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Hart District Replacement Local Plan
Site 1068: West of Brown Croft
Hampshire
Agricultural Land Classification Report
October 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

HART DISTRICT REPLACEMENT LOCAL PLAN
SITE 1068: WEST OF BROWN CROFT

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 6 hectares of land to the north of Brown Croft at Hook, in the Hart District of Hampshire. The survey was carried out during October 1996.

2. The work was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading, in connection with MAFF's statutory input to the Hart District Replacement Local Plan. This survey supersedes any previous ALC information for this land. However information from a reconnaissance survey (ADAS Ref: 1506/03/95), undertaken in 1995, was also used in the assessment of this land.

3. The current work was conducted 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 agricultural land on this site was under permanent pasture. The area shown as Other Land comprised a tennis court.

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 below.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% Total site area	% Surveyed Area
3b	6.5	98.5	100
Other land	0.1	1.5	-
Total surveyed area	6.5	98.5	100.0
Total site area	6.6	100.0	-

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 6 borings and 1 soil pit were described.

8. All of the agricultural land at this site has been classified as Subgrade 3b (moderate quality) on the basis of a significant soil droughtiness limitation. The soils are developed on terrace deposits which overlie the London Clay and, as such, comprise slightly to moderately flinty medium clay loams which became impenetrable to the soil auger at very shallow depths. A soil pit showed that very stony medium-clay loam, and occasional sandy clay loam or fine sandy silt loam, subsoils continue to approximately 60cm depth. Here the profile is again impenetrable so it is assumed that the profile becomes more stony from this depth. The profiles are gleyed from the surface suggesting that, at best, they are only moderately well drained. The high stone content and shallow soil depth over gravelly deposits also limits the amount of profile available water for crops. The combination of these soil properties and the prevailing climate results in a significant soil droughtiness limitation which mean that the land cannot be classified higher than 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).

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.

Table 2: Climatic and altitude data

Factor	Units	Values	Values
Grid reference	N/A	SU 716 543	SU 715 539
Altitude	m. AOD	80	94
Accumulated Temperature	day°C (Jan-June)	1440	1424
Average Annual Rainfall	mm	719	730
Field Capacity Days	days	153	155
Moisture Deficit, Wheat	mm	106	103
Moisture Deficit, Potatoes	mm	98	95

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 (ATO, 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 there is no overall climatic limitation . However, climatic factors can interact with soil properties to influence soil wetness and droughtiness.

14. Local climatic factors such as frost risk and exposure are unlikely to adversely affect agricultural land use on this site. The site is climatically Grade 1.

Site

15. The land on this site slopes very gently from 95m AOD in the south east to 80m AOD in the north and west.

16. Site factors such as flooding, gradient and microrelief do not affect land quality in this area.

Geology and soils

17. The relevant geological sheet (BGS, 1981) maps London Clay across the site.

18. The most recently published soils information for this area (SSEW, 1983) maps the Wickham 4 soil association across the entire site. These soils are described as "Slowly permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils associated with similar clayey soils, often with brown subsoils".(SSEW, 1983).

19. Detailed field examination revealed markedly more stony soils, probably derived from the high level terrace deposits, mapped nearby over the London clay (BGS, 1981).

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.

22. 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.

Subgrade 3b

23. All of the site has been classified as moderate quality agricultural land. The soil profiles comprise slightly flinty (5-10% total flint) medium clay loam topsoils over moderately well structured, slightly to moderately stony (5-25% total flint) upper subsoils of similar or slightly lighter (e.g. fine sandy silt loam) texture. All of the soil profiles became impenetrable to the soil auger at 30-35cm depth. However, the soil inspection pit (Pit 1) showed that a very stony (57-59% total flint), poorly structured, medium (or occasional sandy) clay loam horizon continues to at least 60cm depth. At this depth, the profile became impenetrable during digging, due to the high stone content and extremely dry conditions at the time of survey (October, 1996). With information extrapolated from an adjacent reconnaissance survey (ADAS Ref: 1506/003/95), it is considered that the soil resource will continue to depth with a consistently high stone content. The profile is also gleyed from the surface, indicating a moderate drainage impedance, possibly as a result of the poorly structured, very stony lower

subsoils overlying London Clay. Clear evidence of wetness suggests some waterlogging in the profile for certain periods of the year. The soils are therefore placed in Wetness Class II but this degree of wetness is not a limiting factor at the site, as the land would still be able to qualify for a high grade. In this local climatic regime, it is the combination of soil textures, structures, and stone contents which is the critical factor because, together, they act to reduce the amount of profile available water for crops. This land has therefore been classified as Subgrade 3b due to a significant soil droughtiness limitation.

