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Bridgwater Local Plan

AGRICULTURAL LAND CLASSIFICATION

Prepared for MAFF by
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MAFF

BRIDGWATER LOCAL PLAN

AGRICULTURAL LAND CLASSIFICATION

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BRIDGWATER LOCAL PLAN

AGRICULTURAL LAND CLASSIFICATION SURVEY

SUMMARY

Land at 2 sites in Sedgemoor District amounting to 164.2 ha was surveyed in September 1994 using the MAFF Agricultural Land Classification (ALC) system. Apart from the provisional one inch ALC map (MAFF 1971), no previous survey information exists, although a site at Rhode Lane Farm, which is adjacent to the Hamp Brook site, had been surveyed in May 1994. The surveys were carried out on behalf of MAFF as part of its statutory role in the preparation of the Bridgwater Local Plan.

Fieldwork was carried out by ADAS Resource Planning Team, Taunton Statutory Unit, at a scale of 1:10,000. The information is correct at this scale but any enlargement would be misleading.

The distribution of ALC grades identified in the survey areas is detailed below and illustrated on the accompanying maps.

Distribution of ALC grades: Sydenham Site

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (102.7 ha)
2	14.9	10.2	14.5
3a	47.4	32.5	46.1
3b	40.8	28.0	39.7
Urban	18.2	12.5	
Non Agricultural	5.7	0.4	
Agricultural Buildings	4.8	3.3	
Open Water	14.3	9.8	
TOTAL	145.7		

61% of the agricultural land was found to be best and most versatile with minor and moderate limitations of wetness and workability causing downgrading to Grades 2 and 3a. More serious moderate limitations mainly due to wetness caused downgrading of the remainder of the land to Subgrade 3b.

Distribution of ALC grades: Hamp Brook Site

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (18.3 ha)
2	3.8	20.5	20.8
3a	10.4	56.2	56.8
3b	4.1	22.2	22.4
Urban	0.2	1.1	
TOTAL	18.5		

77% of the agricultural land at this site was found to be best and most versatile, with minor and moderate limitations due to droughtiness and wetness causing downgrading to Grades 2 and 3a. A more serious moderate limitation of wetness caused the downgrading of the remaining land to Subgrade 3b.

1. INTRODUCTION

Land at 2 sites in Sedgemoor District amounting to 164.2 ha was surveyed in September 1994 using the MAFF Agricultural Land Classification (ALC) system. Apart from the provisional one inch ALC map (MAFF 1971), no previous survey information exists, although a site at Rhode Lane Farm, which is adjacent to the Hamp Brook site, had been surveyed in May 1994. The surveys were carried out on behalf of MAFF as part of its statutory role in the preparation of the Bridgwater Local Plan.

This report refers to surveys of land at Sydenham, east of Bridgwater town, and a block of land adjacent to the Hamp Brook site, south west of the town. The fieldwork was carried out by ADAS Resource Planning Team, Taunton Statutory Unit, at a scale of 1:10,000, with one auger sample point approximately every hectare and a soil profile examination pit approximately every 20 ha, a total of 166 auger sample points and 7 soil pits. Details of the findings of the surveys and the distribution of grades are detailed below for each site. The information is correct at the published scale but any enlargement would be misleading.

The published provisional one inch to the mile ALC map (MAFF 1971) shows the grades of the sites at a reconnaissance scale. However, this is considered inadequate for Local Plan purposes and the recent survey was undertaken to provide a more detailed representation of the agricultural land quality. The recent survey also uses the Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (MAFF 1988).

The Agricultural Land Classification system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use, taking account of the top 120 cm of the soil profile. A description of the grades used in the ALC system can be found in Appendix 2.

2. CLIMATE

The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to a lower grade despite other favourable conditions.

Estimates of climatic variables were obtained for each site by interpolation from the 5-km grid agricultural climate dataset (Meteorological Office 1989) and are shown in the details for each site.

