

2/90

8FES 3967

## A303 ILMINSTER-MARSH ROAD IMPROVEMENT

## Agricultural Land Classification

## Report of Survey

## 1. Introduction

In December 1990 a detailed Agricultural Land Classification (ALC) was carried out along the A303 between Ham and Horton in connection with the improvement of the Ilminster-Marsh section of the A303. Two new routes for the road at this section were proposed both to the south of the existing route. The Department of Transport requested information on the impact of the proposed route. In response to this a 250 m corridor along each route was surveyed for information on land quality. A total area of 99 ha was surveyed.

The field work was conducted by the Resource Planning Group at an approximate observation density of 1 auger boring per hectare. A total of 62 borings and 4 soil pits were examined.

## 2. Agricultural Land Classification

2.1 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 ALC grades is detailed below and illustrated on the accompanying ALC map at a scale of 1:10,000. The information is accurate at this scale but any enlargement would be misleading.

Table 1: Distribution of ALC grades

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3B	39.9	40.2	42.7
4	53.5	53.9	57.3
Non Ag	2.4	2.4	
Disturbed	3.4	3.5	
	99.2	100	100 (93.4 ha)

## 2.2 Climate

Estimates of important climatic variables were obtained for the site by interpolation from a 5 km grid Met. Office/MAFF database in order to assess any overall climatic limitation. The indicative parameters for assessing such a limitation 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 2) reveal that there is a climatic limitation affecting the higher part of the site limiting it to grade 2 above 120 m. No local limiting climatic factors were observed at the site.

Table 2: Climatic Interpolation

Grid reference	ST 321146	ST 300135
Height (m)	75	145
Accumulated Temperature (°days)	1496	1416
Average Annual Rainfall (mm)	977	1084
Field Capacity (days)	198	216
Moisture deficit, Wheat (mm)	91	78
Moisture deficit, Potatoes (mm)	80	64

### 2.3 Grade 3B

The area of land graded as 3B extends from the west and along the purple variation 1 route with a small section across purple variation 2. This part of the survey area has lighter topsoil than the rest of the site and hence better workability. The profiles do show clear evidence of wetness and two soil pits confirmed the presence of slowly permeable layers (SPL) in the lower subsoil typically from about 50 cm depth. This places the profiles in Wetness Class 4. This wetness class combined with the medium clay loams or medium silty clay loam topsoils places the area into sub-grade 3B. The subsoils are clays. The SPL obstructs free drainage of water through the soil profile which causes waterlogging in the soil above. This affects crop rooting and the workability of the topsoil. The south western area of 3B also had higher stone contents than the rest of the site typically flaggy rock but this did not provide any greater limitation. There are some slopes to the west of Sixteen Acre Lane which are graded 3B.

### 2.4 Grade 4

Over half of the survey area falls into grade 4. This part of the survey area has similar profiles to the grade 3B area but the topsoils are heavier which places them in a lower workability group and so the area with Wetness Class 4 is placed into grade 4. Two soils pits dug in the area confirmed that there is an SPL from about 50 cm.

### 2.5 Disturbed Land

An area of 3.4 ha has been identified as disturbed, in connection with the recent upgrading of the A303 to the north. During disturbance soil structure can be damaged. It takes a number of years for a soil to return to a stable and more natural structural condition, during which time an appropriate cropping and soil management regime is maintained. In line with MAFF's national framework for classifying land, disturbed land is not normally graded for 5 years after disturbance. This area is, therefore, unsurveyed, but is likely to be no better than the surrounding land.

### 3.1 Agricultural Impact of Routes

The proportion of agricultural land affected by the proposed routes is shown below.

#### Purple Variation 1 route

	ha	%
Grade 3B	25.4	81.4
Grade 4	5.4	17.3
Non Agric	0.4	1.3
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	31.2 ha	100 %

#### Purple Variation 2 route

	ha	%
Grade 3B	21.5	30.5
Grade 4	43.7	62.1
Non Ag	2.0	2.8
Disturbed	3.2	4.6
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	70.4 ha	100%

Neither route affects best and most versatile land (ie Grades 1, 2 and 3a).

