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NEWBURY LOCAL PLAN
SITE 68: GREAT SHEFFORD
AGRICULTURAL LAND CLASSIFICATION
ALC MAP & REPORT
FEBRUARY 1994

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1.0 Summary

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

1.2 Approximately 5 hectares of land relating to site 68 at Great Shefford in Berkshire was surveyed in February 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 5 soil auger borings and 1 soil 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 conducted 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 use on the site was cereal cropping..

1.5 .The distribution of 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 1:5,000. It is accurate at this scale, but any enlargement would be misleading. This map supersedes any previous survey information for this site.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Area
2	1.9	44.2	44.2
3b	2.4	55.8	55.8
Total area of site	4.3	100	100%(4.3ha)

1.6 Appendix 1 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 At the time of survey the site was classified as both, very good quality, grade 2 and, moderate quality, Subgrade 3b land. The lower slopes, adjoining the Wantage Road, were classified as grade 2 with moderately deep soils over chalk. These soils comprise slightly stony medium silty clay loam topsoils becoming stonier and occasionally heavier, over chalk at depths of 100cm below the topsoil. The stone content (chalk and flint) in the profile reduces the available water capacity and makes these soils slightly drought prone. The lower-lying land, to the south west, comprises very stony medium clay loam topsoils becoming increasingly stony with depth. The soil droughtiness and topsoil stone limitations, imposed by the stone content, is more marked here and thus restricts the land to Subgrade 3b. The higher land to the north east of the site is also graded Subgrade 3b where the angle of slope (8^0) limits the range of machinery that can be safely and efficiently used.

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 (degree days Jan-June), 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. However climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations.

2.4 Unpublished local climatic data (Met. Office, 1969) shows that this area is likely to be rather exposed.

Table 2 : Climatic Interpolation

Grid Reference :	SU386751	SU388753
Altitude (m) :	105	115
Accumulated Temperature (days) :	1410	1399
Average Annual Rainfall (mm) :	721	722
Field Capacity (days) :	158	158
Moisture Deficit, Wheat (mm) :	103	102
Moisture Deficit, Potatoes (mm) :	93	92
Overall Climatic Grade :	1	1

3.0 Relief

3.1 The site lies between 105m. AOD and 115m. AOD on the north west facing slope of a relatively steep hill, parts of which have gradients of 8.5^0 within the site boundary, which are sufficient to limit land quality. The degree of slope quickly diminishes, however, becoming flat adjacent to the road.

4.0 Geology and Soil

4.1 British Geological Survey (1971), sheet 267, Hungerford shows the underlying geology to be Upper Chalk on the steeper slopes, river and valley gravel on the gentler slopes and alluvium near the River Lambourn.

4.2 The Soil Survey Map of South East England (SSEW, 1983, 1:250,000), shows the soils on this site as the Coombe 1 Association. These soils are described as 'Well drained calcareous fine silty soils, deep in the valley bottoms, shallow to chalk on valley sides in places. Slight risk of water erosion.' (SSEW 1983). Detailed survey work broadly confirms this description.

5.0 Agricultural Land Classification

5.1 Table 1 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.

5.3 Grade 2

The good quality, Grade 2, agricultural land was found to correspond to the lower slopes of the hill near the Wantage Road. The profiles here comprise slightly to moderately flinty (10% total volume) medium clay loam topsoils over medium silty clay loam or heavy clay loam upper subsoils containing 10-15% v/v Chalk. Below 45cm the subsoil becomes markedly more chalky (20-50% v/v) before the Chalk bedrock is reached at variable depths below 60cm. Due to the volume of flint and chalk within the profile the amount of available water for crops is reduced. This creates a slight droughtiness limitation which is likely to affect yield potential and consistency. In addition the quantity of topsoil stones (5-7% v/v), measuring greater than 2cm in diameter, also restricts the land to Grade 2 due to increased implement and tyre wear and impeded crop establishment. It is also possible that this area is slightly prone to exposure where cold wind and rain could damage crops. (Met. Office, 1969).

5.4 Subgrade 3b

The remainder of the site has been classified as subgrade 3b, moderate quality land, and is associated with the river and valley gravels on the flatter ground near the river. Soil profiles comprise well drained stony to very stony medium clay loam topsoils over increasingly stony (25-60% v/v) medium silty clay loam or heavy clay loam subsoils becoming impenetrable to the soil auger at 45-65cm depth. The volume of stone present throughout the soil significantly reduces the amount of available water leaving insufficient for most crops. The volume of topsoil stones greater than 2cm diameter (16-27% v/v) is also sufficiently high to limit land quality to Subgrade 3b due to the increased wear and tear on farm implements and tyres and adverse effects on crop establishment, growth and quality. Parts of the higher land on this site were also restricted to 3b on the basis of steep gradient. Here the angle of slope was measured as $7\text{-}8.5^0$ using an optical reading clinometer. This limits the range of machinery that can be safely and efficiently used.

