SALISBURY URBAN AREA LOCAL PLAN
AGRICULTURAL LAND CLASSIFICATION

REPORT OF SURVEY

1. Introduction

In July 1989, a detailed Agricultural Land Classification (ALC) survey was carried out over a total of twelve separate sites covering 247 hectares within the Salisbury Urban Area. The surveys were requested as part of MAFF's input to the Local Plan.

The fieldwork was conducted by the Resource Planning Group at an approximate auger sampling density of one boring per hectare. A total of 209 borings and 8 soil pits were examined.

The ALC provides 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. The distribution of grades for each site is detailed below and illustrated on the accompanying ALC maps at a scale of 1:10,000. The information is accurate at the scale shown, but any enlargement of the maps would be misleading.

The following areas were surveyed:-

Site 8: Newbridge Hospital Area, Land adjacent to Odstock Road (22.4ha)
Site 10: Newbridge Hospital Area, Land adjacent to Odstock Road (2.2ha)
Site 11: Land to West of Harvard Hospital (3.73ha)
Site 12: Harnham Hill (17.5ha)
Site 13: Waldron's Farm, Netherhampton Road (71.51 ha)
Site 14: Bemerton Farm, A36T Road (11.7ha)
Site 15: Bishopsdown Farm, Laverstock (72.64ha)
Site 16: Milford Farm (14.83ha)
Site 17: Newbridge Hospital Area, Land adjacent to Downton Road (8.3ha)
Site 18: Fugglestone Red, A360 Road (15.06ha)

Site 6: Bulbridge, Wilton (5.45ha)
Site 8: Ditchampton, Wilton (1.7ha)

(A location map illustrates their relative positions)

2. Climate

Estimates of important climatic variables were obtained for several of the sites by interpolation from a 5 km grid database in order to assess any overall climatic limitation. The results for each site are given separately below.

The important parameters for assessing any overall climatic limitationare accumulated temperature and average annual rainfall. Accumulated temperature is a measure of the relative warmth of a locality and average annual rainfall is a measure of overall wetness. At none of the sites is there an active overall climatic limitation and no local factors (such as exposure) were noted. The main influence that the prevailing climate has on the ALC in this locality is exerted through soil droughtiness.

3. Geology

The geology differs only slightly throughout much of the area with the majority of the higher land having soils that have developed over Upper Chalk (soft, with flints). The river valleys characteristically have a central band of Alluvium flanked by deposits of Valley Gravel.

For the soils that have developed over the chalk the active ALC factors are soil depth and rooting depth; the Valley Gravel soils are affected by stoniness, depth to impenetrable layers and droughtiness; the Alluvium based soils are affected by soil wetness (and lesser factors such as micro-relief, flooding and stoniness).

4.1 Site 8: Newbridge Hospital Area, Land Adjacent to Odstock Road

Table 1: Distribution of ALC Grades, Site 8

Grade	Area (ha)	% of Survey Area
3A	18.6	83.0
Non-Agric	1.9	8.5
Urban	1.9	8.5
	22.4 ha	100%

This site occupies the gentle north-east facing slopes towards Odstock on the south of the city, with altitude varying from 85 to 55 metres. The two climatic interpolations detailed below illustrate only a slight variation in some of the parameters within this altitudinal range.

Table 2: Climatic Interpolations, Site 8

	Locoation 1	Location 2
Grid Reference:	SU 147283	SU 148286
Height (m):	85	60
Accumulated Temperature (°days):	1459	1487
Average Annual Rainfall (mm):	813	784
Field Capacity (days):	179	174
Moisture Deficit, Wheat (mm):	102	107
Moisture Deficit, Potatoes (mm):	94	99

All the agricultural land in this site has been placed in sub-grade 3A. Soil depth and droughtiness are both limiting factors. The depth of soil over the Chalk is typically less than 45 cm and there is little evidence of root penetration beyond this depth into the compact Chalk. One soil pit description details this situation.

4.2 Site 10: Newbridge Hospital Area, Land Adjacent to Odstock Road

This site shares common ALC features with Site 8 - developed over Chalk, with soil depth and soil droughtiness producing an ALC grade of 3A. The soil pit description for Site 8 applies. A small area of

sub-grade 3B has been identified where gradient is locally limiting. This does not continue across into Site 8.