The parameters used for assessing overall climatic limitation are accumulated temperature, a measure of the relative warmth of a locality, and average annual rainfall, a measure of overall wetness. Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections. A description of the Soil Wetness Classes used can be found in Appendix 3.

3. SYDENHAM SITE

3.1 145.7 ha of land to the east of Bridgwater were surveyed in September 1994 by examining a total of 147 auger borings and 5 soil profile pits.

3.2 Climate

Climatic data for the site was interpolated as described in Section 2. The results are shown below and indicate that there is no overall climatic limitation. No local climatic limitations were noted.

Grid Reference		ST 316360	ST 322314	ST 312388
Altitude (m)		6	6	6
Accumulated Temperature (day °)		1565	1564	1564
Average Annual Rainfall (mm)		743	735	734
Overall Climatic Grade		1	1	1
Field Capacity Days		161	159	159
Moisture deficit (mm):	Wheat	113	114	113
	Potatoes	107	108	108

3.3 Relief and Landcover

Altitude varies little around 6 m AOD, and slopes are virtually level over the whole site.

At the time of survey, landcover was mainly grass with a small area of arable cropping at the south end of the site.

3.4 Geology and Soils

The published 1:50,000 scale solid and drift geology map, sheet 295 (Geological Survey of England and Wales, 1984), indicates that the site is underlain by estuarine alluvium.

Soils mapped by the Soil Survey of England and Wales (1983) indicate soils mainly of the Newchurch Association, with Blacktoft Association at the two ends of the site. This distribution was borne out by the recent survey with ALC Grade 2 being found on the lighter silty Blacktoft soils.

Newchurch soils are described as deep stoneless, mainly calcareous clayey soils with groundwater controlled by ditches and pumps. Flat land with a risk of flooding in places. Apparently this risk of flooding is much reduced since the construction of the motorway which improved the arterial drainage.

Blacktoft soils are described as deep stoneless permeable calcareous fine and coarse silty soils with some calcareous clayey soils, also on flat land with groundwater controlled by ditches and pumps.

3.5 Agricultural Land Classification

The distribution of ALC grades identified in the survey is shown on the accompanying ALC map and summarised in the table below. The information is correct at the scale shown but any enlargement would be misleading.

Distribution of ALC grades: Sydenham Site

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (102.7 ha)
2	14.9	10.2	14.5
3a	47.4	32.5	46.1
3b	40.8	28.0	39.7
Urban	18.2	12.5	
Non Agricultural	5.7	0.4	
Agricultural Buildings	4.8	3.3	
Open Water	14.3	9.8	
TOTAL	145.7		

Grade 2

The areas mapped as Grade 2 show minor limitations due to workability. Heavy or medium silty clay loam topsoil is found over clay or silty clay loam upper subsoil, becoming increasingly silty with depth. Although heavily mottled in the lower subsoil, a slowly permeable layer (SPL) is generally not found, indicating Wetness Class I with a slight limitation of workability due to heavy topsoil textures.

Grade 3a

Much of the area was found to be Wetness Class II, with a slowly permeable layer in the clay subsoil starting between 55 and 80 cm deep. In combination with the relevant climatic data, this implies a moderate limitation due to wetness and restricted workability. Because the grading at this site depends on the level at which the slowly permeable layer is found at each boring, the mapping unit shown includes several isolated borings of ALC Grade 2 and a few which are ALC Subgrade 3b.

There is a small area of disturbed land at the south of the site which is shown as Subgrade 3a, where it appears that the ground level has been raised by tipping when the motorway was built. Profiles examined were found to be limited mainly by workability.

Subgrade 3b

Land graded 3b was generally found to be Wetness Class III, with a slowly permeable layer starting above 55 cm. With a heavy clay loam or clay topsoil, this implies a more serious workability limitation.

Other Land

The site includes two large areas of disused clay pits, with open water and reed beds, with bunds and banks used as access for fishermen.

There are several areas of agricultural buildings, including one substantial area of heated glass used for intensive lettuce production.

Areas shown as urban include industrial land, residential land, several roads and a dismantled railway.

