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Proposed Golf Course at Kings Hill,
West Malling, Kent
Agricultural Land Classification
ALC Map and Report
September 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

PROPOSED GOLF COURSE, KINGS HILL, WEST MALLING, KENT

1 Summary

1 1 ADAS was commissioned by MAFF s Land Use Planning Unit to provide information on land quality for an area of land south of West Malling in Kent The work forms part of MAFF s statutory input to the planning application for a golf course

1 2 Approximately 75 hectares of land relating to the aforementioned site was surveyed in September 1994 The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land A total of 38 borings 15 topsoil stone measurements and two soil inspection pits were described in accordance with MAFF s revised guidelines and criteria for grading the quality of agricultural land (MAFF 1988) These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose a long term limitation on its use for agriculture

1 3 At the time of the survey the landuse on the site was a mixture of recently harvested cereals hops and set aside Areas marked as woodland include chestnut coppice areas marked as non agricultural include scrubland dirt tracks and parts of the former airfield Areas marked as urban include tarmac roads and the runways of the former airfield

1 4 The distribution of grades and subgrades is shown on the attached ALC map and the areas and extent are given in the table below The map has been drawn at a scale of 1 10 000 It is accurate at this scale but any enlargement would be misleading

Table 1 Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Land
2	5 4	7 2	13 7
3a	26 5	35 3	67 3
3b	7 5	10 0	19 0
Non-agricultural	14 1	18 8	100% (39 4 ha)
Urban	3 4	4 5	
Woodland	18 1	24 2	
Total area of Site	75 0	100%	

1 5 Appendix I gives a general description of the grades subgrades and land use categories identified in the survey The main classes are described in terms of the type of limitation that can occur the typical cropping range and the expected level and consistency of yield

1 6 The majority of the agricultural land on the site has been classified as Subgrade 3a good quality land with soil droughtiness as the main limitation Soil profiles typically comprise medium clay loam topsoils which become heavier with depth Subsoils tend to be

impenetrable to the auger due to the presence of flaggy soft sandstone below depths of approximately 40 cm The stony nature of the subsoils along with the soil textures and local climatic regime means that there is a moderate restriction on profile available water such that a classification of Subgrade 3a is appropriate It should be noted that deeper less stony profiles in some areas of the site have been mapped as Subgrade 3a due to the presence of between 11 14 % total stones greater than 2cm in the topsoil Towards the south of the site an area of Grade 2 very good quality land has been mapped These soil profiles tend to be less stony and more lightly textured than elsewhere on the site Consequently these profiles show sufficient reserves of profile available water such that droughtiness is less of a limiting factor In the north and the west of the site areas of land with topsoils containing in excess of 15% total stones greater than 2 or 6 cm have been classified as Subgrade 3b due to a significant topsoil stone limitation Excessively stony topsoils may restrict crop establishment and growth and can increase production costs due to increased wear and tear on machinery and tyres

2 Climate

2 1 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions

2 2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall as a measure of overall wetness and accumulated temperature (degree days Jan June) as a measure of the relative warmth of a locality

2 3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met Office 1989) The details are given in the table below and these show that there is no overall climatic limitation affecting the site However the field capacity days for the site are relatively low in a national context and therefore the likelihood of any soil wetness problems may be decreased

2 4 No local climatic factors such as exposure or frost risk are believed to affect the site

Table 2 Climatic Interpolations

Grid Reference	TQ 672 541	TQ 678 548
Altitude (m)	75	100
Accumulated Temperature (degree days Jan-June)	1424	1395
Average Annual Rainfall (mm)	674	680
Field Capacity (days)	139	140
Moisture Deficit Wheat (mm)	112	109
Moisture Deficit Potatoes (mm)	106	101
Overall Climatic Grade	1	1

3 Relief

3 1 The site falls from north to south lying at an altitude of approximately 70 100m AOD Nowhere on the site do gradient or relief pose any limitation on agricultural use

4 Geology and Soils

4 1 The relevant geological sheet (BGS 1971) shows the majority of the site to be underlain by head deposits An area of Hythe Beds is mapped in the south of the site