Table 3: Distribution of ALC grades, Site 10

Grade	Area (ha)	% of Survey/Agricultural Area
3A	1.8	81.8
3B	0.4	18.2
	2.2 ha	100%

4.3 Site 11: Land to West of Harvard Hospital

The whole of this site (3.73ha) has been graded as 3A. The soils are developed over Chalk with soil depth and soil droughtiness the major limitations. The soil pit description for Site 8 and the climatic interpolation for Site 12 apply.

4.4 Site 12: Harnham Hill

This site on the south-western edge of Salisbury contains both 3A and 3B grade agricultural land. The geology is common - soft Upper Chalk with flint. The area mapped as 3A contains soils which are 30-45 cm deep over the chalk and have soil depth and droughtiness as limiting factors. In the north of the site, gradient locally downgrades part of the area to form a map unit of 3B with some shallower soils along the eastern fringe. The soil pit description for Site 8 applies to the 3A area.

Table 4: Distribution of ALC Grades, Site 12

Grade	Area (ha)	% of Survey/Agricultural Area
3A	10.0	57
3B	7.5	43
	17.5 ha	100%

Table 5: Climatic Interpolation, Site 12*

Accumulated Temperature (°days):	1442
Average Annual Rainfall (mm):	844
Field Capacity (days):	184
Moisture Deficit, Wheat (mm)	99
Moisture Deficit, Potatoes (mm)	90

* for Grid Reference SU 131286 at 100 m

4.5 Site 13: Waldron's Farm, Netherhampton Road

This large site occupies part of the floodplain of one of the tributaries of the River Nadder. The majority of the area is underlain by Valley Gravel deposits which have given rise to soils either with a very stony topsoil or with subsoil horizons of flint which act as an impenetrable layer to cultivations. Two representative soil pit descriptions for the site illustrate these two types of stoniness limitation which result in an ALC grade of 3B for the majority of the area.

Alluvium deposits occur in the north of the site which have given rise to deep organic clay loams with clear evidence of wetness at shallow depths. An area of 3A has been mapped here where the soils show no clear evidence of any slowly permeable layer; they fall into wetness class II for the prevaliling FCD value. Where slowly permeable layers are present in the subsoil the soils are placed in WC IV and sub-grade 3B. Wet soils are also present along parts of the southern and eastern fringes where subsoil clay horizons create obvious slowly permeable layers and shallow gleying (WC IV and sub-grade 3B).

Table 6: Distribution of ALC Grades: Site 13

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3A	1.1	1.5	2.1
3B	69.26	97.2	97.9
Urban	0.13	0.2	
Agric Bldgs	0.82	1.1	
	71.31 ha	100%	100% (70.36 ha)

Table 8: Climatic Interpolation, Site 13*

Accumulated Temperature (°days):	1503
Average Annual Rainfall (mm):	809
Field Capacity (days):	180
Moisture Deficit, Wheat:	107
Moisture Deficit, Potatoes:	100

* for Grid Reference SU 120295 at 47m

4.6 Site 14: Bemerton Farm

This site occupies a similar topographic position to Site 13, along the northern floodplain of the River Nadder and its associated Valley Gravel. The climatic interpolation for Site 13 applies. The soils in the site are uniform and have all been placed in sub-grade 3B as a result of shallow flinty layers which act as impenetrable to both cultivation implements and roots. One soil pit description details the limitation.

Table 9: Distribution of ALC Grades: Site 14

Grade	Area	% of Survey Area
3B	10.47	89.7
Non-Agric	0.95	8.1
Agric Bldgs	0.25	2.2
	11.67 ha	100%

4.7 Site 15: Bishopsdown Farm, Laverstock

This large site on the north of the city occupies the higher slopes of the River Bourne watershed where the soils are developed over Chalk, and the Valley Gravel lands adjacent to the River. A small dry valley cuts through the south-western section of the site creating a gently undulating topography. Two climatic interpolations and two soil pits describe the typical situation.

Virtually the whole of the site has been mapped as sub-grade 3B. The soils developed over the Chalk suffer from a droughtiness limitation related to the observed depth of penetration by roots into the Chalk (usually less than 65cm). The Valley Gravel areas have similar restrictions on their rooting depth together with significant toposil stone contents.

A small area of sub-grade 3A has been identified in a slight depression in the north of the site where the depth of soil over Chalk is greater than elsewhere on the site and available water in the profile permits a higher grade.

Table 10: Distribution of ALC Grades, Site 15

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3A	1.48	2.0	2.2
3B	66.82	92.0	97.8
Non Agric	2.36	3.2	
Urban	1.98	2.8	
	72.64	100%	100% (68.3ha)

Table 11: Climatic Interpolations, Site 15

	Location 1	Location 2
Grid Reference:	SU 155323	SU 160322
Altitude (m)	70	50
Accumulated Temperature (°days):	1474	1491
Average Annual Rainfall (mm):	763	753
Field Capacity (Days):	170	168
Moisture Deficit, Wheat (mm):	107	109
Moisture Deficit, Potatoes (mm):	99	102

4.8 Site 16: Milford Farm

The varied geology of this site on the eastern fringe of Salisbury has given rise to differences in soil types which are reflected in the distribution of ALC grades. A band of Grade 2 quality land is developed over river alluvium along the River Bourne. Here, deep organic silt loams with evidence of shallow wetness but no slowly permeable layers fall into wetness class II and grade 2.

The majority of the site is classified as sub-grade 3A, with soils developed partly over chalk (where there is a soil depth limitation) and partly over Valley Gravel (where a similar restriction exists). Shallower phases have been mapped as 3B where there is also an increased droughtiness limitation. The south-eastern map unit of 3B includesan area downgraded on gradient.

A disturbed section near the River and the main road with stony and shallow soils has been placed in grade 4.

Table 12: Distribution of ALC Grades, Site 16

Grade	Area (ha)	% of Survey Area	% of Agric Area
2	2.95	19.9	22.8
3A	8.4	56.6	65.0
3B	1.05	7.1	8.1
4	0.53	3.6	4.1
Agric Bldgs	0.38	2.6	
Urban	1.53	10.2	
	14.83 ha	100%	100% (12.93 ha)

Table 13: Climatic Interpolation, Site 16*

Accumulated Temperature (° days):	1498
Average Annual Rainfall (mm):	765
Field Capacity (days):	171
Moisture Deficit, Wheat (mm):	109
Moisture Deficit, Potatoes (mm):	101

* Grid Reference SU 160295 at 50 m.

4.9 Site 17: Newbridge Hospital Area, Land Adjacent to Downton Road

This site lies almost adjacent to Site 8, and the second, lower altitude, climatic interpolation for site 8 applies here. A geological boundary lies between the two sites and separates the chalk-derived soils on the higher land from those developed over valley gravel in the floodplain; this difference is reflected in the ALC grades.

Tables 14: Distribution of ALC Grades, Site 17

Grade	Area (ha)	% of Survey/Agricultural Area
2	5.4	65.1
3B	2.9	34.9
	8.3 ha	100%

The northern end of the site has been classified as Grade 2, the southern section, sub-grade 3B. In the north clay loam soils with lower subsoils of clay (which show no evidence of wetness) have developed over the gravel to a depth of approximately 60 cm; a soil pit description details this situation. Depth to the gravel is, however, variable (but always greater than 45 cm) and this area has therefore been downgraded to Grade 2 as a result of this soil depth limitation.

4.10 Site 18: Fugglestone Red

This site on the north-western fringe of Salisbury has all been classified as sub-grade 3B (15.00 hectares). Part of the site, the north-eastern edge, contains a dry valley developed in Chalk with local gradients which limit it to 3B. The rest of the site is a mix of stony soils that have developed over Valley Gravel and over Clay with Flints. A representative soil pit reveals an impenetrable flinty layer which occurs at depths throughout the site of less than 30 cm, thus creating a 3B soil depth limitation.

4.11 Site 6 (Wilton): Bulbridge

This 5.45 hectare site has been placed in sub-grade 3B with the exception of 0.2 hectares of non-agricultural land. The main limitation is soil depth, with soils typically less than 30 cm deep over soft Chalk with flints. No individual soil pit was described for this site as the soils are similar to those developed over chalk elsewhere in the Salisbury area. A separate climatatic interpolation has been claculated for this area as Wilton is situated 2-3 km west of the nearest Salisbury sites. However, there is still no overall climatic limitation.

