

BRIDGWATER LOCAL PLAN: WEMBDON
AGRICULTURAL LAND CLASSIFICATION

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BRIDGWATER LOCAL PLAN - WEMBDON

AGRICULTURAL LAND CLASSIFICATION SURVEY

SUMMARY

A semi-detailed survey was carried out by ADAS on behalf of MAFF as part of its statutory role in the preparation of the Bridgwater Local Plan. The fieldwork covered sites at Wembdon and Durleigh and was completed in October 1994 at a scale of 1:10,000. Data on climate, soils, geology and from previous Agricultural Land Classification (ALC) Surveys was used and is presented in the report. The distribution of grades is shown on the accompanying ALC map and summarised below. Information is correct at this scale but could be misleading if enlarged.

Distribution of ALC grades: Wembdon sites

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (154.1 ha)
1	4.7	2.5	3.0
2	80.5	43.3	52.2
3a	57.5	30.9	37.3
3b	11.4	6.1	7.4
Urban	10.8	5.8	
Non Agricultural	9.4	5.1	
Agricultural Buildings	1.2	0.6	
Open Water	0.5	0.2	
Not surveyed	9.7	5.2	
TOTAL	185.7		

93% of the agricultural land at these sites was found to be best and most versatile, with minor limitations due to droughtiness, wetness and workability causing downgrading to Grades 2 and 3a. More serious moderate limitations of wetness and slope caused the downgrading of the remaining land to Subgrade 3b.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out at semi-detailed level in October 1994 at Wembdon and Durleigh on behalf of MAFF as part of its statutory role in the preparation of the Bridgwater Local Plan. The fieldwork covering 185.7 ha of land was conducted by ADAS at a scale of 1:10,000 with approximately one boring per 2 hectares of agricultural land. A total of 95 auger borings were examined and 4 soil profile pits used to assess subsoil conditions.

The published provisional one inch to the mile ALC map of this area (MAFF 1971) shows the grades of the sites at a reconnaissance scale as mainly Grade 3 with a band of Grade 2 around Wembdon Farm in the north of the survey area.

The recent survey supersedes this map, having been carried out at a more detailed level and using the 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 agricultural use. The grading takes 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 interpolated from the published agricultural climate dataset (Meteorological Office 1989). The parameters used for assessing overall climate are accumulated temperature, a measure of the relative warmth of a locality, and average annual rainfall, a measure of overall wetness. The results shown in Table 1 indicate there is no overall climatic limitation.

Table 1: Climatic Interpolations: Wembdon sites

Grid Reference	ST274373	ST289381
Altitude (m)	35	10
Accumulated Temperature (day °)	1532	1560
Average Annual Rainfall (mm)	791	751
Overall Climatic Grade	1	1
Field Capacity Days	170	163
Moisture deficit (mm):		
Wheat	105	111
Potatoes	98	105

Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat and potatoes are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections.

3. RELIEF AND LANDCOVER

Altitude ranges from 10 to 35 m AOD, with mainly gentle slopes which are not limiting. A small area in the centre of the site has moderate slopes which imply a gradient limitation.

At the time of survey the landcover was mainly winter cereals and grass with some cereals to be spring sown, having been in maize the previous season.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:50,000 scale solid and drift geology map, sheet 295, British Geological Survey 1978.

This shows a narrow band of upper sandstone in the north of the sites, with most of the area underlain by Keuper marl and small areas of estuarine alluvium on low-lying land in the north and south of the area. The survey found that although some of the Keuper marl, particularly at the tops of hills, was relatively stone-free, much of the site was affected by superficial deposits of valley gravel, although to varying degree. This gave rise to a variable slight to moderate stone content in the topsoil and upper subsoil.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000, indicating the presence of Whimble 1 and Whimble 3 Associations on the Keuper marl, with Hodnet on the sandstone and Compton Association on the low-lying alluvium.

Whimble 1 soils are described as reddish fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Associated with similar well-drained soils, some over gravel.

Whimble 3 soils are described as reddish fine loamy or fine silty over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some similar clayey soils on brows. Slowly permeable seasonally waterlogged fine loamy and fine silty over clayey soils on lower-slopes.

Hodnet Association soils are described as reddish fine and coarse loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some similar well-drained reddish fine loamy soils stop the slight risk of water erosion.

Compton Association soils are described as stoneless, mostly reddish clayey soils affected by groundwater. Flat land. Risk of flooding.

This distribution was generally borne out by the recent survey, although typical Compton Association soils were not found.

5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades is shown in Table 2 and on the accompanying ALC map. This information could be misleading if shown at a larger scale.