4. HAMP BROOK SITE

4.1 18.5 ha of land on the north side of Rhode Lane to the south-west of Bridgwater were surveyed in September 1994 by examining a total of 19 auger borings and 2 soil profile pits. An area of approximately 36.5 ha on the south side of Rhode Lane had previously been surveyed in May 1994.

4.2 Climate

Climatic data for the site was interpolated as described in Section 2. The results are shown below and indicate that there is no overall climatic limitation. No local climatic limitations were noted.

Grid Reference		ST 286354
Altitude (m)		10
Accumulated Temperature (day °)		1561
Average Annual Rainfall (mm)		764
Overall Climatic Grade		1
Field Capacity Days		165
Moisture deficit (mm):	Wheat	110
	Potatoes	104

4.3 Relief and Landcover

Altitude ranges from a little below 10 m to a maximum of 18 m AOD, with gentle slopes all below 7° and becoming virtually level below the Hamp Brook. At the time of survey, landcover was all grass.

4.4 Geology and Soils

The published 1:50,000 scale Solid and Drift Geology Map, Sheet 295 (Geological Survey of England and Wales, 1984), indicates that the site is underlain by Keuper Marl with alluvium below the Hamp Brook.

Soils mapped by the Soil Survey of England and Wales (1983) indicate soils of the Whimple 3 Association on the upper part of the site, with Compton Association on the lower slopes and below the Hamp Brook.

Whimple 3 is described as reddish fine loamy or fine silty over clayey soils with slowly permeable subsoils and slight seasonal waterlogging, with similar clayey soils on the brows of hills. Slowly permeable seasonally waterlogged fine loamy and fine silty over clayey soils occur on the lower slopes.

Compton Association soils are described as stoneless, mostly reddish clayey soils affected by groundwater occurring on flat land with the risk of floods. The current survey indicates that soils of the Compton Association are confined mainly to the area below the Hamp Brook.

4.5 Agricultural Land Classification

The distribution of ALC grades identified in the survey is shown on the accompanying ALC map and summarised in the table below. The information is correct at the scale shown but any enlargement would be misleading.

Distribution of ALC grades: Hamp Brook Site

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (18.3 ha)
2	3.8	20.5	20.8
3a	10.4	56.2	56.8
3b	4.1	22.2	22.4
Urban	0.2	1.1	
TOTAL	18.5		

Grade 2

The areas mapped as Grade 2 were found to have a slight droughtiness limitation with stone contents assessed by sieving in the soil profile pit at up to 15% in the upper subsoil. Other profiles in this mapping unit were found to have a slight wetness limitation, with a slowly permeable horizon in the red clay parent material occurring between 55 and 80 cm, Wetness Class II.

Subgrade 3a

At the top of the slope, an area of gravel in the topsoil and upper subsoil was identified with a stone content of up to 42% assessed by sieving. This gives rise to a moderate droughtiness limitation. Other profiles in this mapping unit were found to have a moderate wetness limitation, with a slowly permeable layer beginning just above 55 cm, giving Wetness Class III. Topsoil textures were generally found to be medium clay loam.

Subgrade 3b

Low-lying land below the Hamp Brook was graded 3b, with heavy clay loam topsoil and Wetness Class IV indicated by a slowly permeable layer in the upper subsoil.

Other Land

The small area of urban land is a house and garden.

Resource Planning Team
Taunton Statutory Unit
4 October 1994

APPENDIX 1

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1984, Solid and Drift edition, Sheet 295, Taunton, 1:50,000 scale.

MAFF (1971) Agricultural Land Classification Map, Sheet 165, Provisional 1:63,360 scale.

MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of agricultural land), Alnwick.

MAFF (1994) Agricultural Land Classification Report of Survey at Rhode Lane, Birdgwater. ADAS Resource Planning Team, Taunton Statutory Unit.

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5, Soils of South West England, 1:250,000 scale.

APPENDIX 2

DESCRIPTION OF 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 include 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 most 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 park land, 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.

