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Canterbury District Local Plan
CAN 4: Thanington, Kent
Agricultural Land Classification,
ALC Map and Report.
August 1995

AGRICULTURAL LAND CLASSIFICATION REPORT

CANTERBURY DISTRICT LOCAL PLAN
CAN 4: THANINGTON.

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the Canterbury District of Kent. The work forms part of MAFF's statutory input to the preparation of the Canterbury District Local Plan.

1.2 The site comprises 8.3 hectares of land to the south-east of Thanington near Canterbury in Kent. An Agricultural Land Classification (ALC) survey was carried out during March 1995. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land surveyed. A total of 8 borings and one soil inspection pit were described according to 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 a long term limitation on its use for agriculture. Data from the adjacent site, CAN 3: Thanington, Ref: 2002/45/95 has assisted the classification of this site.

1.3 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 At the time of the survey the agricultural land to the north of the site was in set-aside. To the east of the site, there was an orchard and towards the west of the site, a winter wheat crop. The Non-agricultural areas include an unsurfaced, unfenced track and scrub. The Non-agricultural land to the east of the site is an artificial slope covered with scrub. The Urban area is a concrete track.

1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas and extent 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.

Table 1: Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Land
2	6.2	74.8	80.6
3a	0.9	10.8	14.0
3b	0.6	7.2	9.4
Urban	0.3	3.6	100.0 (7.7ha)
Non-Agricultural	0.3	3.6	
Total area of site	8.3 ha	100.0	

1.6 Appendix I gives a general description of the grades, subgrades and land use categories identified in the survey. 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.

1.7 The agricultural land at this site has been classified as Grade 2 (very good quality) to Subgrade 3b (moderate quality). Principal limitations to land quality include soil wetness, soil droughtiness and slope. Grade 2 land covers the majority of the site. The soils in this area comprise slightly to moderately stony medium silty and light loamy topsoils and subsoils. These factors slightly reduce profile available water, insofar as there is a slight risk of drought stress affecting plant growth and yield.

1.8 Subgrade 3a (good quality) land on the area of highest altitude towards the centre of the site is limited by soil wetness. The medium loamy topsoil and medium silty upper subsoil overlie slowly permeable clay at a moderate depth. Soil wetness affects plant growth and yield and reduces the opportunities for cultivations and/or grazing without causing structural damage to the soil.

1.9 Towards the north of the site, slope is significant in the land classification. Gradients in the range 7-11° were measured. These are sufficient to compromise the safe and efficient use of agricultural machinery insofar as Subgrade 3b is appropriate.

2. 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.

2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office, 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site.

2.4 No local climatic factors such as exposure or frost risk are believed to affect the site. However, climatic and soil factors interact to influence soil wetness and droughtiness limitations.

3. Relief

3.1 The site lies between approximately 25 and 40m AOD. Overall, the site slopes from the south-west towards the north and east. Towards the east of the site, the landform has been altered to create more shelter for the orchard in this area. Towards the north of the site the land falls sharply from south to north in an area comprising approximately 7% of the site. This slope is sufficient to affect the classification in this part of the site.

Table 2: Climatic Interpolation

Grid Reference	TR140563
Altitude, (m, AOD)	30
Accumulated Temperature (°days, Jan.-June)	1464
Average Annual Rainfall (mm)	684
Field Capacity Days	143
Moisture deficit, wheat (mm)	118
Moisture deficit, potatoes (mm)	114
Overall Climatic Grade	1

4. Geology and Soils

4.1 The published geological information (BGS, 1982), shows the majority of the site to be underlain by Cretaceous Upper Chalk. Towards the north west of the site Head Brickearth is shown and towards the south River Terrace Gravels, both as drift deposits.

4.2 The most detailed published soils information (SSEW, 1980), shows the site to be underlain by argillic brown earth type soils from the Hamble, Bursledon and Woodnesborough series. The legend accompanying the map describes these as, 'silty soils in brickearth, associated with loamy soils in Thanet and Woolwich Beds. Free drainage generally, but with local slight impedance.' (SSEW, 1980). Some of the soils encountered at this site were of this broad type.