Table 2: Distribution of ALC grades: Wembdon sites

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (154.1 ha)
1	4.7	2.5	3.0
2	80.5	43.3	52.2
3a	57.5	30.9	37.3
3b	11.4	6.1	7.4
Urban	10.8	5.8	
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Agricultural Buildings	1.2	0.6	
Open Water	0.5	0.2	
Not surveyed	9.7	5.2	
TOTAL	185.7		

Grade 1

A small area of Grade 1 is shown in the north of the survey area but is limited to the deeper fine sandy loams found on a north facing bank.

Grade 2

The extensive area shown as Grade 2 includes several distinct soil types.

In the north of the survey area, developed on sandstone deposits, deep fine and medium sandy loam soils are found, sometimes with lighter loamy sand appearing in the lower subsoil. These soils are limited to a minor extent by droughtiness.

On higher ground and in particular around the centre of the site, relatively stone-free heavy red soils are found, typically heavy clay loam topsoil over clay subsoil. These soils show little or no evidence of wetness and in view of their structural characteristics and porosity as assessed at a soil profile pit where no slowly permeable layer was found, are considered to be Wetness Class I, indicating Grade 2, with a minor limitation due to workability.

In the south of the survey area and at other points around the survey area, red clay loam soils affected by stony river gravel are found over red clay. At the soil pit where a typical profile was examined, stone contents of 3% in the topsoil and 32% in the subsoil were assessed by sieving. However, the clay loam texture of the matrix indicates a relatively high available water content and the profile is assessed as Grade 2 with a minor limitation due to droughtiness.

Subgrade 3a

The areas shown as Subgrade 3a were mainly found to be Wetness Class II with heavy clay loam topsoil or Wetness Class III with a medium clay loam topsoil, with a slowly permeable layer appearing in the middle to lower subsoil. These soils are limited mainly by wetness.

However, a small area of Subgrade 3a was found towards the top of the hill on the sandstone deposit with a loamy sand or sand subsoil, giving a moderate droughtiness limitation.

Subgrade 3b

Two areas of Subgrade 3b have been identified, one on low-lying land at the north of the survey area where auger borings revealed peat deposits with groundwater giving rise to Wetness Class IV or even V so that this mapping unit includes borings assessed as Grade 4 with a severe wetness limitation. The other was a small area in the centre of the site where slopes of around 8 or 9° were found.

Other Land

Several small areas were not surveyed as the owner or occupier would not grant access for survey.

Urban areas include houses, gardens, tennis courts, roads and a contractor's yard nearly Durleigh Reservoir.

Areas marked as non-agricultural include allotment gardens, a small area of woodland, and a large urban open space at Northfield which is also used for the Bridgwater Fair.

Resource Planning Team
Taunton Statutory Unit
November 1994

APPENDIX 1

REFERENCES

BRITISH GEOLOGICAL SURVEY (1978) Solid and Drift Edition, Sheet 295, Taunton, 1:50,000.

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, Bridgwater. ADAS Resource Planning Team, Taunton Statutory Unit.

MAFF (1994) Agricultural Land Classification Report of Survey of Sites at Bridgwater for the Bridgwater Local Plan. 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)*, AInwick.

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 Bridgwater/Wembdon		PROFILE NO. Pit 1 (ASP 17)	SLOPE AND ASPECT 5° N	LAND USE Ley	Av Rainfall: 763 mm ATO: 1561 day °C FC Days: 165 Climatic Grade: 1 Exposure Grade: -	PARENT MATERIAL Upper sandstone
JOB NO. 93.94		DATE 27.10.94	GRID REFERENCE ST 283380	DESCRIBED BY P Barnett/N A Done		SOIL SAMPLE REFERENCES PB 177

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	30	FSL	5YR43	0	0	0	-	-	-	G	MF, VF	-	Gradual smooth
2	110	FSL	5YR44	0	0	0	MCSAB	Fr	M	G	CVF	-	Gradual smooth
3	120	LMS	5YR46	0	0	0	-	-	-	G	CVF	-	

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No spl

Wetness Class: I

Wetness Grade: I

Available Water Wheat: 173 mm
Potatoes: 126 mm

Moisture Deficit Wheat: 110 mm
Potatoes: 104 mm

Moisture Balance Wheat: +96 mm
Potatoes: +62 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 1

Main Limiting Factor(s):

Remarks:

Pit dug to 110 cm.

