Kingswood
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Agricultural Land Classification
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Resource Planning Team
Taunton Statutory Group
ADAS Bristol

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Ministry of Agriculture Fisheries and Food
Land Use Planning Unit

KINGSWOOD

AGRICULTURAL LAND CLASSIFICATION SURVEY

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SUMMARY

1 This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 1357 4 ha of land around Siston, Bridgeyate Oldland Common and Willsbridge on the eastern outskirts of Bristol The site covers land from Willsbridge and the River Avon in the south to the old clay pit at Parkfield Colliery (disused) in the north Field survey was based on 468 auger borings and 21 soil profile pits and was completed in January and February 1996

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

3 Information on climate geology and soils and from previous ALC surveys was considered and is presented in the relevant sections The published regional ALC map (MAFF 1977) shows the site at a reconnaissance scale to be virtually all Grade 3 There are some small areas of Grade 2 land to the south of Willsbridge and Bitton and areas of Grade 4 are mapped on the River Avon floodplain and on some of the steeper slopes within the survey area Part of the current site along the eastern edge of Oldland Common and the disused railway near Mangotsfield was previously surveyed in 1983 at a scale of 1 25 000 (ADAS 1983) This showed the land as being Subgrades 3a, 3b and 3c Although this was accurate at the time and still gives an indication of trends in land quality the classification system in use at the time is no longer current The current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) and supersedes all previous ALC surveys Grade descriptions are summarised in Appendix II

4 Land adjacent to the current survey at Hanham Abbots (ADAS 1995) and Abbots Road Hanham (ADAS 1994) has previously been surveyed by the Resource Planning Team The findings of these surveys were taken into account during the current survey

5 At the time of survey land cover was permanent pasture with some small areas of cereals and ley grassland Due to restricted access to land around Oldland Common and North Common the sample density is reduced in these areas Land which was not surveyed included a golf course areas of common ground copses and the old Shortwood brick works Other land which was not surveyed includes agricultural buildings roads and tracks and residential areas

6 The distribution of ALC grades is shown on the two accompanying 1 20 000 scale ALC maps 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

Table 1 Distribution of ALC grades Kingswood

Grade	Area (ha)	% Surveyed Area (1084 5 ha)
1	3 9	0 4
2	55 4	5 1
3a	52 7	4 9
3b	902 7	83 2
4	62 5	5 8
5	7 3	0 6
Agricultural land not surveyed	1084 5	
Other land	272 9	
Total site area	1357 4	

8 The majority over 83 % of the agricultural land surveyed in the Kingswood District has been assessed as Subgrade 3b with another 5 % being Grades 4 and 5 The best and most versatile" land, just over 10 % is mainly found in patches on the flood plain of the River Avon in the southern part of the site These soil profiles have better drainage due to the presence of gravel deposits from the Pleistocene Era and the drainage afforded by the average depth to the water level in the River Avon

9 The small area of Grade 1 land consists of sandy textured profiles which are well drained They have no limitation to their agricultural use due to the relatively high local rainfall These soils coincide with an area of Midford Sands from the Jurassic Era as shown on the relevant geology map (IGS 1990)

10 The Grade 2 land mainly has a moderate workability limitation where the soils are developed over gravel deposits and subsequently have better drainage than other areas The typically heavy clay loam and heavy silty clay loam topsoils with the relatively high local rainfall will reduce the number of days when the land can be cultivated or accessed Some small areas also have a minor drought limitation where the increased stone contents from the gravel geology will reduce the amount of soil water available for uptake by crop roots This may mean that the soil is unable to fully meet the crop needs

11 The Subgrade 3a land is very similar to the Grade 2 land except that its limitations are slightly more severe The areas adjacent to the River Avon are also susceptible to winter flooding which will limit the type of crops which can be grown

12 The majority of the site has been mapped as Subgrade 3b with moderate wetness limitations There are two main types of profile in this mapping unit which reflect their respective geology types Most of the land has reddish clayey soils developed over Triassic Keuper Marl and Lower Coal Series sandstone These profiles were assessed as Wetness Classes II to IV depending on local drainage conditions but with varying topsoil textures they will all have limitations to the amount of time that they can be worked and the type of crops which can be grown on them The other type of profile has the same limitations but is developed over the alluvium deposits of the River Avon giving pale and greyish clayey soils

13 The Grade 4 land is severely limited in its agricultural use Most of this land throughout the site has steep gradients which limit the safe and accurate use of some agricultural machinery The flatter land to the west of Willsbridge has a severe wetness limitation due to the presence of slowly permeable layers in the upper subsoils

14 The Grade 5 land can only be used for rough grazing due to severe gradient and macro relief limitations which will restrict the use of machinery

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INTRODUCTION

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agricultural machinery The flatter land to the west of Willsbridge has a severe wetness limitation due to the presence of slowly permeable layers in the upper subsoils

14 The Grade 5 land can only be used for rough grazing due to severe gradient and macro-relief limitations which will restrict the use of machinery

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 (FC) days 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 These are described in later sections A critical boundary of 175 FC days was found to the west of Willsbridge around Upper Cullyhall Farm and near Shortwood Lodge

Table 2 Climatic Interpolations Kingswood

Grid Reference		ST 688 762	ST 659 694
Altitude (m)		125	9
Accumulated Temperature (day °C)		1403	1539
Average Annual Rainfall (mm)		796	779
Overall Climatic Grade		1	1
Field Capacity Days		177	175
Moisture deficit (mm)	Wheat	90	101
	Potatoes	78	94

Grid Reference		ST 688 691	ST 673 703
Altitude (m)		15	40
Accumulated Temperature (day °C)		1532	1503
Average Annual Rainfall (mm)		761	777
Overall Climatic Grade		1	1
Field Capacity Days		172	174
Moisture deficit (mm)	Wheat	103	99
	Potatoes	96	90

Table 2 continued

Grid Reference		ST 679 706	ST 676 710
Altitude (m)		88	48
Accumulated Temperature (day °C)		1448	1493
Average Annual Rainfall (mm)		790	777
Overall Climatic Grade		1	1
Field Capacity Days		176	174
Moisture deficit (mm)	Wheat	94	99
	Potatoes	83	90

RELIEF

18 Altitude ranges from 10m Above Ordnance datum (AOD) at the River Avon to 90m AOD at Kimber Coombe and 125m to the east of Shortwood Lodge in the northern part of the site Slopes are mainly gentle and moderate which are not limiting There are some small areas which are strongly sloping (8 11) and moderately steeply and steeply sloping (12 15 and 16-25° respectively) locally which will have moderate and severe limitations on the agricultural use of the land These steep areas are to the south of Willsbridge House around Kimber Coombe Redfield Hill and Highfield Farm, and to the north of Shortwood Lodge

19 On the floodplain of the River Avon there was evidence of recent flooding which included debris in the riverside trees Debris was also observed on wire fences 150 m from the river up to heights of 55 cm The implications of this are discussed in Paragraph 28

GEOLOGY AND SOILS

20 The underlying geology of the site is shown on the published geology maps (IGS 1974 1990) as being variable in nature The most recent formations are alluvium and gravel from the Pleistocene Era which are found on the flood plains of the Rivers Avon and Boyd and of Siston brook Older rocks within the survey area include areas of Jurassic Lias (clays and limestones) and micaceous sands Triassic clays and marls and Carboniferous sandstones It is the sandstones marls and Lias limestone which are most abundant The marls occur between Bitton and Bridgeyate with Carboniferous sandstones covering Bridgeyate itself and continuing northwards towards Siston before marls and Lias limestone occur again

21 Parent material was found in several of the soil profile pits which coincides with the geological maps This included the Triassic marls Jurassic Lias limestone and Pleistocene river gravel

22 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1 250 000 (SSEW 1983) This shows that most of the area consists of slowly permeable clayey soils from the Evesham 1 and 2 Worcester Dale and Fladbury 1 Associations They are found over the Lias clays alluvium, Triassic marls and Carboniferous Coal Series

throughout the site There are small areas of associated slightly better drained soils from the Sherborne and Curtisden associations on the higher ground to the north of Siston, to the south east of Bridgeyate around Kimber Coombe and near Longwell Green On the floodplain of the River Avon there are also areas of well drained soils over gravel from the Badsey 1 Association The full descriptions of the associations are shown in Appendix I More detailed soils information is also available in the 1 63 360 scale survey of the Malmesbury and Bath districts (SSEW 1974)

23 The soils found during the current survey closely match those identified by the Soil Survey and follow the geology of the site The majority of the site consists of slowly permeable clayey soils some of which are reddish where they overlie the Keuper Marl and others which overlie limestone and clay from the Jurassic Lias period There are areas of better drained soil overlying some of the shallow limestone areas for example around Shortwood lodge and others over the gravel deposits on the River Avon s floodplain

AGRICULTURAL LAND CLASSIFICATION

24 The distribution of ALC grades found by the current survey is shown on the two accompanying 1 20 000 scale maps 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 mapped at Kimber Coombe has no limitation to its agricultural use The profiles consist of deep well drained medium sandy loams over fine sandy loams The profiles were assessed as Wetness Class I (see Appendix III) and have no drought limitation due to the relatively high local rainfall These soils coincide with an area of Midford Sands from the Jurassic Era as shown on the relevant geology map (IGS 1990)

Grade 2

26 The two areas of land mapped as Grade 2 which have a minor workability limitation, lie over areas of Pleistocene gravel deposits The profiles typically have heavy clay loam and heavy silty clay loam topsoils over heavy clay loam and clay subsoils Although variable amounts of mottles and concretions were observed no wetness limitations are present The profiles were assessed as Wetness Class I A few profiles have slightly higher stone contents which lead to minor drought limitations and others have moderate wetness limitations Those profiles with moderate limitations Subgrade 3a, for example Pit 1 could not be mapped at this level of detail Other small areas shown by Pit 15 have medium clay loam topsoils which do not cause a workability limitation and these profiles are therefore Grade 1 but again they could not be mapped at this detail

27 Some small areas also have a minor drought limitation where the increased stone contents from the gravel geology will reduce the amount of soil water available for uptake by crop roots This may mean that the soil is unable to fully meet the crop needs

Subgrade 3a

28 The areas of land assessed as Subgrade 3a have a variety of moderate limitations to their agricultural use which include workability droughtiness, wetness and flooding The two mapping units of land alongside the River Avon has a moderate flood limitation which will restrict the type of crops which can be grown here The flooding occurs during the winter and while being no worse than Subgrade 3a the limitation may in fact be Grade 2 The soil profiles in these units tend to be well drained because of the depth to the average water depth in the river Pit 14 is an example of this unit

29 The land at Sydenham Mead suffers from the same flood limitation but it also has a moderate workability limitation This limitation is also found on the small area of Subgrade 3a land along the River Boyd, near Beech Hill The profiles in these areas are well drained but they have clay and silty clay topsoils These heavy topsoil textures combined with the relatively wet local climate will reduce the amount of time that the land is in a workable condition as well as affecting crop choice

30 On the flatter land at Kimber Coombe the light textured topsoils medium clay loam and medium sandy loam, occur over a small area where there are clayey slowly permeable subsoils These profiles were assessed as Wetness Class III, as the slowly permeable layers are slightly lower than some of the surrounding Subgrade 3b land and gleying starting below 40 cm With their light textured topsoils they therfore only have a moderate limitation

31 The small area of Subgrade 3a land adjacent to the Bath Road near Bitton, has a moderate drought limitation These soils are developed over an area of gravel deposits (IGS 1990) which have lead to increased stone contents throughout the profiles This will reduce the amount of soil water available for uptake by crop roots This may mean that the soil is unable to fully meet the crop needs which will cause moderately lower and less consistent yields

Subgrade 3b

32 *The majority of the site has been mapped as Subgrade 3b with moderate wetness* limitations There are two main types of profile in this mapping unit which reflect their respective geology On the flood plain of the River Avon, where the land is underlain by alluvium, the profiles typically have heavy clay loam topsoils over pale and grey clay subsoils There is mottling present from the surface and the profiles are gleyed below the topsoil The subsoils are slowly permeable so they were assessed as Wetness Class IV

33 Most of the site to the north of Bitton consists of reddish clayey soils with 25YR and 05YR matrix colours developed over Triassic Keuper Marl and Lower Coal Series sandstone These profiles were assessed as Wetness Classes II to IV but with topsoil textures of clay silty clay heavy clay loam, heavy silty clay loam and medium clay loam they are all Subgrade 3b The majority of the profiles were assessed as Wetness Class IV where there is gleying present above 40 cm and the upper subsoil is slowly permeable In places the gleying and slowly permeable layers started lower down the profile and Wetness Classes II and III were appropriate A number of soil profile pits were dug throughout the site to confirm this grading including Pits 2 4 and 16

34 Tea green marl was found in some of the profiles along with mottling and manganese concretions These horizons were treated in the same way as their associated red clay horizons Pits 8 and 10 are examples of this type of profile

35 Some of the Subgrade 3b land near Shortwood Lodge and Highfield Lodge Farm, where the geology is the shallow Lower Lias limestone has moderate drought and depth limitations Here the interspersed bands of limestone and clay horizons are well drained so there is no wetness limitation. Instead the high stone contents throughout the profiles restrict the amount of soil water available to the crops Stone contents of 90 % hard rock by volume were found in the subsoil bands of Pit 9

36 Small areas of land have a moderate limitation due to gradient These areas are strongly sloping (8 11°) which results in restrictions on the safe and accurate use of some agricultural machinery

37 Throughout the Subgrade 3b land both individual and pairs of well drained profiles were found These profiles included Grades 1 2 and 3a mainly having workability limitations due to their topsoil textures It is possible that at a more detailed level of survey some small areas of 'best and most versatile land would be mapped

Grade 4

38 The areas mapped as Grade 4 can be split into land with two types of characteristics The land mapped as Grade 4 on the high ground to the west of Willsbridge has a severe wetness limitation where the number of FC days is higher The profiles typically have clay topsoils over a thin clay upper subsoil which has a relatively high stone content with further clay horizons below The profiles are basically clay horizons inter bedded with Lower Lias limestone Below this first layer of limestone there is a pale clay horizon with common distinct ochreous and grey mottling This horizon is gleyed and having reduced porosity it is classed as a slowly permeable layer The profiles were therefore assessed as Wetness Class IV This type of profile was also found during the adjacent survey at Hanham Abbots (ADAS 1995)

39 The land around Coxgrove Hill near Pucklechurch, North Common, Redfield Hill, Kimber Coombe and Londonderry Farm at Willsbridge has a severe limitation to its agricultural use due to its moderately steep and steep gradients of 12 18° These will restrict the range of agricultural machinery which can be safely and accurately used on the land and therefore the type of agricultural operation which is practical

Grade 5

40 Three small areas of Grade 5 land have been mapped which have a very severe limitation to their agricultural use The first two areas have limitations due to their relief and macro relief respectively The steeply sloping land at Willsbridge has gradients of over 19° which will severely limit the range of agricultural machinery which can be safely and accurately used The land at Kimber Coombe includes an old sand quarry which due to its landform can not have any machinery used on it It is therefore only capable of being used as rough pasture

41 The third area of Grade 5 land near Redfield Hill is a restored landfill site which can only be used for rough grazing The land has been landscaped into large embankments which cause a macro relief limitation and would prevent machinery being used on the land The area also has moderately steep and steep gradients of 12 18° which causes a Grade 4 gradient limitation

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June 1996

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APPENDIX I

DESCRIPTION OF SOIL ASSOCIATIONS

Badsey 1	Well drained calcareous and non-calcareous fine loamy soils over limestone gravel Some deep fine loamy soils and fine loamy soils over gravel, and similar but shallower soils affected by groundwater
Curtisden	Silty soils over siltstone with slowly permeable subsoils and slight seasonal waterlogging Some similar well drained soils Some well drained coarse loamy soils over sandstone Slumping locally
Dale	Slowly permeable seasonally waterlogged clayey fine loamy over clayey and fine silty soils on soft rock, often stoneless
Evesham 1	Slowly permeable calcareous clayey soils associated with shallow well drained brashy calcareous soils over limestone Landslips and associated irregular terrain locally
Evesham 2	Slowly permeable calcareous clayey soils Some slowly permeable waterlogged non-calcareous clayey and fine loamy or fine silty over clayey soils Landslips and associated irregular terrain locally
Fladbury 1	Stoneless clayey soils, in places calcareous variable affected by groundwater Flat land Risk of flooding
Sherborne	Shallow well drained brashy calcareous clayey soils over limestone associated with slowly permeable calcareous clayey soils
Worcester	Slowly permeable non-calcareous and calcareous reddish clayey soils over mudstone shallow on steeper slopes Associated with similar non calcareous fine loamy over clayey soils Slight risk of water erosion

Source SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5 Soils of South West England (1 250 000)

APPENDIX II

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 III

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 IV

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

AP (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
MSST	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
Kingswood	Pit 1 (ASP 629)	1 South	Permanent Grass	Av Rainfall 786 mm ATO 1463 day C	Gravel (1st Terrace)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	24/01/96	ST673692	PB/HLJ		RPT/HLJ/196

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	20	MCL	10YR43	<1 / HR Total (VIS)	None	None					MF+VF		Abrupt Smooth
2	39	HCL	10YR44	2 / HR Total (VIS)	None	None	MCSAB (Pr tendencies + MSAB)	Friable	Moderate	Good	CF+VF		Clear Smooth
3	59	C	10YR44	6 / HR Total (VIS)	CFFO (10YR58)	Few	WCSAB	Friable	Moderate	Poor	CVF		Gradual Smooth
4	77	HCL (C+SL)	10YR54	7 / HR>2cm (S) 42 /oHR<2cm(S+D) 47 /oHR T tal	None	None	Too Stoney				FVF		Clear Smooth
5	100+	CSL	10YR64	17 / HR>2cm(S) 38 / HR<2cm(S+D) 55 /o HR Total	None	None	Too Stoney				None		

Profile Gleyed From Not Gleyed

Depth to Slowly Permeable Horizon 39cm

Wetness Class III

Wetness Grade 3a

Available Water Wheat 121 mm

Potatoes 105 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 26 mm

Potatoes 20 mm

Droughtiness Grade 2 (Calculated to 120 cm)

Final ALC Grade 3a

Main Limiting Factor(s) Wetness

Remarks H3 well rooted, few stones some fissures therefore marginal spl Mapped in a Grade 3a unit.

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 2 (ASP 143)	0	Permanent Grass	Av Rainfall 786 mm ATO 1463 day C	Keuper Marl
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	8/02/96	ST669 751	HLJ/GMS		None

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	20	C	75YR42	N ne	None	None				Good	MF+VF		Abrupt Smooth
2	45	C	75YR53	None	CDMO (7 5YR56)	Common	WCAB	Firm	Poor	Poor	CVF		Abrupt Smooth
3	55	C	75YR52	No e	CDMO (7 5YR56)	Common	WCAB	Firm	Poor	Poor	FVF		

Profile Gleyed From 20cm

Depth to Slowly Permeable Horizon 20cm

Wetness Class IV

Wetness Grade 3b

Available Water Wheat 122 mm

Potatoes 99 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 27 mm

Potatoes 14 mm

Droughtiness Grade 2 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 3 (ASP 105)	1 West	Permanent Grass	Av Rainfall 786 mm ATO 1463 day C	Keuper Marl
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	2/02/96	ST673 755	GMS/HLJ		None

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	HCL	10YR43	<1 % HR	None	None				Good	MF+VF		Clear Smooth
2	40	C	10YR53	<1 % HR	CDMO (7 5YR56)	None	WCSAB	Firm	Poor	Poor	CF+VF		Clear Smooth
3	85+	C	25YR43 (25Y73 in places)	<1% HR	None	Common (In Patches)	WCSAB (Some MCAB)	Firm	Moderate	Poor	FVF		

Profile Gleyed From 23cm

Depth to Slowly Permeable Horizon 23cm

Wetness Class IV

Wetness Grade 3b

Available Water Wheat 134 mm

Potatoes 110 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 39 mm

Potatoes 25 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks H2 is wet H3 is dry but is also on spl

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 4 (ASP 184)	0°	Permanent Grass	Av Rainfall 786 mm ATO 1463 day C FC Days 175 Climatic Grade 1 Exposure Grade	Lower Coal Series
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
77/95	8/02/96	ST678 750	HLJ/GMS		None

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	HZCL	75YR42	None	None	Few				Good	CF+VF		Clear Smooth
2	50	C	05YR43	None	None	Few	WM+CSAB	Firm	Moderate	Poor	FF+VF		Clear Smooth
3	80+	C	05YR43 (05YR53)	None	(CDOM at depth)	Many	WCSAB	Firm	Moderate	Poor	FVF		

Profile Gleyed From 50cm

Depth to Slowly Permeable Horizon 50cm

Wetness Class III

Wetness Grade 3b

Available Water	Wheat	145 mm
	Potatoes	121 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	50 mm
	Potatoes	36 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Kingswood	Pit 5 (ASP 643)	0	Fallow (Stubble)	Av Rainfall	786 mm	Alluvium
				ATO	1463 day C	
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days	175	SOIL SAMPLE REFERENCES
77/95	9/02/96	ST673 691	HLJ	Climatic Grade	1	RPT/HLJ/194
				Exposure Grade		

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	22	HCL	10YR43	<1 / HR (VIS)	FDFO (75YR58)	None				Good	CF+VF		Clear Smooth
2	60+	C	10YR63	<1 / HR (VIS)	MDMO+G (10YR56 52)	Common	MCPr	Firm	Poor	Poor	FF+VF (ex red)		

Profile Gleyed From 22cm

Depth to Slowly Permeable Horizon 22cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	124 mm
	Potatoes	101 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	29 mm
	Potatoes	16 mm

Droughtiness Grade 2 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Possible flooding but no worse than 3b

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 6 (ASP 387)	1 South West	Permanent Grass	Av Rainfall 786 mm ATO 1463 day C FC Days 175 Climatic Grade 1 Exposure Grade	Keuper Marl
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
77/95	13/02/96	ST679 716	PRW/HLJ		None

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	HCL	75YR34	<1 %HR (VIS)	None	Few					CF+VF		Clear Smooth
2	52	C	75YR64 10YR64	<1 %HR (VIS)	CDMO (7 5YR68+ 10YR66)	Few (C in patches)	MCSAB (Bordering on AB more vertical than horizantal breaks)	Friable	Moderate	Poor	CF+VF (ex ped)		Clear Smooth
3	80+	C	25YR46	<1 %HR (VIS)	FDMO (10YR66)	Few	MCAB (Some Pr)	Firm	Poor	Poor	FF+VF (ex ped)		

Profile Gleyed From 30cm

Depth to Slowly Permeable Horizon 52cm

Wetness Class III

Wetness Grade 3b

Available Water Wheat 134 mm

Potatoes 112 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 39 mm

Potatoes 27 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 7 (ASP 396)	Flat	Permanent Grass	Av Rainfall 761 mm ATO 1532 day C FC Days 172 Climatic Grade 1 Exposure Grade	Alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
77/95	13/02/96	ST692 716	PRW/HLJ		RPT/PRW/138

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	C	7 5YR4/	<1 /HR (VIS)	None	Common		Friable	Moderate	Many	Many Fine & V Fine		Gradual Smooth
2	67	C	7 5YR4/	<1 /HR (VIS)	None	Few	Weak Coarse Subanguler blocky	Friable	Moderate	Many	Few Fine & V Fine		Clear Wavy
3	95	C	10YR4/	<1 /HR (VIS)	None	Common	Moderate Coarse Subangular blocky	Friable	Moderate	Many	Few fine & V Fine		

Profile Gleyed From: Not Gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3a (borderline 3b on FCD)

Available Water	Wheat	130 mm
	Potatoes	124 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	35 mm
	Potatoes	39 mm

Droughtiness Grade 1 (Calculated to 95 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Kingswood	Pit 8 (ASP 423)	3 East	Permanent Grass	Av Rainfall	786 mm	Keuper Marl
				ATO	1463 day C	
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days	175	SOIL SAMPLE REFERENCES
77/95	13/02/96	ST683 712	PRW/HLJ	Climatic Grade	1	None
				Exposure Grade		

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	20	HCL	75YR44	10 / HR Total	None	None				Good	CF+VF		Clear Smooth
2	30	HCL	75YR44	90 % HR Total (VIS)	None	None	WMSAB	Friable	Good	Good	CF+VF		Abrupt Wavy
3	70	C	05GY51	<1 / HR	None	Few (Common in Patches)	WCSAB	Firm	Moderate	Poor	FVF		Abrupt Smooth
4	100	C	05YR64	<1 / HR	None	Few (Common in Patches)			Poor (Assumed)	Poor	None		

Profile Gleyed From Not Gleyed

Depth to Slowly Permeable Horizon 30cm

Wetness Class IV

Wetness Grade 3b

Available Water Wheat 118 mm

99 mm

Potatoes 95 mm

Moisture Deficit Wheat 85 mm

Potatoes

Moisture Balance Wheat 23 mm

14 mm

Potatoes

(Calculated to 120 cm)

Droughtiness Grade 2

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Assume that green marl can be treated as red marl Grade 3b/4 on depth

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 9 (ASP 435)	3 East	Permanent Grass	Av Rainfall 790 mm ATO 1448 day C	Keuper Marl
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 176 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	13/02/96	ST683 711	PRW/HLJ		None

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	22	MCL	7 5YR$\frac{}{y}$	<1 % HR T tal (VIS)	None	None		Friable	Moderate	Many	Many Fine V Fine		Clear Smooth
2	30	SCL	75YR44	<1 % HR T tal (VIS)	None	Common	Weak Coarse Subangular blocky	Friable	Moderate	Many	Many Fine		Abrupt Wavey
3	46	C	75YR44	Flaggy Stone 90 / HR T tal (VIS)	None	None	Too Stoney		Moderate (Assume)	Poor	Common Fine		Abrupt Wavey
4	60	C	5GY$\frac{}{y}$ 5GY$\frac{}{y}$	<1 %HR Total (VIS)	None	Common	Weak adherent CSAB	Friable	Poor	Poor	Few Fine		Abrupt Smooth
5	60+	C		Flaggy Ston 90 % HR (VIS)							Few Fine		

Profile Gleyed From Not Gleyed

Depth to Slowly Permeable Horizon 46cm

Wetness Class III

Wetness Grade 3a

Available Water	Wheat	67 mm
	Potatoes	73 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	28 mm
	Potatoes	12 mm

Droughtiness Grade 3b (Calculated to 80 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Drought

Remarks 3a on depth Pit filling with water to 40cm Roots penetrating rock at 60cm

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 10 (ASP 453)	3 North West	Permanent Grass	Av Rainfall 786 mm ATO 1463 day C	Keuper Marl
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1	SOIL SAMPLE REFERENCES
77/95	8/02/96	ST678 708	HLJ/PRW	Exposure Grade	RPT/HLJ/195

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	22	HZCL	10YR43	<1%HR (VIS)	None	None				Good	CF+VF		Clear Smooth
2	55	C	05YR56	<1%HR (VIS)	None	Few	WCAB	Firm	Poor	Poor	FF+VF (ex ped)		Clear Smooth
3	70+ Augered to 100	C	05GY51	<1/HR (VIS)	None	None	MCAB (Some Cpr)	Firm	Moderate	Poor	FVF (ex ped)		

Profile Gleyed From Not gleyed

Depth to Slowly Permeable Horizon 22cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	131 mm
	Potatoes	106 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	36 mm
	Potatoes	21 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Green marl is treated as red marl therefore spl to 100+ Long discussion over H2 spl on colour (05YR or 75YR) and structure (AB or SAB) therefore borderline spl

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Kingswood	Pit 11 (ASP 266)	0°	PGR	Av Rainfall ATO FC Days Climatic Grade Exposure Grade	786 mm 1463 day C 175 1	Lower Coal Series
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY			SOIL SAMPLE REFERENCES
77/95	13/02/96	ST679 738	GMS			None

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	HCL	10YR41	Non (Visual)	None	None				Good	MVF		Clear Smooth
2	33	C	10YR53	None (Visual)	CDFO (10YR56)	None	MCSAB	Firm	Moderate	Good	CVF		Clear Smooth
3	50+	C	2 5Y72 64	None (Visual)	MDFOG (10YR66 61)	Firm	MCPr	Firm	Poor	Poor	CVF		

Profile Gleyed From 25cm

Depth to Slowly Permeable Horizon 33cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	129 mm
	Potatoes	106 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	34 mm
	Potatoes	21 mm
Droughtiness Grade	1	(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 12 (ASP 577)	0°	PGR	Av Rainfall 786 mm ATO 1463 day C	Lower Lias (Clay)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	13/02/96	ST672 697	GMS		None

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	20	HZCL	10YR41	None (Visual)	None	None				Good	CVF		Abrupt Smooth
2	60+	C	10YR62	None (Visual)	MDMO (10YR68)	None	WCPr Breaking into WCAB (Some Mod Dev)	Firm	Poor	Poor	FVF		

Profile Gleyed From 20cm

Depth to Slowly Permeable Horizon 20cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	126 mm
	Potatoes	103 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	31 mm
	Potatoes	18 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Kingswood	Pit 13 (ASP 586)	0	PGR	Av Rainfall	786 mm	Alluvium
				ATO	1463 day C	
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days	175	SOIL SAMPLE REFERENCES
77/95	13/02/96	ST661 696	GMS	Climatic Grade	1	RPT/GMS/522
				Exposure Grade		

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	ZC	10YR41	N ne (Visual)	None	None				Good	MVF		Gradual Smooth
2	80+	C	10YR54	Non (Vis al)	None	None (Very few at depth)	MCSAB (Easily breaking into MMSAB)	Friable	Moderate to Good	Good	CVF		

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3a

Available Water	Wheat	142 mm
	Potatoes	118 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	47 mm
	Potatoes	33 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks: Flood risk assessed to be no worse than 3a and possibly 2

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 14 (ASP 668)	0	PGR	Av Rainfall 786 mm ATO 1463 day C	Alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	13/02/96	ST689 690	GMS		RPT/GMS/521

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	C/ZC	10YR42	None (Visual)	None	None				Good	MVF		Clear Smooth
2	80+	C	10YR54	None (Visual)	None	None	MCSAB	Friable	Moderate	Good	CVF		

Profile Gleyed From Not gleyed

Depth to Slowly Permeable Horizon No SPL

Wetness Class I

Wetness Grade 3a

Available Water	Wheat	142 mm
	Potatoes	118 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	47 mm
	Potatoes	33 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3a

Main Limiting Factor(s) Workability

Remarks Flood risk assessed to be no worse than 3a and possibly 2

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 15 (ASP 645)	0	PGR	Av Rainfall 786 mm ATO 1463 day C FC Days 175 Climatic Grade 1 Exposure Grade	Gravel (1st Terrace)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
77/95	13/02/96	ST676 691	GMS		RPT/GMS/523

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	10YR42	1 / HR (Visual)	None	None				Good	MVF		Clear Smooth
2	60	MSL	10YR43	N (V ual)	None	Few	MCSAB	Friable	Moderate	Good	MVF		Clear Smooth
3	80+	HCL	10YR54	46 /6>2mm HR (S+D)	None	None	WMSAB	Friable	Good	Good	FVF		

Profile Gleyed From Not Gleyed

Depth to Slowly Permeable Horizon No SPL

Wetness Class I

Wetness Grade 1

Available Water Wheat 141 mm

Potatoes 110 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 46 mm

Potatoes 25 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 1

Main Limiting Factor(s)

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 16 (ASP 33)	0	PGR	Av Rainfall 178 mm ATO 1463 day C	Keuper Marl
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	14/02/96	ST679 765	GJC/GMS		None

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	MCL	7 5YR33	Non (Visual)	None	None					MF VF		Clear Smooth
2	38	C	5YR44	Non (V sual)	None	Common	MMPr	Firm	Moderate	Poor	CVF		Sharp Wavy
3	70+	C	2 5YR46 (Also pale patches within red clay)	None (Visual)	CDMO (7 5YR58)	Few	MCPr	Firm	Poor	Poor	FVF		

Profile Gleyed From 38cm

Depth to Slowly Permeable Horizon 28cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	131 mm
	Potatoes	108 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	36 mm
	Potatoes	23 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Horizon 3 had areas of a pale 10YR clay which was heavily gleyed

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 17 (ASP 354)	0°	PGR	Av Rainfall 790 mm ATO 1448 day C	Lower Lias (Limestone)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 176 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	14/02/96	ST686 722	GJC/GMS		RPT/GJC/162

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	C	10YR33	17 % HR>2cm(S) 8/ HR<2cm (S+D) 25 % HR Total	None	None					C F VF		Clear Smooth
2	40	C	10YR43	60% HR 2cm (S) 4/<2cm (S+D) 64 % HR Total	None	None	WDFSAB	Friable	Good	Good (due to sones)	Common F VF		Clear Smooth
3	50+	C+HR		>70% HR(VIS)						Well Fractured	Common		

Profile Gleyed From Not Gleyed

Depth to Slowly Permeable Horizon No Spl

Wetness Class I

Wetness Grade 3a

Available Water	Wheat	48 mm
	Potatoes	48 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	-47 mm
	Potatoes	37 mm

Droughtiness Grade 3b (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Droughtiness

Remarks Pit dug to 50cm Close to being Grade 4 on drought H2 stone content maybe >70 %

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 18 (ASP 47)	0	Ceral	Av Rainfall 790 mm ATO 1448 day C FC Days 176 Climatic Grade 1 Exposure Grade	Lower Lias (Limestone)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
77/95	14/02/96	ST685 765	GMS/GJC		RPT/GJC/163

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (PedFace) 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	20	C	10YR43	5 / HR>2cm 10 % HR Total (Vis)	None	None				Good	FVF		Abrupt Smooth
2	25	Fractured sone layer lying on top of next horizon											Abrupt Smooth
3	45	Clay	2 5Y53	50%HR (VIS)	CDFO 2 5Y56	None	MCSAB	Firm	Moderate	Low	FVF		Abrupt Smooth
4	45+	Fractured stone layer											

Profile Gleyed From 25cm

Depth to Slowly Permeable Horizon None

Wetness Class II

Wetness Grade 3b

Available Water Wheat 66 mm

Potatoes 66 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 29 mm

Potatoes 19 mm

Droughtiness Grade 3b (Calculated to 85 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks Possible depth limitation of 3b

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 19 (ASP 115)	0	Cereal	Av Rainfall 786 mm ATO 1463 day C	Lower Lias (Clay)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	14/02/96	ST889756	GJC/GMS		RPT/GJC/164

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	22	C	10YR43	1/HR (Sie ed)	None	None				Good	FVF		Clear Smooth
2	60	C	25Y44	1/6HR (Sieved)	None	Common	MCSAB	Friable	Moderate	Good	FVF		

Profile Gleyed From Not Gleyed

Depth to Slowly Permeable Horizon No SPL

Wetness Class I

Wetness Grade 3a

Available Water Wheat 113 mm

Potatoes 113 mm

Moisture Deficit Wheat 95 mm

Potatoes 85 mm

Moisture Balance Wheat 18 mm

Potatoes 28 mm

Droughtiness Grade 2 (Calculated to 90 cm)

Final ALC Grade 3a

Main Limiting Factor(s) Workability

Remarks Large horizontal stone at base of pit prevented further digging Water collected in pit at depth Keep as WCI because of absence of mottling (cf other pits) The pit has been included in a 3b mapping unit after reference to the surrounding borings and the geology of the locality

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Kingswood	Pit 20 (ASP 152)	0	Permanent Grass	Av Rainfall	786 mm	Keuper Marl
				ATO	1463 day C	
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days	175	SOIL SAMPLE REFERENCES
77/95	20/02/96	ST682 751	HLJ	Climatic Grade	1	None
				Exposure Grade		

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	C	10YR43	5 / HR>2cm 10% HR Total (Vis)	None	None					CF+VF		Clear Smooth
2	35	C	10YR54	15 % SLST Total (Vis) 12% SLST<2cm (S+D) 27% SLST Total	FFFO (10YR68)	None	MCSAB	Friable	Moderate	Good	FF+VF		Clear Smooth
3	70	C	10YR63	<1% SLST (Vis)	CDFO+G (10YR56 51)	None	MCAB	Firm	Poor	Good	FF+VF		Abrupt Smooth
4	85+	C	25Y63	>70 % SLST (Vis)	CDFO (10YR56)	None			Moderate (Assumed)		FVF		

Profile Gleyed From 35cm

Depth to Slowly Permeable Horizon (35cm possibly)

Wetness Class III

Wetness Grade 3b

Available Water	Wheat	95 mm
	Potatoes	98 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	0 mm
	Potatoes	13 mm

Droughtiness Grade 3a (Calculated to 100 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks H3 is possibly an spl Marginal porosity which would give WC IV H4 is thin layers clay in bedded limestone

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Kingswood	Pit 21 (ASP 492)	3 South East	Permanent Grass	Av Rainfall 790 mm ATO 1448 day C	Lower Lias (Limestone)
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 176 Climatic Grade 1 Exposure Grade	SOIL SAMPLE REFERENCES
77/95	21/02/96	ST659 704	HLJ		None

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	C	10YR42	10% SLST T tal (Vis)	None	None					CF VF		Clear Smooth
2	38	C	10YR53	20 / SLST Total (Vis)	None	None	MCSAB	Friable	Moderate	Good	FF+VF		Abrupt Smooth
3	80+	C	10YR63	5% SLST T tal (Vis)	CDFO+G (10YR58 52)	None	WCSAB (Some MCAB)	Firm	Poor	Poor	FVF		

Profile Gleyed From 38cm

Depth to Slowly Permeable Horizon 38cm

Wetness Class IV

Wetness Grade 4

Available Water	Wheat	119 mm
	Potatoes	97 mm
Moisture Deficit	Wheat	95 mm
	Potatoes	85 mm
Moisture Balance	Wheat	24 mm
	Potatoes	12 mm

Droughtiness Grade 2 (Calculated to 120 cm)

Final ALC Grade 4

Main Limiting Factor(s) Wetness

Remarks