Creech St Michael

Agricultural Land Classification
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Resource Planning Team
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CREECH ST MICHAEL

AGRICULTURAL LAND CLASSIFICATION SURVEY

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INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 345.6 ha of land between Henlade and the A361 to the north of Creech Heathfield, near Taunton. This covered land at Henlade, Creech St Michael and Creech Heathfield. Field survey was based on 130 auger borings and eight soil profile pits, and was completed in April and May 1996.

2. The survey was conducted by the Resource Planning Team of ADAS Taunton Statutory Group on behalf of MAFF Land Use Planning Unit in its statutory role in the preparation of the Taunton Deane Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as being mainly Grade 2 to the north of Creech St Michael and Grade 3 to the south, the site had not been surveyed previously. However, the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF, 1988) and supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.

4. The land along the western edge of the current site has previously been surveyed by the Resource Planning Team (ADAS: 1994a and 1995) as has three small areas of land within the boundary of the current survey at Creech St Michael and Creech Heathfield (ADAS, 1994b). The findings of these surveys were taken into account during the current survey.

5. At the time of survey land cover was mainly permanent pasture with some areas of winter cereal and spring maize. A small horticultural holding was also included. An area of 8.5 ha of agricultural land within the survey area was not surveyed due to access restrictions. Other land which was not surveyed included a golf course, agricultural buildings and, residential and light industrial areas.

SUMMARY

6. The distribution of ALC grades is shown on the accompanying 1: 20 000 scale ALC map. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas. Areas are summarised in the Table 1.

7. Almost half of the agricultural land surveyed was found to be 'best and most versatile'. The majority of which has been classified as Subgrade 3a (good quality land) with some Grade 2 land (very good quality). The remainder of the site was mapped as Subgrade 3b land (moderate quality).

8. A small area of grade 1 land, which has no limitation, is mapped on the eastern edge of Creech St Michael. These profiles are deep and well drained with no drought limitation. The mapping unit links up with a larger unit from a previous survey (ADAS, 1994b).

Table 1: Distribution of ALC grades: Creech St Michael

Grade	Area (ha)	% Surveyed Area (217.7 ha)
1	0.1	0.0
2	33.8	15.5
3a	70.7	32.5
3b	113.1	52.0
Agricultural land not surveyed	8.5	-
Other land	119.4	-
Total site area	345.6	-

9. The Grade 2 land is mainly limited by minor drought limitations with the smaller mapping units in the north and south having minor wetness and workability limitations respectively. The droughty profiles typically consist of medium clay loam topsoils overlying permeable medium clay loam and coarse sandy loam subsoils. The stone contents of the horizons increase with depth. This together with the coarse textured lower subsoils and the relatively dry climatic conditions means that the amount of available moisture in the profile is reduced such that the soils will not be able to meet the potential crop moisture requirements throughout the year. This is likely to have the effect of restricting the level of consistency of crop yields in most years.

10. The small areas of Grade 2 land which have wetness (near the A361) and workability limitations (near Henlade and the Bridgwater and Taunton Canal) have slightly impaired drainage in the red clay subsoils and heavier topsoil textures respectively. This will limit the time during which the land is in a suitable condition for certain cultivations, trafficking by machinery or grazing by livestock.

11. Most of the Subgrade 3a land has a moderate wetness limitation. These profiles typically have medium clay loam topsoils over red clay subsoils of variable permeability. Generally the subsoils impair the drainage of the land which will reduce the amount of time that the land is in a workable condition, as mentioned in Paragraph 9 but to a greater degree, and will also affect the choice of cropping.

12. The smaller areas of Subgrade 3a land in the southern part of the site have clay topsoils over stoneless, permeable clay subsoils and are well drained. The heavy topsoil textures cause a workability limitation effective for longer than that affecting the Grade 2 land..

13. Most of the land mapped as Subgrade 3b has a moderate wetness limitation. These profiles typically have heavy clay loam and clay topsoils over clay subsoils with severely restricted drainage. These areas have similar limitations to those of the Subgrade 3a land but to a greater degree.

14. There is an area of land on the eastern edge of Creech St Michael which has a moderate drought limitation. These profiles are similar to those mentioned in Paragraph 9 but with increased stone contents, especially in the subsoil. This increase causes a greater reduction in the available soil moisture content which will result in there being insufficient moisture for the crops needs in most years and so Subgrade 3b is appropriate.

CLIMATE

15. Estimates of climatic variables for this site were derived from the published agricultural climate dataset "Climatological Data for Agricultural Land Classification" (Meteorological Office, 1989) using standard interpolation procedures. Data for key points around the site are given in Table 2 below.

16. Since the ALC grade of land is determined by the most limiting factor present, overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions. Parameters used for assessing overall climate are accumulated temperature, a measure of relative warmth and average annual rainfall, a measure of overall wetness. The results shown in Table 2 indicate that there is no overall climatic limitation.

17. Climatic variables also affect ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes, which are compared with the moisture available in each profile in assessing soil droughtiness limitations. . The crop-adjusted soil moisture deficits at the site are above the average for the region which will increases the likelihood of soil droughtiness limitations. These are described in later sections.

Table 2: Climatic Interpolations: Creech St Michael

Grid Reference		ST 286 281	ST 275 250
Altitude (m)		50	10
Accumulated Temperature (day °C)		1519	1566
Average Annual Rainfall (mm)		770	729
Overall Climatic Grade		1	1
Field Capacity Days		165	159
Moisture deficit (mm):	Wheat	104	114
	Potatoes	97	109

Grid Reference		ST 275 247	ST 278 262
Altitude (m)		20	20
Accumulated Temperature (day °C)		1555	1554
Average Annual Rainfall (mm)		760	741
Overall Climatic Grade		1	1
Field Capacity Days		164	161
Moisture deficit (mm):	Wheat	111	111
	Potatoes	106	106

RELIEF

18. Altitude ranges from 10 metres at Ham Road, Creech St Michael, to 50 metres near Drake's Farm on the A361. The site is gently undulating with gentle and moderate gradients (0-7°) which are not limiting.

GEOLOGY AND SOILS

19. The underlying geology of the site is shown on the published geology maps (BGS, 1984 and IGS, 1976). The site is mainly underlain by Upper Marls of the Mercia Mudstone Group, with a small area of Otter Sandstone on the northern edge, both of the Permian and Triassic Era. Drift deposits of alluvium are found along streams and the River Tone. Small patches of river deposits are also found within the site.

20. Soils derived from the marl and alluvium match the geology but no evidence of the Otter Sandstone was found and the river deposits proved to be very variable in their location.

21. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as being from four main soil associations. To the north of the Bridgwater and Taunton Canal the soils are mapped as being reddish fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging from the Whimple 1 Association. They are associated with similar well drained soil, some of which are over gravel. Small lobes of soils from the Newnham Association are mapped in the eastern part of the site at Charlton Road, in the Wortheys Farm area and on the western side at Vicarage Lane Farm. These are similar to the soils further north but are developed over gravel, some of which are deep and others which may be affected by groundwater.

22. Between the old Chard Canal and the Bridgwater and Taunton Canal Fladbury Association soils are mapped. They are described as being stoneless clayey soils, in places calcareous, variably affected by groundwater with a risk of flooding. In the southern part of the site slowly permeable non-calcareous fine loamy over clayey and clayey soils and calcareous reddish clayey soils over mudstone from the Worcester Association are mapped.

23. The soils found during the current survey closely match those identified by the Soil Survey and on the whole follow the geology of the site. The majority of the site consists of poorly drained clayey soils similar to those of the Whimple 1, Fladbury 1 and Worcester Associations. There are patches of more permeable soils within these areas which generally match the areas mapped as belonging to the Newnham Association.

AGRICULTURAL LAND CLASSIFICATION

24. The distribution of ALC grades found by the current survey is shown on the accompanying 1: 20 000 scale map and areas are summarised in Table 1. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas.

Grade 1

25. The small area of Grade 1 land lies on the end of a terrace overlooking a small valley. The profiles have medium clay loam topsoils over stoneless, permeable heavy clay loam subsoils. They were assessed as Wetness Class I (see Appendix II) and have no drought limitation. This area links with a larger mapping unit from a previous survey (ADAS, 1994b).

Grade 2

26. Within these mapping units there are three types of profile. The land to the south west of Creech Heathfield is subject to a minor drought limitation. These profiles typically have medium clay loam topsoils overlying permeable, slightly stony (14% hard rocks by volume) medium clay loam upper subsoils and very stony (51% hard rocks by volume) coarse sandy loam lower subsoils. The profiles, which are represented by Pit 2, are well drained and were therefore assessed as Wetness Class I. With the relatively dry local climatic conditions, the sandy textures and stone contents mean that the amount of available moisture in the profile is reduced and the soils will not be able to meet the potential crop moisture requirements throughout the year. This is likely to have the effect of slightly restricting the level of consistency of crop yields in most years.

27. The two small areas of Grade 2 land to the north of Creech Heathfield and to the east of Creech St Michael have a minor wetness limitation. These profiles typically have medium clay loam topsoils over heavy clay loam and clay subsoils that have variable permeability. The land to the east of Creech St Michael has gleyed upper subsoils, with the gleying starting at 30 cm. However, the subsoils are permeable so the profiles were assessed as Wetness Class II. Together with the topsoil texture and the local climatic conditions this will combine in a minor limitation to the amount of time during which the land will be in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

28. The Grade 2 land on the northern edge of the site, near the A361 has a similar degree of limitation. The profiles in this mapping unit were also assessed as Wetness Class II and have medium clay loam topsoils. The subsoils are red clays which have gleying starting around 45-50 cm and are poorly structured, slowly permeable layers in the lower subsoils starting around 60 cm.

29. The small area of Grade 2 mapped to the south of Creech St Michael, near Ruishton, has a minor workability limitation. The profiles are typically heavy clay loam topsoils overlying permeable, red clay subsoils. They are well drained and were assessed as Wetness Class I. These heavier topsoil textures, combined with the local lead to limitations similar to those mentioned in Paragraph 27. A soil pit showing a similar profile was previously examined to the north west of this unit (ADAS, 1994a).

Subgrade 3a

30. The land mapped as Subgrade 3a to the south of Creech St Michael has a moderate workability limitation. The profiles typically have clay topsoils over red clay subsoils developed from the Keuper Marl geology, as shown in Pit 8. The subsoils are permeable and well structured so the profiles are well drained. They were therefore assessed as Wetness Class I. The heavy topsoil textures, combined with the local climate will reduce the amount of

time that the land is in a workable condition, but to a greater degree than the Grade 2 land mentioned in Paragraph 27, as well as affecting crop choice.

31. The remainder of the Subgrade 3a land, around Creech Heathfield has a moderate wetness limitation where the choice of crop, type and timing of cultivations, grazing and trafficking by machinery will be reduced. A typical profile has medium clay loam topsoils over red clay subsoils. The permeability of the subsoils is on the whole poor and together with their poor structures, the subsoils are slowly permeable layers. A typical characteristic of these red clays is that they do not exhibit the usual mottling associated with impaired drainage so the profiles are not always gleyed. The mapping unit is described in Pits 3, 6 and 7 which show that the drainage of the subsoils is variable in nature and that in places they are very stony (up to 50 % hard rocks by volume). Although the subsoils have high stone contents they also had poor structures and were very compact so they are slowly permeable. These profiles were assessed as Wetness Class III.

Subgrade 3b

32. There are three types of profile within these mapping units which have moderate limitations to their agricultural use. The land near Henlade, around the southern part of Creech St Michael, from the railway to the old Chard Canal, and near Durston has a moderate wetness limitation. The profiles typically are derived from alluvium and have heavy clay loam or clay topsoils over clay subsoils as is shown by Pit 5. The subsoils are gleyed and slowly permeable from immediately below the topsoil, at around 10-25 cm, so the profiles were assessed as Wetness Class IV.