ADAS REFERENCE : 4205/029/93
MAFF REFERENCE : EL 02/00297

Resource Planning Team
Guildford Statutory Group
ADAS Reading

REFERENCES

* British Geological Survey (1971), Sheet No.267, Hungerford, 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 (1969), Unpublished Climatic Data For 1:63360 Scale Map Sheet 158.

* Meteorological Office (1989), Climatological Data for Agricultural Land Classification.

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

APPENDIX I

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 and 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 into 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 poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

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 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 root 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 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 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 (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 land cover types, eg 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 II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

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 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 *or*, 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 *or*, 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 III

SOIL BORING AND SOIL PIT DESCRIPTIONS

Contents:

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 - sugarbeet	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
   EROSN : Soil erosion
   EXP : Exposure
   FROST : Frost prone
   DIST : Disturbed land
   CHEM : Chemical limitation)

   If any of these factors are considered significant in terms of the assessment of agricultural land quality a 'y' will be entered in the relevant column.

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

OC - overall climate
AE - aspect
EX - exposure
FR - frost
GR - gradient
MR - micro-relief
FL - flooding
TX - soil texture
DP - soil depth
CH - chemical limitations
WE - wetness
WK - workability
DR - drought
ER - erosion
WD - combined soil wetness/soil droughtiness
ST - topsoil stoniness

PROFILES & 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 ⅔ of the sand less than 0.2 mm)
C - coarse (more than ⅓ of sand greater than 0.6 mm)
M - medium (less than ⅔ fine sand and less than ⅓ 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 (>2cm, >6cm 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 decribed 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

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	SU38777540	CER	NW	05			1	1	139	36	113	20	1				ST	2	
1P	SU38707520	CER	NW	06			1	1	105	2	106	13	3A				DR	3A	ROOTS TO 80
2	SU38707530	CER	NW	02			1	1	124	21	110	17	2				ST	2	IMP100
3	SU38607520	CER	NW				1	1	072	-31	079	-14	3B				ST	3B	IMP65
4	SU38707520	CER	NW	06			1	1	117	14	112	19	2				DR	2	AP TO 93
5	SU38607510	CER	W	02			1	1	060	-43	060	-33	3B				ST	3B	IMP45

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	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	10YR53 00						5	0	HR	10						Y
	30-46	mzcl	10YR63 00						0	0	CH	15		M				Y
	46-60	mzcl	25Y 73 00						0	0	CH	10		M				Y
	60-80	mzcl	25Y 73 00						0	0	HR	25		M				Y
	80-100	mzcl	25Y 73 00						0	0	CH	50		M				Y
	100-120	mzcl	25Y 73 00						0	0	CH	70		P				Y
1P	0-25	mzcl	10YR53 00						6	0	HR	10						
	25-45	mzcl	10YR54 00						0	0	CH	10	MDCSAB FR	M				Y
	45-55	mzcl	10YR54 00						0	0	CH	20	MDCSAB FR	M				Y
	55-80	ch	00CH00 00						0	0	HR	2		P				Y
2	0-35	mzcl	10YR42 00						7	0	HR	11						
	35-60	hcl	10YR54 00						0	0	HR	8		M				
	60-70	hcl	10YR54 00						0	0	HR	15		M				
	70-85	c	10YR44 00						0	0	HR	10		M				Y
	85-100	mzcl	25Y 83 00						0	0	CH	30		M				Y
3	0-25	mcl	10YR42 43						27	0	HR	40						
	25-55	mzcl	10YR53 00						0	0	CH	60		M				Y
	55-65	mzcl	10YR53 00	10YR56 00	F				0	0	CH	60		M				Y
4	0-28	mzcl	10YR53 00						6	0	HR	10						Y
	28-63	mzcl	10YR54 00						0	0	CH	10		M				Y
	63-93	ch	00CH00 00						0	0	HR	1		P				Y
5	0-32	mcl	10YR42 00						16	0	HR	25						
	32-45	hcl	10YR43 00						0	0	HR	25		M				

SOIL PIT DESCRIPTION

Site Name : SITE 68,GREAT SHEFFORD Pit Number : 1P

Grid Reference: SU38707520
Average Annual Rainfall : 722 mm
Accumulated Temperature : 1410 degree days
Field Capacity Level : 158 days
Land Use : Cereals
Slope and Aspect : 06 degrees NW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 25	MZCL	10YR53 00	6	10		
25- 45	MZCL	10YR54 00	0	10		MDCSAB
45- 55	MZCL	10YR54 00	0	20		MDCSAB
55- 80	CH	00CH00 00	0	2		

Wetness Grade : 1
Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 3A
APW : 105mm MBW : 2 mm
APP : 106mm MBP : 13 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness