Chichester District Local Plan
Objector Site OSH07
Land north of Saxon Meadow,
Tangmere, West Sussex.
Agricultural Land Classification
ALC Map and Report
August 1995

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

CHICHESTER DISTRICT LOCAL PLAN
OBJECTOR SITE OSH07: LAND NORTH OF SAXON MEADOW, TANGMERE

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 4.4 ha of land to the north of Saxon Meadow in the village of Tangmere, West Sussex. The survey was carried out during August 1995.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Reading in connection with the preparation of the Chichester District Local Plan.

3. The 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. Information from an adjacent objector site (ADAS Ref: 4203/146/95) has been used in the classification of this site.

4. At the time of survey, the land on the site comprised recently harvested oilseed rape.

Summary

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10000; it is accurate at this scale but any enlargement would be misleading.

6. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 4 borings and one soil pit were described.

7. All of the land on the site (4.4 ha.) has been classified as Subgrade 3a, good quality land, with soil wetness and droughtiness as the main limitations. Soils typically comprise medium silty clay loam topsoils which become heavier with depth, subsoils on the site being variably stony. A soil inspection pit on a neighbouring site (ADAS Ref: 4203/146/95) found that where profiles become stony in the subsoil, a combination of soil textures, structures, stone contents and the local climatic regime means that these soils are moderately drought prone. This can affect the level and consistency of crop yields. Where subsoils on the site are less stony, lower subsoils were found to comprise a poorly structured, slowly permeable heavy silty clay loam. These soils show signs of a drainage imperfection in the form of gleying, and are judged to be suffering from a moderate wetness limitation. This in turn can affect the frequency and timing of agricultural operation on this land.

FACTORS INFLUENCING ALC GRADE

Climate

8. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

9. 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	SU 900 062
Altitude	m, AOD	15
Accumulated Temperature	day°C	1531
Average Annual Rainfall	mm	788
Field Capacity Days	days	162
Moisture Deficit, Wheat	mm	115
Moisture Deficit, Potatoes	mm	111

10. 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.

11. 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.

12. The combination of rainfall and temperature at this site means that there is no overall climatic limitation. Local climatic factors such as exposure are also believed not to affect the site. The site is climatically Grade 1.

Site

13. The site is flat, lying at an altitude of approximately 15 m AOD. Nowhere on the site does gradient affect land quality. No other site factors such as flooding or microrelief affect the survey area.

Geology and soils

14. The most detailed published geological information for the site (BGS, 1972) shows the entire site to be underlain by valley gravel.

15. The most detailed published soils information (SSGB, 1967) shows all of the site to comprise soils of the shallow Hook series. These are described as 'brown earths with gleying and a calcareous clay horizon' (SSGB, 1967).

AGRICULTURAL LAND CLASSIFICATION

16. 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.

17. 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 3a

18. All of the agricultural land on the site has been classified as Subgrade 3a, good quality land, with soil wetness and droughtiness as the main limitations. Soil profiles on the site typically comprise medium silty clay loam topsoils, with subsoils which are variable in nature. Where soil wetness is the overriding limitation a soil inspection pit (pit 1) was dug to investigate the nature of the problem. At the location of the pit, a slightly stony (8% total flints v/v) medium silty clay loam topsoil was found to rest upon a similar textured upper subsoil containing 5% total flints and extending to a depth of 35cm. A very slightly stony (2% total flints v/v) medium silty clay loam lower subsoil rests upon a heavy silty clay loam with similar stone contents commencing at 65cm. The profile shows evidence of a drainage imperfection in the firm of gleying, from a depth of 35cm. The heavy silt clay loam lower subsoil was found to be poorly structured with low porosity and therefore slowly permeable, causing a moderate drainage impedance. Such drainage characteristics equate these soils to Wetness Class III, which in combination with the topsoil texture and the local climatic regime gives a resultant classification of Subgrade 3a. Poorly drained wet soils can inhibit plant growth and rooting and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.