33. The block of Subgrade 3b to the west Creech Heathfield also has a moderate wetness limitation. These profiles are very similar to those mentioned in Paragraph 31 but the slowly permeable layers are found higher up the profile, starting at around 25-30 cm. The profiles were therefore assessed as Wetness Class IV. The limitations to their agricultural use are similar to those mentioned in Paragraph 30.

34. An area of droughty land has been mapped on the eastern side of Creech St Michael, with an area of poorly drained land running through the middle of it. These profiles typically have medium clay loam topsoils over red clay subsoils. The drainage regime is similar to that mentioned in Paragraph 31 but the stone content is greater. Pit 1 shows stone content percentages by volume of 18, 33, 55 and 74 in the topsoil and horizons 2, 3 and 4 respectively. The permeability of Horizon 4 is restricted by the very dense packing and poor structural condition despite the high stone content. At the time of examination, the last week in April, groundwater filled the pit to a depth of 80 cm. The overall limitation, though, is a moderate droughty one. The relatively dry local climate and the stones restrict the amount of moisture available for crops and this may result in there being insufficient for the crops needs in most years.

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APPENDIX I

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 (e.g. 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.

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

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile.

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.

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report. Terms used and abbreviations are set out below. These conform to definitions contained in the Soil Survey Field Handbook (Hodgson, 1974).

1. Terms used on computer database, in order of occurrence.

GRID REF: National 100 km grid square and 8 figure grid reference.

LAND USE: At the time of survey

WHT:	Wheat	**SBT:**	Sugar Beet	**HTH:**	Heathland
BAR:	Barley	**BRA:**	Brassicas	**BOG:**	Bog or Marsh
OAT:	Oats	**FCD:**	Fodder Crops	**DCW:**	Deciduous Wood
CER:	Cereals	**FRT:**	Soft and Top Fruit	**CFW:**	Coniferous Woodland
MZE:	Maize	**HRT:**	Horticultural Crops	**PLO:**	Ploughed
OSR:	Oilseed Rape	**LEY:**	Ley Grass	**FLW:**	Fallow (inc. Set aside)
POT:	Potatoes	**PGR:**	Permanent Pasture	**SAS:**	Set Aside (where known)
LIN:	Linseed	**RGR:**	Rough Grazing	**OTH:**	Other
BEN:	Field Beans	**SCR:**	Scrub		

GRDNT: Gradient as estimated or measured by hand-held optical clinometer.

GLEY, SPL: Depth in centimetres to gleying or slowly permeable layer.

AB (WHEAT/POTS): Crop-adjusted available water capacity.

MB (WHEAT/POTS): Moisture Balance. (Crop adjusted AP - crop potential MD)

DRT: Best grade according to soil droughtiness.

If any of the following factors are considered significant, 'Y' will be entered in the relevant column.

MREL:	Microrelief limitation	**FLOOD:**	Flood risk	**EROSN:**	Soil erosion risk
EXP:	Exposure limitation	**FROST:**	Frost prone	**DIST:**	Disturbed land
CHEM:	Chemical limitation				

LIMIT: The main limitation to land quality: The following abbreviations are used.

OC:	Overall Climate	**AE:**	Aspect	**EX:**	Exposure
FR:	Frost Risk	**GR:**	Gradient	**MR:**	Microrelief
FL:	Flood Risk	**TX:**	Topsoil Texture	**DP:**	Soil Depth

CH:	Chemical	**WE:**	Wetness	**WK:**	Workability
DR:	Drought	**ER:**	Erosion Risk	**WD:**	Soil Wetness/Droughtiness
ST:	Topsoil Stoniness				

TEXTURE: Soil texture classes are denoted by the following abbreviations:-

S:	Sand	**LS:**	Loamy Sand	**SL:**	Sandy Loam
SZL:	Sandy Silt Loam	**CL:**	Clay Loam	**ZCL**	Silty Clay Loam
ZL:	Silt Loam	**SCL:**	Sandy Clay Loam	**C:**	Clay
SC:	Sandy clay	**ZC:**	Silty clay	**OL:**	Organic Loam
P:	Peat	**SP:**	Sandy Peat	**LP:**	Loamy Peat
PL:	Peaty Loam	**PS:**	Peaty Sand	**MZ:**	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:-

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content: **M:** Medium (< 27% clay) **H:** heavy (27 - 35% clay)

MOTTLE COL: Mottle colour using Munsell notation.

MOTTLE ABUN: Mottle abundance, expressed as a percentage of the matrix or surface described.

F: few <2% **C:** common 2 - 20% **M:** many 20 - 40% **VM:** very many 40%+

MOTTLE CONT: Mottle contrast

F: faint - indistinct mottles, evident only on close inspection
D: distinct - mottles are readily seen
P: Prominent - mottling is conspicuous and one of the outstanding features of the horizon.

PED. COL: Ped face colour using Munsell notation.

GLEY: If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

STONE LITH: Stone Lithology - One of the following is used.

HR:	All hard rocks and stones	**SLST:**	Soft oolitic or dolimitic limestone
CH:	Chalk	**FSST:**	Soft, fine grained sandstone
ZR:	Soft, argillaceous, or silty rocks	**GH:**	Gravel with non-porous (hard) stones
MISST:	Soft, medium grained sandstone	**GS:**	Gravel with porous (soft) stones

SI: Soft weathered igneous or metamorphic rock

Stone contents are given in % by volume for sizes >2cm, >6cm and total stone >2mm.

STRUCT: The degree of development, size and shape of soil peds are described using the following notation

Degree of development	**WK:**	Weakly developed	**MD:**	Moderately developed
	ST:	Strongly developed		
Ped size	**F:**	Fine	**M:**	Medium
	C:	Coarse	**VC:**	Very coarse
Ped Shape	**S:**	Single grain	**M:**	Massive
	GR:	Granular	**AB:**	Angular blocky
	SAB:	Sub-angular blocky	**PR:**	Prismatic
	PL:	Platy		

CONSIST: Soil consistence is described using the following notation:

L: Loose **VF:** Very Friable **FR:** Friable **FM:** Firm
VM: Very firm **EM:** Extremely firm **EH:** Extremely Hard

SUBS STR: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G:** Good **M:** Moderate **P:** Poor

POR: Soil porosity. If a soil horizon has poor porosity with less than 0.5% biopores >0.5mm, a 'Y' will appear in this column.

IMP: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

SPL: Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

CALC: If the soil horizon is calcareous with naturally occurring calcium carbonate exceeding 1% a 'Y' will appear this column.

2. Additional terms and abbreviations used mainly in soil pit descriptions.

STONE ASSESSMENT:

VIS: Visual **S:** Sieve **D:** Displacement

MOTTLE SIZE:

EF: Extremely fine <1mm **M:** Medium 5-15mm
VF: Very fine 1-2mm> **C:** Coarse >15mm

F: Fine 2-5mm

MOTTLE COLOUR: May be described by Munsell notation or as ochreous (OM) or grey (GM).

ROOT CHANNELS: In topsoil the presence of 'rusty root channels' should also be noted.

MANGANESE CONCRETIONS: Assessed by volume

N:	None		**M:**	Many	20-40%
F:	Few	<2%	**VM:**	Very Many	>40%
C:	Common	2-20%			

STRUCTURE: Ped Development *

WA:	Weakly adherent	**M:**	Moderately developed
W:	Weakly developed	**S:**	Strongly developed

POROSITY:

P: Poor - less than 0.5% biopores at least 0.5mm in diameter
G: Good - more than 0.5% biopores at least 0.5mm in diameter

ROOT ABUNDANCE:

The number of roots per $100cm^2$:		Very Fine and Fine	Medium and Coarse
F:	Few	1-10	1 or 2
C:	Common	10.25	2 - 5
M:	Many	25-200	>5
A:	Abundant	>200	

ROOT SIZE

VF:	Very fine	<1mm	**M:**	Medium	2 - 5mm
F:	Fine	1-2mm	**C:**	Coarse	>5mm

HORIZON BOUNDARY DISTINCTNESS:

Sharp:	<0.5cm	**Gradual:**	6 - 13cm
Abrupt:	0.5 - 2.5cm	**Diffuse:**	>13cm
Clear:	2.5 - 6cm		

HORIZON BOUNDARY FORM: Smooth, wavy, irregular or broken.*

* See Soil Survey Field Handbook (Hodgson, 1974) for details.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 1 (ASP 87)	0° N	Oilseed Rape	Av Rainfall: 741 mm ATO: 1554 day °C	Upper Marl/Mercia mudstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 161 Climatic Grade: 1	SOIL SAMPLE REFERENCES
22/96	25.4.96	ST 27752629	HLJ/PB	Exposure Grade: -	RPT/HLJ/208

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	23	MCL	7.5YR43	1% HR > 2cm (s) 17%HR < 2 (S+D) 18% HR Total	None	None	-	-	-	Good	FF,VF	-	Abrupt smooth
2	45	C	05YR54	3% HR > 2cm(s) 30% < 2 cm (S+D) 33% HR Total	None	None	MCSAB (Some MMSAB)	Friable	Good	Good	FF	-	Gradual smooth
3	76	C	7.5YR64	3% > 2 cm (s) 52% < 2 cm(S+D) 55% HR Total	MDMP (10YR64) CDFO (10YR58)	Few	W(A)CSAB	Friable	Moderate	Good	None	-	Clear wavy
4	100+	C (SC)	2.5YR46	20% > 2 cm (s) 54% < 2 cm(S+D) 74% HR Total	MDMO (7.5YR68) at top of horizon	Common (Through out)	Weak Adherent	Firm	Poor	Poor	None	-	-

Profile Gleyed From: 45 cm

Depth to Slowly Permeable Horizon: 76 cm

Wetness Class: II

Wetness Grade: 2

Available Water Wheat: 82 mm

Potatoes: 85 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: -29 mm

Potatoes: -21 mm

Droughtiness Grade: 3b (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Drought

Remarks: Pit probed to 110cm. H4 has poor structural condition due to dense packing. Water filled to 80cm. Putting in 74% rather than 99% for H4 gives MBW-21, MBP-21; close to Subgrade 3a. Topsoil texture is borderline (MSZL).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 2 (ASP 72)	0°	PGR	Av Rainfall: 741 mm ATO: 1554 day °C FC Days: 161 Climatic Grade: 1 Exposure Grade: -	Upper Marl/Mercia mudstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
22/96	26.4.96	ST 27172668	HLJ/PB		RPT/HLJ/209

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	27	MCL	10YR44	1% HR > 2cm (s) 4%HR < 2 (S+D) 5% HR Total	None	None	-	-	-	Good	MF, VF	-	Clear Wavy
2	50	MCL (HCL)	75YR54	1% HR > 2cm(s) 13% < 2 cm (S+D) 14% HR Total	None	None	WM(+C) SAB	Friable	Good	Good	CF, VF	-	Clear Wavy
3	100+	CSL	05YR44 05YR53	15% > 2 cm (s) 36% < 2 cm(S+D) 51% HR Total	CDFO 75YR58	C*1	Weak	Very Friable	Poor (Very compact)	(G)*2	FVF	-	

Profile Gleyed From: 50 cm

Depth to Slowly Permeable Horizon: No spl

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 117 mm

Potatoes: 100 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: +6 mm

Potatoes: -6 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Droughtiness

Remarks: *1 H3 many manganese top 12cm.
*2 H3 tightly packed; restricted permeability. Borderline 2/3a on drought. Topsoil texture is borderline MSZL. H2 texture is borderline HCL.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 3 (ASP 77)	0°	PGR	Av Rainfall: 741 mm ATO: 1554 day °C	Upper Marl/Mercia mudstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 161 Climatic Grade: 1 Exposure Grade: -	SOIL SAMPLE REFERENCES
22/96	26.4.96	ST 27882670	HLJ/PB		RPT/HLJ/210

