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KENT MINERALS LOCAL PLAN REVIEW

Land west of Ightham Sand Pit near Borough Green Kent

Agricultural Land Classification

ALC Map and Report

September 1998

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT

KENT MINERALS LOCAL PLAN REVIEW LAND WEST OF IGHTHAM SAND PIT NEAR BOROUGH GREEN KENT

INTRODUCTION

- 1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 15.4 ha of land west of Ightham Sand Pit near Borough Green in Kent. The survey was carried out during September 1998.
- 2 The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). The survey was carried out in connection with MAFF's statutory input to the Kent Minerals Local Plan Review. This survey supersedes any previous ALC information for this land.
- 3 The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. 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 agricultural land on the site was in ley grassland and being grazed by sheep. The areas mapped as 'Other land' include an area where soils have been stripped and stored in a bund and adjacent grassland not in agricultural use.

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	% site area
1	10.3	70.1	66.9
2	0.4	2.7	2.6
3b	4.0	27.2	26.0
Other land	0.7		4.5
Total surveyed area	14.7	100	95.5
Total site area	15.4		100

- 7 The fieldwork was conducted at an average density of 1 boring per hectare. In total 15 borings and 2 soil pits were described.

¹ FRCA is an executive agency of MAFF and the Welsh Office.

- 8 The agricultural land at this site has been classified in the range Grade 1 (excellent quality) to Subgrade 3b (moderate quality) including an area of Grade 2 (very good quality) Where they exist the principal limitations include soil wetness soil droughtiness and topsoil stoniness
- 9 The land classified as Grade 1 is mainly located towards the south and east of the site Soils in this area comprise deep medium clay loam textured topsoils and subsoils The soils are very slightly stony or slightly stony and given the local climate the reserves of water in the soil are high enough to be sufficient to meet crop needs throughout the growing season in most years As a result this land has no or very minor limitations to agricultural use and is suitable for a very wide range of agricultural or horticultural crops
- 10 Grade 2 land has been mapped as a small area in the north east of the site The soils comprise clay loam textured topsoils and subsoils with moderately stony subsoils which exhibit signs of slight wetness sufficient to limit them to Grade 2
- 11 Towards the north west the land rises to the highest point on the site This area has been classified as Subgrade 3b The soils on the upper slopes comprise medium clay loam topsoils over heavy clay loam subsoils The subsoils are very stony which causes a reduction in the reserves of water in the soil In the local climate this acts to impart a soil droughtiness limitation which may lower the level and consistency of crop yields Soils on the lower slopes have moderately stony topsoils sufficient to restrict this area to Subgrade 3b The main effects of such a stoniness limitation are to act as an impediment to cultivation harvesting and crop growth

FACTORS INFLUENCING ALC GRADE

Climate

- 12 Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics
- 13 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)
- 14 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
- 15 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
- 16 The combination of rainfall and temperature at this site means that there is no overall climatic limitation Unpublished meteorological data (Sheet 171 1980) indicates that the site is rather frost prone However a detailed examination showed the lower part of the site to have an

open aspect with no obvious frost pockets Therefore frost is not considered to be a climatic limitation on the site The overall climatic grade on the site is Grade 1

Table 2 Climatic and altitude data

Factor	Units	Values	
		TQ 598 576	TQ 599 574
Grid reference	N/A		
Altitude	m AOD	93	83
Accumulated Temperature	day C (Jan June)	1404	1416
Average Annual Rainfall	mm	741	741
Field Capacity Days	days	153	153
Moisture Deficit Wheat	mm	103	104
Moisture Deficit Potatoes	mm	94	95
Overall climatic grade	N/A	Grade 1	Grade 1

Site

- 17 The survey area lies between approximately 80m and 100m AOD The highest land is located in the north with moderate slopes towards the centre of the site Across the central and southern part of the site the land is gently undulating Gradient microrelief and flooding are not limitations to the agricultural use of the land on the site

Geology and soils

- 18 The most detailed published geological information for this area (BGS 1971) shows the majority of the site to comprise Folkestone Beds These consist of sands with concretions of limestone and chert A small area of drift deposits of head brickearth is mapped in the south west of the site
- 19 The most recent published soils information covering the area (SSEW 1983) shows the site to comprise soils of the Fyfield 2 Association These soils are described as Well drained coarse loamy and sandy soils over sands and sandstones Some very acid sandy soils with bleached sub surface horizons on heaths and in woodlands Risk of water erosion (SSEW 1983)

