7 DRT Grade according to soil droughtiness assessed against soil moisture balances

8 M REL Micro relief)
FLOOD Flood risk) If any of these factors are
EROSN Soil erosion) considered significant in terms
of
EXP Exposure) the assessment of agricultural
land
FROST Frost prone) quality a 'y' will be entered in the
DIST Disturbed land) relevant column
CHEM Chemical limitation)

9 LIMIT Principal limitation to agricultural land quality
The following abbreviations are used

OC - overall climate

CH - chemical limitations

AE - aspect

WE wetness

EX - exposure

WK workability

FR - frost

DR drought

GR - gradient

ER erosion

MR - micro-relief

WD - combined soil wetness/soil droughtiness

TX - soil texture

ST - topsoil stoniness

DP - soil depth

PROFILES AND PITS

1 TEXTURE Soil texture classes are denoted by the following abbreviations

S	- sand
LS	- loamy sand
SL	- sandy loam
SZL	sandy silt loam
ZL	- silt loam
MZCL	- medium silty clay loam
MCL	- medium clay loam
SCL	sandy clay loam
HZCL	- heavy silty clay loam
HCL	- heavy clay loam
SC	sandy clay
ZC	- silty clay
C	- clay

For the sand loamy sand sandy loam and sandy silt loam classes the predominant size of sand fraction may be indicated by the use of prefixes

- F - fine (more than $\frac{2}{3}$ of the sand less than 0.2 mm)
- C - coarse (more than $\frac{1}{3}$ of sand greater than 0.6 mm)
- M - medium (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ coarse sand)

The sub divisions of clay loam and silty clay loam classes according to clay content are indicated as follows

- M - medium (less than 27% clay)
- H - heavy (27-35% clay)

Other possible texture classes include

OL organic loam

P peat

SP - sandy peat

LP - loamy peat

PL - peaty loam

PS - peaty sand

MZ marine light silts

2 MOTTLE COL Mottle colour

3 MOTTLE ABUN Mottle abundance

F - few - less than 2% of matrix or surface described

C - common 2 20% of the matrix

M - many 20-40% of the matrix

VM very many - 40% + of the matrix

4 MOTTLE CONT Mottle continuity

F - faint - indistinct mottles evident only on close examination

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

6 STONE LITH Stone lithology *One of the following is used*

HR - all hard rocks or stones

MSST - soft medium or coarse grained sandstone

SI - soft weathered igneous or metamorphic

SLST - soft oolitic or dolomitic limestone

FSST - soft fine grained sandstone

ZR - soft, argillaceous or silty rocks

CH - chalk

GH - gravel with non porous (hard) stones

GS - gravel with porous (soft) stones

Stone contents (>2 cm >6 cm and total) are given in percentages (by volume)

- 7 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 well developed

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

- ped shape S - single grain
M - massive
GR - granular
SB/SAB - sub-angular blocky
AB angular blocky
PR - prismatic
PL - platy

- 8 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

- 9 SUBS STR Subsoil structural condition recorded for the purpose of calculating profile droughtiness

G - good
M - moderate
P - poor

- 10 **POR** Soil porosity If a soil horizon has less than 0.5% biopores >0.5 mm a 'y' will appear in this column
- 11 **IMP** If the profile is impenetrable a 'y' will appear in this column at the appropriate horizon
- 12 **SPL** slowly permeable layer If the soil horizon is slowly permeable a 'y' will appear in this column
- 13 **CALC** If the soil horizon is calcareous a 'y' will appear in this column
- 14 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