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	MCL	10YR53	5% HR Total (Vis)	None	None	-	-	-	Good	MF,VF	-	Gradual Wavy
2	56	C	10YR64	5 HR Total (Vis)	MDMO (10YR58) CDFG (10YR74)	None	WC(+M)SAB	Friable	Moderate	Good	CF,VF	-	Gradual Wavy
3	85+	C	2.5YR56 10YR73	30% HR Total (Vis)	CDMO (7.5YR56)	None	WACSAB	Friable	Moderate	Poor/ Good	FF, VF	-	-

Profile Gleyed From: 30 cm

Depth to Slowly Permeable Horizon: 56 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 123 mm

Potatoes: 107 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: 12 mm

Potatoes: 1 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3a (borderline)

Main Limiting Factor(s): Wetness

Remarks: Evidence of topsoil mixing between H1 + H2,. Pale clay in H3 is less likely to be an SPL than the heavier red clay. (Pale clay is more friable and has more roots). H3 is well packed especially red clay.
H4 paler material persists between patches/areas of red (which is sandy in places) below 80 cm H_2O was welling up from grey/pale material at bottom of the pit.
- porosity of the horizon is variable.
Pit site was a fair distance from any drainage ditch so water was only going to move away slowly hence deep gleyed H2.
Topsoil texture is borderline MSZL.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 4 (ASP 3)	2° North	Cereal	Av Rainfall: 741 mm ATO: 1554 day °C	Otter Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 161 Climatic Grade: 1 Exposure Grade: -	SOIL SAMPLE REFERENCES
22/96	26.4.96	ST 28302808	HLJ/PB		RPT/HLJ/365

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: Distinctnes s and form
1	30	FSZL	10YR43	10% HR(Vis)	None	None	-	-	-	Good	CF	-	Gradual Wavy
2	68	C	05YR54 10YR63 (05YR64)	None	CDFO 75YR58	Common	WCSAB	Firm	Poor	Poor*	FVF	-	Clear Wavy
3	85+	C	2.5YR44 2.5Y73	None	FDFO 75YR58	Few	WCSAB	Firm	Poor	Poor	None	-	-

Profile Gleyed From: 30 cm

Depth to Slowly Permeable Horizon: 30 cm

Wetness Class: IV

Wetness Grade: 3a

Available Water Wheat: 124 mm

Potatoes: 101 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: 13 mm

Potatoes: -5 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: H2 has large pores evident but poor overall. Mapped in a Subgrade 3b unit because of different topsoil texture. Topsoil texture is borderline MSL.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 5 (ASP 132-3)	0°	Cereal	Av Rainfall: 741 mm ATO: 1554 day °C FC Days: 161 Climatic Grade: 1 Exposure Grade: -	Alluvium
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
22/96	30.4.96	ST 27682500	HLJ/PB		RPT/HLJ/366

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	C	7.5YR43	None	FFMO (75YR58)	None	-	-	-	Good	CF	-	Abrupt Smooth
2	38	C	7.5YR64	None	MDFO (75YR58)	Common	WACSAB	Firm	Poor	Poor	FVF	-	Abrupt Smooth
3	65+	C	2.5Y62	None	CDFO (75YR58)	Few	MCAB	Firm	Moderate	Poor	FVF	-	-

Profile Gleyed From: 18 cm

Depth to Slowly Permeable Horizon: 18 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 132 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: 21 mm

Potatoes: 2 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: Water at 55cm. H2 ploughed at top: Trash evident.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 6 (ASP 83)	0°	PGR	Av Rainfall: 741 mm ATO: 1554 day °C	Upper Marls/Mercia Mudstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 741 Climatic Grade: 1 Exposure Grade: -	SOIL SAMPLE REFERENCES
22/96	30.4.96	ST 27732643	HLJ/PB		RPT/HLJ/211