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 landcover types, eg buildings in large grounds, *and where may be shown separately. Otherwise, the most extensive cover type will usually be shown.*

Source: MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and *Criteria for Grading the Quality of Agricultural Land*), Alnwick.

APPENDIX 3

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years.

Wetness Class 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.

Wetness Class 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.

Wetness Class 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.

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (in preparation), Soil Survey Field Handbook (revised edition).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hamp Brook, Bridgwater	Pit 1	0°	PGR	Av Rainfall: 764 mm ATO: 1561 day °C FC Days: 165 Climatic Grade: 1 Exposure Grade: 1	Keuper Marl
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
92/94	2/9/94	(ASP 10)	HLJ/PB		PB 161

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	18	MCL	75Y42	1% HR >2cm 18% HR <2cm 19% HR Total (S+D)	0	0	-	-	-	G	MVF		Clear smooth
2	60	C	75YR54	2% HR >2cm 40% HR <2cm 42% HR Total (S+D)	)	0	Too stony	-	M	G	CVF		Smooth* diffuse
3	120+	C	2.5YR46 (5YR54)	0 (Vis)	0	C	-	Fm	-	-	0		

Profile Gleyed From: N/A

Depth to Slowly Permeable Horizon: 60 cm

Wetness Class: III

Wetness Grade: 3a

Available Water	Wheat:	110 mm
	Potatoes:	83 mm
Moisture Deficit	Wheat:	110 mm
	Potatoes:	104 mm
Moisture Balance	Wheat:	0 mm
	Potatoes:	-21 mm
Droughtiness Grade:		3a (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks:

Pit dug to 75 cm. Augered to 120 cm.

* Transition with few ochreous mottles and many manganese (also 14% HR <2cm - sieved).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Hamp Brook, Bridgwater	Pit 2	3° W	PGR	Av Rainfall: 764 mm ATO: 1561 day °C	Keuper Marl
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 165 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES
92/94	7/9/94	(ASP 4)	HLJ/PB		RPT/HLJ/65

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	25	MCL	10YR54	<1% HR >2cm 5% HR <cm 5% HR Total (S+D)	None	None	-	-	-	G	MF+VF	-	Abrupt smooth
2	46	HCL	7.5YR54	1% HR >2cm 13% HR <2cm 14% HR Total (S+D)	None	None	WCSAB	Fr	M	G	CVF	-	Clear smooth
3	65	C	7.5YR54	14% HR Total (Visual)	CFMOM (05YR56)	C	WCSAB	Fr	G	G	CVF	-	Gradual smooth
4	90+	C	2.5YR46 (2.5YR44)	0% (Visual)	None	C (top 20cm of horizon)	WCAB	Fm	P	P	FVF	-	-

Profile Gleyed From: N/A

Depth to Slowly Permeable Horizon: 65

Wetness Class: II

Wetness Grade: 2

Available Water Wheat: 137 mm

Potatoes: 113 mm

Moisture Deficit Wheat: 110 mm

Potatoes: 104 mm

Moisture Balance Wheat: +27 mm

Potatoes: +9 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Wetness and droughtiness

Remarks:

SOIL PLASTICITY RECORDING SHEET

ANNEX 2

SITE DATA

Job No.	92.94		Site Name	Hamp Brook			LPA	Sedgemoor	
AAR	764 mm	ATO	1561°		FCD	165	MD (wheat)	110	MD (potatoes)	104

SOIL PIT DATA

	PIT ONE ST 288355 SOIL SERIES Whimple 3			PIT TWO ST 287356 SOIL SERIES Whimple 3			PIT THREE SOIL SERIES		
DEPTH	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS
10 cm	MCL	N	No ball, no worm	MCL	N	No ball, no worm			
20 cm	MCL	N	"	MCL	N	"			
30 cm	C	N	"	HCL	N	"			
40 cm	C	N	"	HCL	N	"			
50 cm	C	N	"	C	N	"			
60 cm	C	N	"	C	N	"			