The Purple Variation 1 option takes up less agricultural land (31 ha versus 70 ha) however it is better quality land than the longer Variation 2 option. Both routes have agricultural land quality which has limited use because of the wetness limitation which imposes constraints on timing of cultivations and hence crops grown, and also period for livestock grazing. The land is restricted, under normal management, to grass with occasional cereals with moderate yields.

## 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: golf courses, 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.

## SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

### (i) TEXTURE:-

Soil texture classes are denoted by the following abbreviations (all Upper case\*):

S	Sand
LS	Loamy Sand
SL	Sandy Loam
SZL	Sand 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, thus:

F	fine (more than $\frac{2}{3}$ of sand less than 0.2 mm)
C	coarse (more than $\frac{1}{3}$ of sand greater than 0.6 mm)
M	medium (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ 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:

P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts

\* There are two exceptions to the Upper Case rule:-

- The prefix "Calc" is used to identify naturally calcareous soils containing more than 1% Calcium Carbonate
- For organic mineral soils, the texture of the mineral fraction is prefixed by "Org".

(ii) STRUCTURE:-

Nature and size of structural units are denoted by the following abbreviations:

SAB Subangular Blocky  
AB Angular Blocky  
P Prismatic

(single grain, granular and platy are not abbreviated)

F Fine  
M Medium  
C Coarse  
VC Very Coarse

eg Weak MSAB = Weakly developed medium subangular blocky

(iii) OTHER

f = few = less than 2% of the matrix or surface described  
c = common = 2-20% of the matrix or surface described  
m = many = 20-40% of the matrix or surface described  
vm = very many = +40% of the matrix or surface described

f = faint = indistinct mottles, evident only on close examination  
d = distinct = although not striking, the mottles are readily seen  
p = prominent = the mottles are conspicuous, and the mottling is one of the outstanding features of the horizon

gm = grey mottling  
om = ochreous mottling

eg cdom = common distinct ochreous mottles

ppf = pale ped faces  
mn = manganese

st = stones 6 cm  
sst = stones 2-6 cm  
vsst = stones 2 cm

WC = Wetness Class (use Roman numerals, eg WC IV)  
SPL = Slowly Permeable Layer  
WT = Water Table  
I = Impenetrable if used in Depth Column  
IMP = Impenetrable if used in soil profile notes  
(IMP 2 x 40 cm = 2 additional borings, both impenetrable at 40 cm)  
ASP = Auger Sample Point

SITE NAME Ilminster-Marsh A303		PROFILE NUMBER 1		SLOPE AND ASPECT 2° N		LAND USE Silage grass		Av Rainfall :- 977 ATO :- 1496 FC Days :- 198 Climatic grade :- 1		PARENT MATERIAL Shale			
		DATE 11/12/90		GRID REFERENCE ST 307137									

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-10	10YR33	MCL	None	none	-	-	-	-	Many	-	-	clear abrupt
2	10-23	10YR42	C	5% large flaggy visual in situ	cdom	Med Dev Medium prismatic	>.5%	moderate	friable	Many rusty roots	-	few	
3	23-49	10YR52 [10YR51]	C	"	vcdom 7.5YR58	Strong dev. coarse angular blocky	>.5%	moderate	friable	Common through peds			
4	49-85+	2.5Y50	C	"	cdom	M developed CAB	<.5%	poor	firm	few			
Pit dug to 85 cm													

Depth to Slowly Permeable Horizon :- 49 gleyed from 10  
 Wetness Class :- 4  
 Wetness Grade :- 4

Available Water Wheat :-  
 Potatoes :- Not limiting  
 Moisture Deficit Wheat :-  
 Potatoes :-  
 Moisture Balance Wheat :-  
 Potatoes :-  
 Droughtiness Grade :-