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	15	MCL	10YR43	<1% HR Total (Vis)	None	None	-	-	-	Good	MF&VF	-	Cleart Smooth
2	32	HCL	10YR53	20% HR Total (Vis)	FFFO (10YR66)	Few	WFSAB (Some MSAB)	Friable	Good	Good	MVF	-	Gradual Smooth
3	44	HCL	10YR64	15% HR Total (Vis)	CDFO (75YR56)	None	WFSAB	Friable	Good	Good	MVF	-	Gradual Wavy
4	65	C	10YR74 7.5YR66	40% HR Total (Vis)	CDMO (7.5YR56)	Common (at top of horizon)	WACSAB	Friable	Moderate	Poor (Marginally Fissured)	FVF	-	Clear Irregular
5	90+	C	25YR54 10YR63	50% HR Total (Vis)	CDMO (05YR56)	Many	WCSAB	Firm	Poor	Poor	None	-	-

Profile Gleyed From: 32 cm

Depth to Slowly Permeable Horizon: 65 cm (H3 restricted drainage)

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 112 mm

Potatoes: 102 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: 1 mm

Potatoes: -4 mm

Droughtiness Grade: 3a (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness and Drought

Remarks: Void found in red H4 with clean stones in it, where water has been moving? H4 has more small stones in the red clay. Although the drainage in H3 is restricted it was not assessed as being an Spl as it was not as compact as H4. Topsoil texture is borderline MSZL.

TE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
reech St Michael	Pit 7 (ASP 100)	2° North	OSR	Av Rainfall: 741 mm ATO: 1554 day °C FC Days: 161 Climatic Grade: 1 Exposure Grade: -	River Deposits/UpperMarl
OB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
22/96	30.4.96	ST 27472588	HLJ/PB		RPT/HLJ/367

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	26	MCL	75YR43	10% HR (Vis)	None	None	-	-	-	Good	CVF	-	Abrupt Smooth
2	44	C	05YR54	30% HR (Vis)	None	None	WCSAB	Friable	Moderate	Good	FVF	-	Clear Smooth
3	58	C	25YR46 (25YR54)	None	CDMO 75YR68	Few	WM(C)SAB	Firm	Moderate	Good	FVF		Grad Smooth
4	100+	C	25YR46*	None	None	Common	WCSAB (MMAB)	Firm	Moderate	Poor	FVF	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: 58

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 129 mm

Potatoes: 105 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: 18 mm

Potatoes: -1 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: H4 patches of grey 25Y62 which are the matrix not gleying. H4 SPL on structure, which is borderline therefore borderline Grade 1.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Creech St Michael	Pit 8 (ASP 155)	4° North	Ley	Av Rainfall: 741 mm ATO: 1554 day °C	Upper Marl/Mercia Mudstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 161 Climatic Grade: 1 Exposure Grade: -	SOIL SAMPLE REFERENCES
22/96	01.05.96	ST 27372450	HLJ/PB		RPT/HLJ/212

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	HCL/C	75YR42	1% HR (Vis)	None	None	-	-	-	Good	MF,VF	-	Clear Smooth
2	53	C	05YR43	2% HR (Vis)	None	Few	MCSAB	Friable	Moderate	Good	CF,VF	-	Clear Wavy
3	90+	C	05YR53/ 05GY61 in parts	None	None	None	MMAB	Firm	Good	Poor	FVF	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No Spl

Wetness Class: I

Wetness Grade: 2/3a

Available Water Wheat: 185 mm

Potatoes: 123 mm

Moisture Deficit Wheat: 111 mm

Potatoes: 106 mm

Moisture Balance Wheat: 74 mm

Potatoes: 17 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 2/3a

Main Limiting Factor(s): Workability

Remarks: * H3 few large pores but overall poor. Mapped as 3a. Topsoil texture is borderline HCL/C.