Table 15: Climatic Interpolation, Bulbridge*

Accumulated Temperature (° days):	1465
Average Annual Rainfall (mm):	859
Field Capacity (Days)	188
Moisture Deficit, Wheat (mm):	101
Moisture Deficit, Potatoes (mm):	92

* for SU089305 at 80 m

4.12 Site 8 (Wilton), Ditchampton

The whole of this site (1.7 ha) has been classified as sub-grade 3B. The soils are shallow, developed over Valley Gravel, with the Gravel acting as an impenetrable layer to cultivations at depths consistently

less than 30 cm. The north-western fringe of the site also suffers from a local 3B gradient limitation. The climatic interpolation for Site 6 applies here.

[RPG-23]SJ

Impenetrable: +72 cm

Although there is technically enough soil to qualify for 3A on soil depth (because the flint layer has probably just less than 70% stone and can therefore not be considered to be a layer of "rock") the presence of the flint band at 21 cm produces an horizon "which cannot be penetrated satisfactorily by cultivation implements" (p. 12 Revised Guidance). As a result, this limits the capability of the site to the range of crops typical of "moderate quality agricultural land" (p. 3 Revised Guidance).
[RPG-12]SJ

ALC Grade = 3B

[RPG-12]SJ

SALISBURY URBAN AREA LOCAL PLAN

Soil Pit Descriptions

Site 8, Salisbury Pit 1:

Topsoil: 0-20 cm
Medium Silty Clay Loam (towards HZCL)
10YR53
Calcareous
1-2% flint stones, 2 cm (Visual estimate)

Subsoil: 20-40 cm
Heavy Silty Clay Loam
10YR54
Calcareous
Approximately 50% soft chalk mixed in with soil matrix

Below 40 cm the profile consists of 70% of soft chalk and, therefore, the soil horizons are taken to stop at 40 cm. There is thus a soil depth limitation.

The soft chalk can be augered to approximately 80 cm before becoming impenetrable. It has been assumed that roots may penetrate to 80 cm but no further, and the AP calculations are terminated at 80 cm. Average subsoil structural conditions are assumed.

AP Wheat	= 95 mm;	MD Wheat	= 102 mm;	MB Wheat	= -7 mm
AP Potatoes	= 94 mm;	MD Potatoes	= 94 mm;	MB Potatoes	= 0 mm

Grade according to Droughtiness = 3A
Grade according to Soil Depth = 3A

Site 17, Salisbury Pit 1:

Topsoil: 0-19 cm
Medium Clay Loam (with high Sand content)
10YR33
2% flint stones, 2 cm (Visual estimate)
No evidence of mottling

Subsoil 1: 19-37 cm
Medium Clay Loam (with high Sand content)
10YR44
5-10% flint stones, 2 cm (Visual estimate)
No evidence of mottling

Subsoil 2: 37-65 cm
Clay
10YR46; (not pale; no evidence of mottling)
Medium to Coarse Subangular Blocky; Poor to Moderately Developed; firm

Porosity: 0.5% 0.5 mm
Cacareous
10YR64 from 60 cm

Too difficult to auger below 65 cm (soil developed over gravel with hard stones). Although soil depth is not a limiting factor at this site, depth does vary throughout the map unit from 40-80 cm. As a result, there is assumed to be a depth limitation which restricts these soils to Grade 2.

The subsoil exhibits good structural conditions and the soil therefore has an adequate moisture balance to qualify for Grade 2.

Site 18, Salisbury Pit 1:

Topsoil: 0-22,5 cm
Medium to Heavy Silty Clay Loam
Non-Calcareous
10YR42
7% stone greater than 2 cm (stoniness assessment); flint
Approx 10-15% 2 mm - 2 cm
No evidence of wetness

Valley Gravel from 25 cm. Impenetrable at 35 cm. Between 25-35 cm there is approaching 70% flint stones with a clay soil matrix which acts as an impenetrable layer and causes a 3B soil depth limitation. Few roots evident in this zone; none below.