4 2 The published Soil Survey map (SSEW 1983) shows the soils on the site to comprise two distinct associations The majority of the site is shown to comprise soils of the Marlow association These are described as well drained fine loamy over clayey and clayey soils Some fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging (SSEW 1983) Towards the south of the site soils of the Malling association are mapped These are described as well drained fine loamy soils over limestone at variable depths Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging (SSEW 1983)

4 3 Detailed field examination found the soils on the site to be well drained loamy and clayey soils occasionally with coarse textured subsoils Topsoils tend to contain hard sandstone in some areas of the site subsoils commonly consisting of clay interbedded with sandstone

5 Agricultural Land Classification

5 1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map

5 2 The location of the soil observation points are shown on the attached sample point map

Grade 2

5 3 An area of agricultural land towards the south of the site has been classified as Grade 2 very good quality land with soil droughtiness as the main limitation Profiles proved to be deeper to the auger than elsewhere on the site and subsoils tend to be slightly stony (8-15% total v/v >2mm sandstone) Profile textures tend to comprise medium silty clay loam or medium clay loam topsoils overlying medium clay loam or heavy silty clay loam upper subsoils Occasionally lower subsoils consist of a silty clay which extends to depth Soil inspection pit no 2 which is typical of this mapping unit was dug to investigate the textures and structures of the subsoil At the location of the pit the profile was found to comprise a slightly stony (6 % total v/v >2mm hard sandstone) medium clay loam topsoil overlying a similarly textured upper subsoil containing 8% total soft sandstone extending to a depth of 45cm A stoneless medium silty clay loam subsoil was found to extend to a depth of 90cm where a stoneless heavy silty clay loam lower subsoil commences Although the lower subsoil shows evidence of gleying there is no significant wetness limitation (Wetness Class I) However the pit profile and profiles elsewhere exhibit a slight restriction on the amount of profile available water for plant growth Consequently this can affect the level and consistency of crop yields such that a classification of Grade 2 is appropriate

Subgrade 3a

5 4 Good quality Subgrade 3a land covers a large proportion of the site The key limitations within this mapping unit being soil droughtiness and in some areas of the site topsoil

stoniness The majority of soil observations within this mapping unit proved to be impenetrable to the soil auger at depths of between 30 65cm this can be attributed to the presence of flaggy sandstone within the subsoils Above this depth profiles tend to comprise a slightly stony (6 15% total v/v >2mm hard sandstone) medium clay loam topsoil prevailing as an upper subsoil which was occasionally found to rest upon a moderately stony (25% total v/v >2mm soft sandstone) heavy clay loam or clay lower subsoil The impenetrable nature of the soil auger samples means that it was necessary to dig a soil inspection pit (pit no 1) to investigate the nature of the subsoil particularly the stone contents The soil profile at the location of the pit (where the soil augering proved impenetrable at 40cm) was found to comprise a slightly stony (15% total v/v >2mm hard sandstone) medium clay loam topsoil overlying a moderately stony (25% total v/v >2mm soft sandstone) clay upper subsoil extending to a depth of 48cm The lower subsoil comprised a heavy clay loam extending to 95cm containing 25% total soft sandstone to a depth of 65cm and 35% total soft sandstone below this A medium sandy loam containing 35% total soft sandstone was observed between 95 120cm Subsoils contain some manganese concretions yet the profile is well drained and assigned to Wetness Class I The combination of soil texture structures the presence of interbedded sandstone in the subsoil and the local climatic regime means that there is a moderate restriction on the amount of profile available water for plant growth Consequently this will have an affect upon the level and consistency of crop yields such that a classification of Subgrade 3a due to droughtiness is appropriate The impenetrable nature of the soils within this mapping unit means that for the purpose of assigning an overall grade it has been necessary to assume that subsoils resemble those observed in the soil inspection pit

5 5 Some deeper less droughty soils were observed within this mapping unit yet the principal limitation proved to be topsoil stoniness due to the presence of between 11 14% total hard sandstone greater than 2cm in size in the topsoils

Subgrade 3b

5 6 The remainder of the agricultural land on the site has been classified as Subgrade 3b moderate quality land with topsoil stoniness as the main limitation Topsoil stone measurements with a 2cm mesh sieve across much of the site showed certain areas to be excessively stony such that a classification of Subgrade 3b is appropriate Within this mapping unit a range of stone contents in the top 25 cm of soil were recorded (8 15% > 2 6cm 2 8% > 6cm in size) However the total volume of stones larger than 2cm (i e both stones >2cm and stones >6cm) ranged between 16 18% The main effects of high topsoil stone contents are to act as an impediment to cultivation harvesting and crop growth A high stone content can increase production costs by causing extra wear and tear to implements and tyres Stones can also impair crop establishment by causing reduced plant populations in precision drilled crops and significantly reduce the available water capacity of the soil thereby increasing the susceptibility of crops to drought

SOURCES OF REFERENCE

British Geological Survey (1971) Sheet No 287 Sevenoaks 1 50 000 Series (solid and drift edition)

MAFF (1988) Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land

Meteorological Office (1989) Climatological Data for Agricultural Land Classification

Soil Survey of England and Wales (1983) Sheet 6 Soils of South East England 1 250 000 and accompanying legend

APPENDIX I

DESCRIPTION OF THE 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 includes top fruit soft fruit salad crops and winter harvested vegetables Yields are high and less variable than on land of lower quality

Grade 2 Very Good Quality Agricultural Land

Land with minor limitations which affect crop yield cultivations or harvesting A wide range of agricultural or horticultural crops can usually be grown but on some land of this 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 land

Grade 3 Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops the timing and type of cultivation harvesting or the level of yield When 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 the level of yields It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable In moist climates yields of grass may be moderate to high but there may be difficulties in utilisation The grade also includes very droughty arable land

Grade 5 Very Poor Quality Agricultural Land

Land with severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

Urban

Built-up or hard' uses with relatively little potential for a return to agriculture including housing industry commerce education transport religous buildings cemetries Also hard surfaced sports facilities permanent caravan sites and vacant land all types of derelict land including mineral workings which are only likely to be reclaimed using derelict land grants

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture including private parkland public open spaces sports fields allotments and soft surfaced areas on airports Also active mineral workings and refuse tips where restoration conditions to 'soft after-uses may apply

Woodland

Includes commercial and non-commercial woodland A distinction may be made as necessary between farm and non-farm woodland

Agricultural Buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses Temporary structures (eg polythene tunnels erected for lambing) may be ignored

Open Water

Includes lakes ponds and rivers as map scale permits

Land Not Surveyed

Agricultural land which has not been surveyed

Where the land use includes more than one of the above eg buildings in large grounds and where map scale permits the cover types may be shown separately Otherwise the most extensive cover type will be shown

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile Six soil wetness classes are identified and are defined in the table below

Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years [2]
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 only wet within 40 cm depth for 30 days in most years
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 present within 80 cm depth it is wet within 70 cm for more than 180 days but only wet within 40 cm depth for between 31-90 days in most years
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or** if there is no slowly permeable layer present within 80 cm depth it is wet within 40 cm depth for 91-210 days in most years
V	The soil profile is wet within 40 cm depth for 211 335 days in most years
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics site and climatic factors Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field The method adopted here is common to ADAS and the SSLRC

[1]The number of days specified is not necessarily a continuous period

[2] In most years is defined as more than 10 out of 20 years

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents

Soil Abbreviations - Explanatory Note

Soil Pit Descriptions

Database Printout Boring Level Information

Database Printout - Horizon Level Information

SOIL PROFILE DESCRIPTIONS EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database This uses notations and abbreviations as set out below

Boring Header Information

1 **GRID REF** national 100 km grid square and 8 figure grid reference

2 **USE** Land use at the time of survey The following abbreviations are used

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

3 **GRDNT** Gradient as estimated or measured by a hand-held optical clinometer

4 **GLEY/SPL** *Depth in centimetres (cm) to gleying and/or slowly permeable layers*

5 **AP (WHEAT/POTS)** Crop adjusted available water capacity

6 **MB (WHEAT/POTS)** Moisture Balance (Crop adjusted AP crop adjusted MD)

7 **DRT** Best grade according to soil droughtiness

8 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				

9 **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				

Soil Pits and Auger Borings

1 **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)

2 **MOTTLE COL** Mottle colour using Munsell notation

3 **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% +

4 **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

5 **PED COL** Ped face colour using Munsell notation

6 **GLEY** If the soil horizon is gleyed a Y will appear in this column If slightly gleyed an S will appear

