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Newbury District Local Plan
Site 70: South End Road, Bradfield
Agricultural Land Classification
ALC Map and Report
March 1994

NEWBURY DISTRICT LOCAL PLAN
SITE 70: SOUTH END ROAD, BRADFIELD
AGRICULTURAL LAND CLASSIFICATION REPORT

1. Summary

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

1.2 Site 70 comprises 6.6 hectares of land to the west of the village of South End, Berkshire. An Agricultural Land Classification, (ALC), survey was carried out during February 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 6 soil auger borings and one soil inspection 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.

At the time of survey the site was in permanent grassland.

1.3 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 1:5,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1: Distribution of Grades and Subgrades

Grade	Area (ha)	% of Agricultural Area
3b	5.0	100
Non-agricultural	1.6	
Total Area of Site	6.6 ha	

1.4 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.

1.5 All of the survey area in agricultural use has been classified as moderate quality, Subgrade 3b land on the basis of a significant soil wetness limitation. Clay loam topsoils overlie gleyed and slowly permeable clay subsoils which impede soil drainage to the extent that land cannot be graded higher than 3b. The land will be prone to lie wet for considerable lengths of time and as a result crop growth and development will be adversely affected and the opportunities for cultivations and/or grazing will be restricted.

2. Climate

2.1 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5km grid point dataset (Met. Office, 1989) for a representative location in the survey area.

Table 2: Climatic Interpolation

Grid Reference	SU591704
Altitude (m, AOD)	100
Accumulated Temperature (°days, Jan-June)	1413
Average Annual Rainfall (mm)	699
Field Capacity Days	147
Moisture Deficit, Wheat (mm)	106
Moisture Deficit, Potatoes (mm)	98

2.2 Climatic factors are considered first when classifying land since climate can be overriding in the sense that adverse climatic conditions may restrict land quality irrespective of favourable site and soil conditions. The details in the table above show that there is no overall climatic limitation affecting this site. In addition, no local climatic factors such as exposure or frost risk affect the land quality.

2.3 However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations.

3. Relief

3.1 The site lies at an altitude in the range 90 - 100m, the highest land being towards the south-west, falling gently towards the north-east. Relief nor gradient affect agricultural land quality on this site.

4. Geology and Soil

4.1 British Geological Survey, (1946) Sheet 268 Reading shows much of the site to be underlain by deposits of London Clay, although more recent Plateau Gravel drift outcrops across the eastern part of the site.

4.2 Soil Survey of England and Wales (1983) Sheet 6, Soils of South-East England shows the site to comprise two soil associations which broadly coincide with the geological deposits. Soils of the Wickham 4 association have been mapped in conjunction with deposits of London Clay. These are described as, 'slowly permeable, seasonally waterlogged, fine loamy over clayey and fine silty over clayey soils', (SSEW, 1984). Sonning 2 association is mapped where Plateau Gravel occurs, these soils being described as 'well drained, flinty, coarse loamy and gravelly soils', (SSEW, 1984).

4.3 Detailed field examination of the soils on the site revealed the presence of poorly drained, clayey soils mostly, with the occasional shallow, gravelly profile.

5 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.

Subgrade 3b

5.3 The agricultural land on the site has been classified as Subgrade 3b, moderate quality land. Soil wetness and workability act as restrictions to its agricultural use. Profiles typically comprise non-calcareous medium or heavy clay loam topsoils which may contain between 2 and 15% total flints by volume, (< 2% of which are >2 cm diameter). These overlie similarly textured upper subsoils or directly pass to slowly permeable clay between 25 and 47 cm depth. In most cases gleying was evident within 30 cm of the surface and commonly topsoils were gleyed. Drainage through these soils is impeded by the slow permeability of the subsoils such that Wetness Class IV, occasionally III, is appropriate, (see appendix II). Given the prevailing climatic regime, land having such a drainage status equates to Subgrade 3b. Difficulties will be experienced in farming this land, in terms of restricted opportunities for cultivations and grazing, along with adverse effects on crop growth and yields.

Occasional profiles were found to be gravelly and impenetrable (to soil auger) from about 50 cm. The combination of shallow soil depth and gravelly subsoil horizons gives rise to restricted profile available water for crop growth. The resulting soil droughtiness limitation means land cannot be graded higher than Subgrade 3b.