AGRICULTURAL LAND CLASSIFICATION

- 20 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
- 21 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 II

Grade 1

- 22 Grade 1 land of excellent quality occurs on the lower lying land across the south of the site and towards the north east and is typified by Pit 2. This land has no or very minor limitations to agricultural use. Profiles comprise medium clay loam textured topsoils overlying similarly textured subsoils with clay occurring below 85cm. The soils are very slightly to slightly stony and this prevented augering to 120 cm depth at a number of borings. Where this was the case a spade was used to make a shallow excavation to observe the soil profile at the impenetrable layer. This was to assess if a stony horizon existed or if there was a relatively small stone content and that Pit 2 was still typical. The profile in Pit 2 was observed to be slightly gleyed below 76cm however this does not restrict the land quality and the profiles are assessed as being well drained (Wetness Class I). All the subsoils are moderately structured and permeable.
- 23 The combination of medium clay loam topsoil textures and the prevailing climate means that this land has no or very minor workability restrictions on the flexibility of cropping, stocking and cultivations. In addition the clay content of the soils means that these profiles have high reserves of soil available water which will support a very wide range of agricultural or horticultural crops throughout the growing season in most years. Consequently Grade 1 is appropriate.

Grade 2

- 24 The land classified as Grade 2 very good quality has minor soil wetness limitations. The profiles typically comprise medium clay loam topsoils over medium clay loam subsoils. Topsoils are very slightly stony containing up to 5% flints by volume. The subsoils have a similar stone content down to about 50cm where the stone content increases to about 12% flints. These profiles exhibited gleying below 40cm depth but did not contain a slowly permeable layer. These characteristics were confirmed by observation of a soil cutting between the Grade 2 and the Other Land. The depth to gleying and the permeable nature of these soils means that Wetness Class II is appropriate given the local climatic parameters. When combined with the medium textured topsoils the land is subject to a slight soil wetness limitation. This restricts the number of days when either cultivations or grazing should occur without damaging the soil. It can also adversely affect crop quality and yield. Nevertheless such land is suitable for a wide range of agricultural and horticultural uses.

Subgrade 3b

- 25 Land in the north west of the site has been mapped as Subgrade 3b moderate quality. This area is coincident with the hillslope rising to the highest point on the site. The soils on the upper slopes have been characterised by Pit 1 (Appendix II) and comprise medium clay loam topsoils over heavy clay loam subsoils. The topsoils are very slightly stony containing 5% flints by volume with 3% greater than 2cm in diameter. The subsoils are very stony containing 51% flints by volume and the stone content was such as to prevent the soil pit being excavated below 65cm. At this depth the available water content restricts the soils to Subgrade 3b on the basis of soil droughtiness. It would need to be demonstrated that plants could obtain water from below 85cm depth before these soils could be placed in Subgrade 3a.

As it was not possible to examine the soil resource below 65 cm at the time of survey this area has been classified conservatively as Subgrade 3b

- 26 At the foot of the slope the topsoil stone content was 25% flints with 18% greater than 2cm diameter. The volume of stones of greater than 2cm diameter is sufficient to place this land in Subgrade 3b
- 27 The main effects of stones are to act as an impediment to cultivation, harvesting and crop growth. A high stone content can increase production costs by causing extra wear and tear to implements and tyres. Crop quality may be reduced in stony soils by causing, for example, the distortion of root crops or bruising of potatoes during harvesting. Stones can impair crop establishment by causing reduced plant populations in precision drilled crops, and they reduce the nutrient capacity of the soil.

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SOURCES OF REFERENCE

British Geological Survey (1971) *Sheet No 287 Sevenoaks 1 50 000 Solid and Drift Edition*
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) *Soils of England and Wales Sheet 6 South East England*
1 250 000 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 DATA

Contents

Sample location map

Soil abbreviations explanatory note

Soil pit and soil boring descriptions (boring and horizon levels)

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	Brassicæ
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	OTH	Other
DCW	Deciduous woodland	BOG	Bog or marsh	SAS	Set Aside
HTH	Heathland	HRT	Horticultural crops	PLO	Ploughed

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	ST	Topsoil Stoniness
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
EX	Exposure				

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	FSST	soft fine grained sandstone
ZR	soft argillaceous or silty rocks	CH	chalk
MSST	soft medium grained sandstone	GS	gravel with porous (soft) stones
SI	soft weathered igneous/metamorphic rock	GH	gravel with non porous (hard) stones