SITE NAME Wembdon		PROFILE NO. Pit 2	SLOPE AND ASPECT 1° N	LAND USE Cereals	Av Rainfall: 763 mm ATO: 1561 day °C	PARENT MATERIAL Keuper marl
JOB NO. 93.94		DATE 27.10.94	GRID REFERENCE ST 277373	DESCRIBED BY P Barnett/N A Done	FC Days: 165 Climatic Grade: 1 Exposure Grade: -	SOIL SAMPLE REFERENCES PB 176

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	28	HZCL	5YR44	0	0	0	-	-	-	G	CF, VF	-	Ab smooth
2	45	C	5YR54	0	0	F	MCSAB	Fr	M	G	FVF	-	Gradual smooth
3	80	C	25YR46	0	0	0	MCSAB	Fr	M	G/P	FVF	-	Gradual smooth
4	120	C	25YR44	0	0	0	MFAB	Fr	M	P	FVF	-	

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No spl

Wetness Class: 1

Wetness Grade: 2

Available Water Wheat: 142 mm

Potatoes: 118 mm

Moisture Deficit Wheat: 110 mm

Potatoes: 104 mm

Moisture Balance Wheat: +32 mm

Potatoes: +14 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Workability

Remarks:

Borderline topsoil texture at pit, but HZCL representative of unit.

SITE NAME Wembdon, Bridgwater		PROFILE NO. Pit 3 (ASP 51)	SLOPE AND ASPECT 3° East	LAND USE Fallow	Av Rainfall: 763 mm ATO: 1561 day °C	PARENT MATERIAL Keuper marl
JOB NO. 93/94		DATE 28/10/94	GRID REFERENCE ST 273372	DESCRIBED BY H Lloyd-Jones/N A Done	FC Days: 170 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES HLJ 84

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	30	MZCL	7.5YR44	1% HR Total (Vis)	None	None	-	-	-	Good	CF	-	Gradual smooth
2	65	HCL	7.5YR54	1% HR Total (Vis)	CDFOM 7.5YR58	Common	WCSAB	Friable	Moderate	Good	CVF	-	Gradual wavy
3	85+	C	05YR34	0% (Vis)	None	Common	WCSAB tendency to MMAB	Friable	Moderate	Poor	FVF	-	-

Profile Gleyed From: 30 cm

Depth to Slowly Permeable Horizon: 65 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 144 mm

Potatoes: 117 mm

Moisture Deficit Wheat: 110 mm

Potatoes: 104 mm

Moisture Balance Wheat: +34 mm

Potatoes: +13 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:

Augered to 120 cm. H2 is heavily mottled - slightly gleyed. Borderline topsoil texture at pit but MZCL representative of unit.

SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE	Av Rainfall: 763 mm	PARENT MATERIAL
Bridgwater		Pit 4	2° S	Plough	ATO: 1561 day °C	
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 167	SOIL SAMPLE REFERENCES
		28/10/94	nr ASP 91 ST 286 362	H Lloyd-Jones/N A Done	Climatic Grade: 1	
					Exposure Grade: 1	-

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Cones	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	28	MCL	75YR44	3% HR Total	-	-	-	-	-	G	CF	-	Gradual/ smooth
2	65	MCL	05YR46	32% HR Total sieved and displaced	-	-	WD CSAB	Friable	M	G	CF+VF		Abrupt/ wavy
3	120	C	25YR46	Neg	-	C	WD adherent CSAB	Firm	M	G	CF+VF		

Profile Gleyed From: -

Depth to Slowly Permeable Horizon: -

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 128 mm

Potatoes: 98 mm

Moisture Deficit Wheat: 110 mm

Potatoes: 104 mm

Moisture Balance Wheat: +18 mm

Potatoes: -6 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Droughtiness

Remarks:

SOIL PLASTICITY RECORDING SHEET

ANNEX 2

SITE DATA

<u>Grid Ref</u>	<u>Site Name</u> Wembdon		<u>LPA</u> West Sedgemoor DC		
<u>AAR</u> 763	<u>ATO</u> 1561	<u>FCD</u> 165	<u>MD (wheat)</u> 110	<u>MD (potatoes)</u> 104	

SOIL PIT DATA

<u>PIT ONE</u> ST 283380 SOIL SERIES Hodnet				<u>PIT TWO</u> ST 277373 SOIL SERIES Whimple 3			<u>PIT THREE</u> SOIL SERIES		
DEPTH	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS	TEXTURE	PLASTIC Y/N	COMMENTS
10 cm	MSL	N	No ball	HCL	Y	Worm			
20 cm	MSL	N	"	HCL	N	Ball no worm			
30 cm	MSL	N	"	C	N	"			
40 cm	MSL	N	"	C	N	"			
50 cm	MSL	N	"	C	N	"			
60 cm	MSL	N	"	C	N	"			