ALC = 3B

Site 14, Salisbury Pit 1:

Topsoil: 0-21 cm
Medium Silty Clay Loam
10YR52
Approx 2-3% flint stone 2 cm, and 10% 2 mm - 2 cm (Visual)
Slight feint mottling

Flint Layer: 21-35cm
Not penetrable by auger; just penetrable by pick-axe
Roots fail to penetrate this flinty layer
At least 50% flint stone 2 cm

Subsoil: 35-72 cm
Clay
10YR54
Common 10YR64 mottling
Approx 5% flint stone
Porosity borderline (0.5% 0.5 mm)
Difficult to assess the structure through the flint layer but not apparently SPL

Impenetrable: +72 cm

Although there is technically enough soil to qualify for 3A on soil depth (because the flint layer has probably just less than 70% stone and can therefore not be considered to be a layer of "rock") the presence of the flint band at 21 cm produces an horizon "which cannot be penetrated satisfactorily by cultivation implements" (p. 12 Revised Guidance). As a result, this limits the capability of the site to the range of crops typical of "moderate quality agricultural land" (p. 3 Revised Guidance).

ALC Grade = 3B

Site 13, Salisbury Pit 1:

Topsoil: 0-18 cm
Medium Clay Loam
10YR62
3% flint stone 2 cm; stoniness assessment;
approx 10% stone 2 mm - 2 cm (visual)
Calcareous
No evidence of wetness

Subsoil 1: 18-24/28 cm
Heavy Silty Clay Loam
10YR62
This horizon is a compacted iron-stained mix of 50/50% soil and stone material (flint and calcareous material); visual estimate

Subsoil 2: 28-45 cm
The compacted subsoil layer continues but with a much reduced stone content (15% 2 mm; only 5% 2 cm), and root penetration stops at approximately 45 cm

Droughtiness is the main limitation; the AP calculation is stopped at 45 cm because the underlying layers appear to be too compacted for roots to penetrate.

AP Wheat = 65 mm MD Wheat = 107 mm MB Wheat = -42 mm
AP Pots = 65 mm MD Pots = 100 mm MB Pots =-35 mm
Grade according to Draughtiness = 3B

Site 13, Salisbury Pit 2:

This pit description takes the form of an inspection of the soil profile revealed by a recently dug trench.

Topsoil: 0-16 cm
Sandy Silt Loam (slightly organic)
10YR41
Approx 15% flint stone and calcareous material (2 mm - 2 cm); visual estimate; few stones actually 2 cm in this horizon
Rusty root mottling

Stone content greatly increases immediately below the topsoil with the result that overall stone content in the top 25 cm is approx 30%; visual estimate. The high flint stone content immediately below the topsoil may almost produce a soil depth limitation. The 'topsoil' stone content is variable along the trench, but is within the 3B range (15-30%, 2 cm).

These stone contents continue and increase in the subsoil to 65 cm, the depth of the trench. Subsoil texture is difficult to assess because of high stone content but is at least HCL.

At the time of inspection, the water table in the trench was at 60 cm (there appears to be backing up from the nearby river).

Elsewhere along the trench there is clear evidence of a heavy silty clay layer at 40 cm, which is mottled and acts as a slowly permeable layer (WC IV).

ALC Grade: 3B on stone content (and soil wetness in places).

Site 15, Salisbury Pit 1:

Topsoil:	0-20 cm Heavy Silty Clay Loam 10YR43 Approx 10% stone 2 cm; 5% stone 2 mm - 2 cm; visual estimate; flint No evidence of soil wetness.
Subsoil:	20-32 cm Heavy Silty Clay Loam 10YR44 Calcareous Approx 40% stone 2 mm; visual estimate; mixture of flint and chalk.
Chalk:	32-56 cm Soft weathered chalk Cream coloured; 10YR74 Approx 5% flint stone 2 cm; visual estimate Few roots evident in this layer
Chalk:	+56 cm From this depth there is no evidence of roots penetrating into what is a much more compact layer of chalk.

Droughtiness is the main limitation; the AP calculation is stopped at 56 cm because of the presence of an impenetrable layer to roots. This layer cannot be penetrated by augering.

AP Wheat = 68 mm MD Wheat = 107 mm MB Wheat = -39 mm
AP Pots = 70 mm MD Pots = 99 mm MB Pots = -29 mm
Grade according to Droughtiness = 3B.