19 A number of soil observations on the site proved impenetrable to the auger at relatively shallow depths of 35-45 cm, where higher stone contents were encountered.. For the purpose of grading these more stony soils, information from a soil inspection pit dug on a neighbouring site (ADAS Ref: 4203/146/95), where soils also proved impenetrable has been used. At this pit, a slightly stony (6% total flints v/v) medium silty clay loam topsoil and upper subsoil were found to extend to a depth of 45cm where the profile became appreciably more stony. A very stony (40% total flints v/v) medium silty clay loam lower subsoil extends

to a depth of 60cm, where stone contents increase to 50% total flints v/v. The pit proved impenetrable to digging at a depth of 75cm, which has been used as a cut-off point for the purpose of calculating profile available water. Consequently, there is a moderate restriction on the amount of profile available water for plant growth due to soil textures and stone contents. This can affect the level and consistency of crop yield, such that a classification of Subgrade 3a is appropriate.

SOURCES OF REFERENCE

British Geological Survey (1972) *Sheet No. 317, Chichester.*
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 Great Britain (1967) *Sheet SU90, Bognor Regis.*
SSGB: Harpenden.

Soil Survey of England and Wales (1983) *Soils and their Use in South East England*
SSEW: Harpenden

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, 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. 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 : CHICHESTER DLP OSH07 Pit Number : 1P

Grid Reference: SU90100620 Average Annual Rainfall : 788 mm
Accumulated Temperature : 1531 degree days
Field Capacity Level : 162 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 26	MZCL	10YR43 00	5	8	HR					
26- 35	MZCL	10YR54 00	0	5	HR		MDCSAB	FR	M	
35- 65	MZCL	10YR53 54	0	2	HR	C	MDCSAB	FR	M	
65-120	HZCL	10YR53 00	0	2	HR	C	WKCPR	FM	P	

Wetness Grade : 3A Wetness Class : III
Gleying :035 cm
SPL :065 cm

Drought Grade : 2 APW : 132mm MBW : 17 mm
APP : 116mm MBP : 5 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
1	0-30	mzcl	10YR43 00						6	0	HR	10						
	30-35	mzcl	10YR54 00						0	0	HR	10		M				
1P	0-26	mzcl	10YR43 00						5	0	HR	8						
	26-35	mzcl	10YR54 00						0	0	HR	5	MDCSAB	FR M				
	35-65	mzcl	10YR53 54	10YR58 00	C			Y	0	0	HR	2	MDCSAB	FR M				
	65-120	hzcl	10YR53 00	10YR68 00	C		00MN00 00	Y	0	0	HR	2	WKCPR	FM P	Y		Y	
2	0-25	mzcl	10YR43 00						4	0	HR	6						
	25-45	mzcl	10YR53 00	10YR58 00	C			Y	0	0	HR	2		M				
	45-80	mzcl	75YR53 00	10YR68 00	C		00MN00 00	Y	0	0		0		M				
3	0-20	mzcl	10YR43 00						5	0	HR	8						
	20-45	mzcl	10YR53 54						0	0	HR	10		M				
4	0-25	mzcl	10YR43 00						5	0	HR	8						
	25-40	mzcl	10YR54 00						0	0	HR	5		M				
	40-60	mzcl	10YR53 54	10YR58 00	C			Y	0	0	HR	2		M				

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	SU90000630	STB				1	1	059	-56	059	-52	4				DR		3A	SEE OSH06
1P	SU90100620	STB		035	065	3	3A	132	17	116	5	2				WE		3A	
2	SU90100630	STB		025		2	2	117	2	121	10	3A				DR		3A	I80
3	SU90000620	STB				1	1	074	-41	074	-37	3B				DR		3A	SEE OSH06
4	SU90100620	STB		040		3	3A	095	-20	102	-9	3B				WE		3A	SEE 1P