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		
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	FM firm	EH extremely hard
VF very friable	VM very firm	
FR friable	EM extremely firm	

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	a 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	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
1	TQ59905770	PGR			1	1	153	50	115	21	1			1	
2	TQ60005770	PGR		40	2	2	79	-24	79	-15	38		DR	3B	
3	TQ59605760	LEY S	6		1	1	76	-27	76	-18	38		DR	3B	IMPQDRANDSTONE
4	TQ59705760	LEY S	6		1	1	57	-46	57	-37	38		DR	3B	IMPQDR
5	TQ59805760	LEY			1	1	156	53	118	24	1			1	
6	TQ59905760	PGR			1	1	155	52	119	25	1			1	
7	TQ59705750	LEY	2		1	1	34	-69	34	-60	4		DR	3B	IMPQDRANDSTONE
8	TQ59805750	LEY			1	1	26	-77	26	-68	4		TS	3B	SMALLPIT
9	TQ59905750	LEY			1	1	101	-2	113	19	3A		DR	3A	
10	TQ59505740	LEY	4		1	1	47	-56	47	-47	4		DR	3B	IMPQDR
11	TQ59605740	LEY	3		1	1	47	-56	47	-47	4		DR	3B	IMPQDRANDSTONE
12	TQ59705740	LEY			1	1	69	-34	69	-25	38		DR	3A	IMPQDR
13	TQ59805740	LEY			1	1	87	-16	92	-2	3A		DR	3A	IMPQDR
14	TQ59905740	LEY			1	1	145	42	107	13	1			1	
15	TQ59605731	LEY			1	1	148	45	113	19	1			1	
1P	TQ59705760	LEY SE	5		2	2	68	-35	73	-21	38		DR	3B	PITIMP65
2P	TQ59605740	LEY E	2		1	1	147	44	115	21	1			1	PIT95 AUG120

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL	----STONES----			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR	POR	IMP
1	0-40	SCL	10YR52					0	0	0						
	40-62	SCL	10YR53					0	0	0				M		
	62-120	HZCL	10YR54					0	0	0				M		
2	0-40	SCL	10YR52					0	0	HR	5					
	40-50	SCL	10YR53	10YR56	C	D		Y	0	0	HR	5			M	
3	0-40	MZCL	10YR52					0	0	0						
4	0-30	MZCL	10YR52					0	0	0						
5	0-40	MCL	10YR52					0	0	HR	3					
	40-65	MCL	10YR53					0	0	0				M		
	65-120	MCL	10YR63	10YR68	M	D		0	0	0				M		
6	0-40	SCL	10YR52					0	0	0						
	40-62	HZCL	10YR53					0	0	0				M		
	62-120	HZCL	10YR54	10YR56	C	F		N	0	0	0			M		
7	0-20	SCL	10YR42					0	0	0						
8	0-20	SCL	10YR42					18	0	HR	25					
9	0-28	MCL	10YR52					3	0	HR	6					
	28-70	MCL	75YR43					0	0	HR	3			M		
10	0-30	SCL	10YR42					0	0	HR	8					
11	0-30	SCL	10YR42					0	0	HR	8					
12	0-38	SCL	10YR42					0	0	HR	8					
	38-45	SCL	10YR54					0	0	HR	8			M		
13	0-38	SCL	10YR42					0	0	HR	5					
	38-60	SCL	75YR43					0	0	HR	8			M		
14	0-36	SCL	10YR42					0	0	HR	5					
	36-90	SCL	10YR54					0	0	HR	5			M		
	90-120	SC	10YR54	10YR56	C			S	0	0	HR	5		M		
15	0-36	SCL	10YR42					0	0	HR	8					
	36-85	MZCL	10YR54					0	0	HR	3			M		
	85-120	MZCL	10YR64					0	0	HR	1			M		
1P	0-25	MCL	10YR42	10YR56	C			Y	3	0	HR	5	MCSAB	FR		
	25-65	HCL	10YR63	10YR66	M			Y	0	0	HR	51			M	
2P	0-25	MCL	10YR42	10YR46	C			Y	1	0	HR	2	MCSAB	FR		
	25-50	MCL	10YR53						0	0	HR	1	MCSAB	FR	M	
	50-75	MCL	10YR54						0	0	HR	1	MCAB	FR	M	
	75-85	MCL	10YR54	75YR56	C			S	0	0	0				M	
	85-120	C	10YR54	75YR56	M			S	0	0	0				M	