Site 15, Salisbury Pit 2:

Topsoil:	0-19 cm Medium Silty Clay Loam 10YR43 10% stone 2 cm; stoniness assessment; 5% stone 2 mm - 2 cm (visual); flint No evidence of wetness
Subsoil 1:	19-36 cm Heavy Silty Clay Loam 10YR54 Approx 40% stone 2 mm; visual estimate; flint
Subsoil 2:	36-66 cm Heavy Silty Clay Loam 10YR54 Very Calcareous layer Approx 50% stone 2 mm; visual estimate; mixture of chalk and flint Few roots evident
+66cm:	Chalky flint matrix (with some soil) continues below 66 cm but is much more compact and has no evidence of root penetration at this depth.

Droughtiness is the main limitation; the AP calculation is stopped at 66 cm due to the presence of a layer that is impenetrable to roots. This layer cannot even be penetrated by augering.

AP Wheat = 76 mm MD Wheat = 107 mm MB Wheat = -31 mm
AP Pots = 83 mm MD Pots = 99 mm MB Pots = -16 mm
Grade according to Droughtiness = 3B

B[RPG.12,CC]

SALISBURY URBAN AREA LOCAL PLAN

Soil Pit Descriptions

Pit 1: Site 8, Salisbury

Topsoil: 0-20 cm
Medium Silty Clay Loam (towards HZCL)
10YR53
Calcareous
1-2% flint stones, >2 cm (Visual estimate)

Subsoil: 20-40 cm
Heavy Silty Clay Loam
10YR54
Calcareous
Approximately 50% soft chalk mixed in with soil matrix

Below 40 cm the profile consists of >70% of soft chalk and, therefore, the soil horizons are taken to stop at 40 cm. There is thus a soil depth limitation.

The soft chalk can be augered to approximately 80 cm before becoming impenetrable. It has been assumed that roots may penetrate to 80 cm but no further, and the AP calculations are terminated at 80 cm. Average subsoil structural conditions are assumed.

AP Wheat = 95 mm; MB Wheat -7 mm
AP Potatoes = 94 mm; MB Potatoes = 0 mm
Grade according to Droughtiness = 3A
Grade according to Soil Depth = 3A

Pit 2: Site 17, Salisbury

Topsoil: 0-19 cm
Medium Clay Loam (with high Sand content)
10YR33
2% flint stones, >2 cm (Visual estimate)
No evidence of mottling

Subsoil 1: 19-37 cm
Medium Clay Loam (with high Sand content)
10YR44
5-10% flint stones, >2 cm (Visual estimate)
No evidence of mottling

Subsoil 2: 37-65 cm
Clay
10YR46; (not pale; no evidence of mottling)
Medium to Coarse Subangular Blocky; Poor to Moderately Developed; firm

Porosity: >0.5% 0.5 mm
Cacareous
10YR64 from 60 cm

Too difficult to auger below 65 cm (soil developed over gravel with hard stones). Although soil depth is not a limiting factor at this site, depth does vary throughout the map unit from 40-80 cm. As a result, there is assumed to be a depth limitation which restricts these soils to Grade 2.

The subsoil exhibits good structural conditions and the soil therefore has an adequate moisture balance to qualify for Grade 2.

Pit 3: Site 18, Salisbury

Topsoil:
0-22/5 cm
Medium to Heavy Silty Clay Loam
Non-Calcareous
10YR42
7% stone greater than 2 cm (stoniness assessment); flint
Approx 10-15% 2 mm - 2 cm
No evidence of wetness

Valley Gravel from 25 cm. Impenetrable at 35 cm. Between 25-35 cm there is approaching 70% flint stones with a clay soil metrix which acts as an impenetrable layer and causes a 3B soil depth limitation. Few roots evident in this zone; none below.

ALC = 3B

Pit 4: Site 14, Salisbury

Topsoil:
0-21 cm
Medium Silty Clay Loam
10YR52
Approx 2-3% flint stone >2 cm, and 10% 2 mm - 2 cm (Visual)
Slight feint mottling

Flint Layer:
21-35cm
Not penetrable by auger; just penetrable by pick-axe
Roots fail to penetrate this flinty layer
At least 50% flint stone >2 cm

Subsoil:
35-72 cm
Clay
10YR54
Common 10YR64 mottling
Approx 5% flint stone
Porosity borderline (0.5% >0.5 mm)
Difficult to assess the structure through the flint layer but not apparently SPL