Final ALC Grade :- 4  
 Main Limiting Factor(s) :- Wetness  
 Remarks :-



SITE NAME		PROFILE NUMBER	SLOPE AND ASPECT		LAND USE		Av Rainfall :- 1084		PARENT MATERIAL		
Ilminster-Marsh A303		2	0°		Winter cereal		ATO :- 1416		Shale		
DATE		GRID REFERENCE		FC Days :- 216		Climatic grade :- 2					
12/12/90		ST 300136									

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-25	10YR33	MZCL	10% visual sieve	-	-	-	-	-	many	-	-	abrupt smooth
2	25-45	10YR53	SCL	25% estimate	cdom 7.5YR58 10YR61	WDCSAB	<.5% biopores	moderate	friable	few	-	-	
3	45-80	5Y73	C	10% estimate	vcdom 7.5YR58	WDCSAB	<.5% biopores	moderate	firm	few	-	-	

Pit dug to 80 cm  
Water observed from 60 cm

Depth to Slowly  
Permeable Horizon :- 25  
Gleyed from 25

Wetness Class :- 4

Wetness Grade :- 3B

Available Water Wheat :-  
Potatoes :-

Moisture Deficit Wheat :- not limiting  
Potatoes :-

Moisture Balance Wheat :-  
Potatoes :-

Droughtiness Grade :-

Final ALC Grade :- 3B

Main Limiting Factor(s) :- Wetness

Remarks :- Some large flaggy stones > 6 cm

SITE NAME Ilminster-Marsh A303		PROFILE NUMBER 3	SLOPE AND ASPECT -	LAND USE Ley (Grass)	Av Rainfall :- 977 ATO :- 1496 FC Days :- 198 Climatic grade :- 1	PARENT MATERIAL Shale
		DATE 13/12/90	GRID REFERENCE ST 311142			

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-20	10YR53	MCL	negligible	none		common	-	-	common	-	none	abrupt/smooth
2	20-50	10YR62 Ped skins 2.5Y62	C	5% flaggy stones	CDOM + gleying colours	Mod to weakly Dev C SAB	<0.5%	moderate	friable	common	-	common	
3	50-68	10YR62 Ped skins 2.5Y62	C	5% flaggy stones	V many Och mottles	Mod Dev CAB Main indication for wetness is primary structure Secondary structure of mod Dev MSAB	<0.5%	moderate	friable	common	-	few	
Pit dug to 68 cm													

Depth to Slowly Permeable Horizon :- SPL at 50 cm	If weakly dev.	Available Water Wheat :- Potatoes :-	Final ALC Grade :- 3B
Wetness Class :- Gleyed <40 cm SPL <50 cm		Moisture Deficit Wheat :- not limiting Potatoes :-	Main Limiting Factor(s) :- Wetness
Wetness Grade :- WC 4 3B		Moisture Balance Wheat :- Potatoes :-	Remarks :-
		Droughtiness Grade :-	

SITE NAME Ilminster-Marsh A303		PROFILE NUMBER 4	SLOPE AND ASPECT 0	LAND USE Grass	Av Rainfall :- 977 ATO :- 1496 FC Days :- 198 Climatic grade :- 1	PARENT MATERIAL Shale
		DATE 13/12/90	GRID REFERENCE ST 316143			

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	0-21	10YR43	HCL	2% estimate	-	-	-	-	-	common	-	-	abrupt smooth
2	21-48	10YR51	C	2% flaggy stones estimate	vdom 7.5YR56	MDCSAB Secondary MDMAB (primary governs water movt.)	<.5%	-	fim	common	-	common	clear wavy
3	48-73	10YR61 clear peds only next to stones	C	"	cdom 7.5YR56	Apedal massive	<.5%	-	fim	common	-	common large nodules	

Depth to Slowly Permeable Horizon :- 48 Gleyed from 21 cm  Wetness Class :- 4  Wetness Grade :- 4	Available Water Wheat :- Potatoes :-  Moisture Deficit Wheat :- not limiting Potatoes :-  Moisture Balance Wheat :- Potatoes :-  Droughtiness Grade :-	Final ALC Grade :- 4  Main Limiting Factor(s) :- wetness  Remarks :-
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