ADAS Reference : 0202/019/94
MAFF Reference : EL02/0297

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

* British Geological Survey (1946), Sheet 268, Reading.

* 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 (1983), Sheet 6, Soils of South East England.

* Soil Survey of England and Wales (1984), Bulletin 15, Soils and their use in South-East England.

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 boring descriptions
* Soil pit descriptions
* Soil Abbreviations : Explanatory Note

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	0-25	mcl	10YR52 00	10YR56 00	C			Y	0	0	HR	5						
	25-47	hcl	10YR63 00	10YR58 00	C			Y	0	0	HR	2		M				
	47-70	c	10YR62 00	75YR58 00	M			Y	0	0		0		P			Y	
1P	0-32	hcl	10YR41 00	75YR46 00	F				2	0	HR	15						
	32-50	c	10YR63 00	75YR58 00	M		25 Y72 00	Y	0	0	HR	20	WKCSAB FM	P	Y		Y	
	50-65	c	25 Y70 00	75YR68 00	M			Y	0	0		0	MDMCAB FM	P	Y		Y	
2	0-25	hcl	10YR52 00	75YR46 00	C			Y	0	0	HR	2						
	25-65	c	10YR53 00	10YR58 00	M			Y	0	0	HR	2		P			Y	
3	0-32	hcl	10YR62 00	75YR46 00	C			Y	0	0	HR	2						
	32-60	c	25 Y63 00	10YR58 00	M			Y	0	0	HR	2		P			Y	
4	0-29	mcl	10YR52 00	10YR56 00	C			Y	0	0		0						
	29-50	c	10YR53 00	75YR58 00	C		10YR62 00	Y	0	0	HR	2		P			Y	
	50-60	c	10YR53 00	75YR58 00	M		10YR62 00	Y	0	0	HR	20		P			Y	Imp 60+, stones
5	0-25	mcl	10YR31 00						0	0	HR	10						
	25-50	mcl	10YR62 00						0	0	HR	65		M				Imp 50+, gravel
	50-120	gh	10YR62 00						0	0		0		M				
6	0-28	hcl	10YR42 00						0	0	HR	3						
	28-50	c	10YR53 00	75YR58 00	M			Y	0	0	HR	5		P	Y		Y	
	50-70	c	25Y 72 00	75YR56 00	M			Y	0	0		0		P	Y		Y	

MPLE	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	SU59227070	PGR	N	03	0	047	3	3A	000	0	000	0					WE	3A	
1P	SU59107050	RGR	N	01	032	032	4	3B	079	-28	088	-12	3B				WE	3B	
2	SU59007060	PGR	N		0	025	4	3B	000	0	000	0					WE	3B	
3	SU59107060	PGR	N	02	0	032	4	3B	000	0	000	0					WE	3B	
4	SU59177060	PGR	N	02	0	029	4	3B	000	0	000	0					WE	3B	IMP 60, STONES
5	SU59007050	RGR	N	02			1	1	063	-44	060	-40	3B				DR	3B	IMP 50, GRAVEL
6	SU59107050	RGR	N	01	028	028	4	3B	000	0	000	0					WE	3B	

SOIL PIT DESCRIPTION

Site Name : SOUTHEND ROAD, BRADFIELD Pit Number : 1P

Grid Reference: SU59107050
Average Annual Rainfall : 699 mm
Accumulated Temperature : 1424 degree days
Field Capacity Level : 147 days
Land Use : Rough Grazing
Slope and Aspect : 01 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 32	HCL	10YR41 00	2	15	F	
32- 50	C	10YR63 00	0	20	M	WKCSAB
50- 65	C	25 Y70 00	0	0	M	MDMCAB

Wetness Grade : 3B
Wetness Class : IV
Gleying :032 cm
SPL :032 cm

Drought Grade : 3B
APW : 079mm MBW : -28 mm
APP : 088mm MBP : -12 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

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 $^2/_3$ of the sand less than 0.2 mm)
C - coarse (more than $^1/_3$ of sand greater than 0.6 mm)
M - medium (less than $^2/_3$ fine sand and less than $^1/_3$ 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.

- <u>degree of development</u>
  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