5. Agricultural Land Classification

5.1 Paragraph 1.5 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map.

5.2 The location of the soil observation points are shown on the attached sample point map.

Grade 2

5.3 Land of very good quality is shown over the majority of the site. The principal limitation to land quality is soil droughtiness. Soils in this area commonly comprise a very slightly to slightly stony (up to 12% flints or chalk fragments) medium sandy silt loam or medium silty clay loam topsoil which was occasionally calcareous. This occurred towards the east of the site where chalk fragments were recorded. The upper subsoil comprises a stoneless to moderately stony (up to 25% total flints or chalk fragments) medium silty clay loam which was similarly calcareous. This horizon was on one occasion impenetrable to the soil auger where the flint content was moderate. The lower subsoil horizons comprise medium silty clay loam, occasionally medium clay loam and heavy silty clay loam textures and contain up to 10% flints or up to 40% chalk fragments, in which cases they are calcareous. Pit 1 on the adjacent site CAN 3, Thanington (ADAS Ref: 2002/045/95) is representative of this soil type, except that a slight soil wetness was evident there.

In the local climate, these well drained (Wetness Class I) soil profiles are slightly restricted in terms of available plant water thus leading to a slight soil droughtiness limitation. This area is therefore shown as Grade 2 on this basis. Soil droughtiness affects plant growth and yield. As mentioned above, an observation was impenetrable to the soil auger due to flints in the subsoil, however as this was a singular occurrence it has not been mapped separately.

Subgrade 3a

5.4 Land of good quality is shown towards the south west of the site on the land of highest altitude. The principal limitation in this area is soil wetness. Soils commonly comprise a slightly stony (10% flints, with 6%>2cm) medium silty clay loam topsoil, passing to a moderately stony (20% flints) heavy silty clay loam upper subsoil. The lower subsoil, from approximately 40cm, is a slightly stony (10% flints) gleyed and slowly permeable clay, see Pit 1. The depth at which the slowly permeable horizon occurs is such that in the local climate Wetness Class III is applied. Subsequently Subgrade 3a is applied when the workability status of the medium silty clay loam topsoil is taken into account. Soil wetness restricts land utilisation as well as affecting plant growth and yield.

Subgrade 3b

5.5 Moderate quality land is mapped towards the centre of the site. The principal limitation is slope. Gradients in this area were measured in the range 7-11°. Slopes of this gradient are sufficient to compromise the safe and efficient operation of farm machinery, particularly for cultivation and harvesting, to the extent that Subgrade 3b is appropriate.

SOURCES OF REFERENCE

British Geological Survey (1982), Sheet 289, Canterbury, Solid & Drift Edition. 1:50,000

MAFF (1988), Agricultural Land Classification of England and Wales : Revised guidelines and criteria for grading the quality of agricultural land.

Meteorological Office (1989), Climatic datasets for Agricultural Land Classification.

Soil Survey of England and Wales (1980), Bulletin No.9, Soils of Kent.

Soil Survey of England and Wales (1983), Sheet No.6, Soils of South-East England, 1:250,000, and accompanying legend.

Soil Survey of England and Wales (1984), Bulletin No.15, Soils and their use in South-East England.

APPENDIX I

DESCRIPTION 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 (eg. 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.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religous buildings, cemetries. 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. 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 (eg. polythene tunnels erected for lambing) may be ignored.

Open Water

Includes lakes, ponds and rivers as map scale permits.

Land Not Surveyed

Agricultural land which has not been surveyed.

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

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

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.

Definition of Soil Wetness Classes

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.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

[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 III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

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. **GLEY/SPL** : 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 **ST** : strongly developed	**MD** : moderately developed
ped size	**F** : fine **C** : coarse	**M** : medium **VC** : very coarse
ped shape	**S** : single grain **GR** : granular **SAB** : sub-angular blocky **PL** : platy	**M** : massive **AB** : angular blocky **PR** : prismatic

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 appropiate 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 : CANTERBURY LP CAN 4 Pit Number : 1P