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SOURCES OF REFERENCE

British Geological Survey (1981) *Sheet No. 284, Basingstoke*. 1:50,000 Series. Solid & Drift. 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.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
SSEW: Harpenden

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:

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 : HART DRLP,1068 BRN CROFT Pit Number : 1P

Grid Reference: SU71585410 Average Annual Rainfall : 719 mm
Accumulated Temperature : 1440 degree days
Field Capacity Level : 153 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 23	MCL	10YR42 00	5	10	HR	C				
23- 30	MCL	10YR53 52	0	25	HR	C		FR	M	
30- 40	MCL	10YR53 00	0	57	HR	C		FR	M	
40- 50	MCL	10YR53 00	0	59	HR	C		FR	M	
50- 60	SCL	10YR53 00	0	59	HR	C			P	

Wetness Grade : 2 Wetness Class : II
Gleying : 0 cm
SPL : No SPL

Drought Grade : 3B APW : 53 mm MBW : -41 mm
APP : 55 mm MBP : -30 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	USE	ASPECT	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	SU71605430	PGR	N	02	0		2	2	49	-57	49	-49	4				DR	3B	I30 see 1P
1P	SU71585410	PGR			0		2	2	53	-41	55	-30	3B				DR	3B	I60 hard/stony
2	SU71605420	PGR	NE	02	0		2	2	57	-49	57	-41	3B				DR	3B	I35 see 1P
3	SU71585410	PGR			0		2	2	60	-46	60	-38	3B				DR	3B	I35 see 1P
4	SU71505400	PGR	N	01	0		2	2	54	-52	54	-44	4				DR	3B	I35 see 1P
5	SU71605400	PGR			0		2	2	46	-60	46	-52	4				DR	3B	I27 see 1P
6	SU71505390	PGR			0		2	2	50	-56	50	-48	4				DR	3B	I30 see 1P

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	0-20	mcl	10YR42 00 75YR58 00 C					Y	3	0	HR	5							
	20-30	mcl	10YR53 00 10YR58 00 C					Y	0	0	HR	10		M					Imp Flinty
1P	0-23	mcl	10YR42 00 75YR58 00 C					Y	5	0	HR	10							At borings
	23-30	mcl	10YR53 52 75YR58 00 C					Y	0	0	HR	25		FR M					
	30-40	mcl	10YR53 00 10YR58 00 C					Y	0	0	HR	57		FR M					H3-5 wet sieved
	40-50	mcl	10YR53 00 10YR58 00 C					Y	0	0	HR	59		FR M					
	50-60	scl	10YR53 00 75YR58 00 C					Y	0	0	HR	59		P					Imp Hard/Stony
2	0-18	mcl	10YR43 53 75YR58 00 C					Y	3	0	HR	5							
	18-35	mcl	10YR42 00 10YR56 00 F						0	0	HR	5		M					Imp Flinty
3	0-25	mcl	10YR42 00 75YR58 00 C					Y	3	0	HR	5							
	25-35	fszl	10YR53 00 10YR58 00 C					Y	0	0	HR	20		M					Imp Flinty
4	0-20	mcl	10YR51 00 75YR58 00 C					Y	3	0	HR	5							
	20-35	mcl	25Y 53 64 10YR58 00 C					Y	0	0	HR	20		M					Imp Flinty
5	0-27	mcl	10YR41 42 75YR58 00 C					Y	3	0	HR	5							Imp Flinty
6	0-20	mcl	10YR41 00 75YR58 00 C				00MN00 00	Y	3	0	HR	5							
	20-30	mcl	10YR52 00 75YR58 00 C				00MN00 00	Y	0	0	HR	5		M					Imp Flinty