Grid Reference: TR14075617
Average Annual Rainfall : 684 mm
Accumulated Temperature : 1464 degree days
Field Capacity Level : 143 days
Land Use : Cereals
Slope and Aspect : 02 degrees NW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	MZCL	10YR43 00	6	10	HR					
28- 42	HZCL	10YR54 00	0	20	HR	F			M	
42- 60	C	10YR53 00	0	10	HR	C	MASSIV	FM	P	
60- 80	C	10YR52 00	0	10	HR	C	MASSIV	FM	P	

Wetness Grade : 3A
Wetness Class : III
Gleying : 42 cm
SPL : 42 cm

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

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE		GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT		ALC	COMMENTS
1	TR13905640	SAS					1	1	146	28	119	5	2				DR	2		IMP FLINTS 110
1P	TR14075617	CER	NW	02	42	42	3	3A		0		0					WE	3A		PIT 80
2	TR13805630	SAS					1	1	158	40	122	8	2				DR	2		
3	TR13905630	SAS					1	1	155	37	119	5	2				DR	2		
4	TR14005630	SAS	NW	03			1	1	156	38	120	6	2				DR	2		
5	TR14075617	CER	NW	02	50	50	3	3A		0		0					WE	3A		SEE 1P
6	TR14105620	ORC	NW	05			1	1	152	34	120	6	2				DR	2		CH DRIFT
7	TR14105610	CER					1	1	68	-50	68	-46	3B				DR	3B		IMP FLINTS 45
8	TR14105600	ORC	NW	02			1	1	132	14	123	9	2				DR	2		IMP FLINTS 95

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
1	0-26	mszl	10YR42 00						0	0	HR	2							
	26-40	mzcl	10YR54 42						0	0	HR	2		M					
	40-110	mcl	75YR54 00						0	0	HR	2		M					IMP FLINT 110
1P	0-28	mzcl	10YR43 00						6	0	HR	10							
	28-42	hzcl	10YR54 00	10YR58 00 F			00MN00 00		0	0	HR	20		M					
	42-60	c	10YR53 00	75YR58 00 C				Y	0	0	HR	10	MASSIV FM	P	Y		Y		
	60-80	c	10YR52 00	75YR68 00 C				Y	0	0	HR	10	MASSIV FM	P	Y		Y		PIT TO 80
2	0-27	mszl	10YR42 00						0	0	HR	5							
	27-70	mzcl	75YR54 00	00MN00 00 F					0	0		0		M					
	70-120	hzcl	75YR56 00	00MN00 00 F					0	0		0		M					
3	0-24	mszl	10YR42 00						0	0	HR	5							
	24-55	mzcl	75YR54 00						0	0	HR	5		M					
	55-75	mzcl	75YR54 00						0	0		0		M					
	75-120	hzcl	75YR56 00	00MN00 00 F					0	0		0		M					
4	0-27	mzcl	10YR42 00						0	0	HR	5							
	27-50	mzcl	*10YR54 00*						*0*	*0*	*CH*	5		M				Y	
	50-120	mzcl	75YR54 00						0	0	CH	5		M				Y	
5	0-30	mcl	10YR43 00						6	0	HR	10							
	30-50	hzcl	10YR54 00	10YR58 00 F					0	0	HR	15		M					
	50-85	c	75YR54 00	75YR58 00 C				S	0	0	HR	5		P		Y			
	85-120	c	10YR53 00	10YR58 00 C				Y	0	0	HR	5		P		Y			
6	0-26	mzcl	25Y 42 00						0	0	CH	5						Y	
	26-40	mzcl	10YR54 00						0	0	CH	5		M				Y	
	40-65	mzcl	10YR64 00						0	0	CH	10		M				Y	
	65-85	mzcl	10YR64 00						0	0	CH	15		M				Y	
	85-120	mzcl	10YR74 00						0	0	CH	40		M				Y	
7	0-25	mzcl	10YR42 00						8	0	HR	12							
	25-45	mzcl	10YR54 00						0	0	HR	25		M					IMP FLINTS 45
8	0-30	mzcl	10YR42 00						0	0	CH	3						Y	
	30-75	mzcl	10YR54 00	00MN00 00 F					0	0	CH	5		M				Y	
	75-95	mzcl	75YR54 00						0	0	HR	10		M				Y	IMP FLINTS 95