7 **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/metamorphic rock		

Stone contents (>2cm >6cm and total) are given in percentages (by volume)

8 **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	

9 **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

10 **SUBS STR** Subsoil structural condition recorded for the purpose of calculating profile droughtiness **G** good **M** moderate **P** poor

11 **POR** Soil porosity If a soil horizon has less than 0 5% biopores >0 5 mm a 'Y' will appear in this column

12 **IMP** If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropiate horizon

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

14 **CALC** If the soil horizon is calcareous a 'Y' will appear in this column

15 Other notations

APW available water capacity (in mm) adjusted for wheat
APP available water capacity (in mm) adjusted for potatoes
MBW moisture balance wheat
MBP moisture balance potatoes

SOIL PIT DESCRIPTION

Site Name WEST MALLING GOLF COURSE Pit Number 1P

Grid Reference TQ67595438 Average Annual Rainfall 674 mm
Accumulated Temperature 1424 degree days
Field Capacity Level 139 days
Land Use
Slope and Aspect degrees

HORIZON	TEXTURE	COLOUR	STONES	2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 27	MCL	10YR43 00	10		15	HR					
27- 48	C	10YR56 44	0		25	MSST	C			M	
48- 65	HCL	10YR44 56	0		25	MSST	F			M	
65- 95	HCL	75YR54 53	0		35	MSST	F			M	
95-120	MSL	25Y 53 00	0		35	MSST				M	

Wetness Grade 1 Wetness Class I
Gleying cm
SPL No SPL

Drought Grade 3A APW 123mm MBW 17 mm
APP 95 mm MBP -17 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Droughtiness

SOIL PIT DESCRIPTION

Site Name WEST MALLING GOLF COURSE Pit Number 2P

Grid Reference TQ67505404 Average Annual Rainfall 674 mm
Accumulated Temperature 1424 degree days
Field Capacity Level 139 days
Land Use
Slope and Aspect degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 29	MCL	10YR42 00	3	6	HR					
29- 45	MCL	10YR53 54	0	8	MSST		MDCSAB	FR	M	
45- 90	MZCL	10YR54 00	0	0		C	MDCSAB	FR	M	
90-120	HZCL	75YR53 00	0	0		C			M	

Wetness Grade 1 Wetness Class I
Gleying 090 cm
SPL No SPL

Drought Grade 2 APW 151mm MBW 45 mm
APP 115mm MBP 3 mm

FINAL ALC GRADE 2
MAIN LIMITATION Droughtiness

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WETNESS GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M REL DRT	EROSN FLOOD	FROST EXP	CHEM DIST	ALC LIMIT		COMMENTS
1P	TQ67595438	STB					1	1	123	17	95	-17	3A				DR	3A	
1S	TQ68075467	SAS					1	1		0		0					ST	3B	
2P	TQ67505404	STB			090		1	1	151	45	115	3	2				DR	2	
2S	TQ68015477	SAS					1	1		0		0					ST	3B	
3S	TQ67875473	SAS					1	1		0		0					ST	3B	
4S	TQ67945458	SAS					1	1		0		0					ST	3A	
5S	TQ67985464	SAS					1	1		0		0					ST	3B	
6S	TQ68115451	STB					1	1		0		0					ST	2	
7S	TQ67905439	STB					1	1		0		0					ST	3A	
8S	TQ67795440	STB					1	1		0		0					ST	3B	
9S	TQ67695439	STB					1	1		0		0					ST	2	
10S	TQ67505438	STB					1	1		0		0					ST	3A	
11S	TQ67355447	STB					1	1		0		0					ST	2	
12S	TQ67255446	STB					1	1		0		0					ST	2	
13S	TQ67255437	STB					1	1		0		0					ST	3B	
14S	TQ67185428	STB					1	1		0		0					ST	2	
15S	TQ67325422	STB					1	1		0		0					ST	2	
22	TQ68105470	STB					1	1		0		0					ST	3B	
24	TQ67475458	STB			S45		1	2	77	-29	77	-35	3B				ST	3B	I50SST
28	TQ67905460	STB					1	1	39	67	39	-73	4				ST	3B	
29	TQ68805460	STB					1	2	69	-37	69	43	3B				DR	3A	I55SST SEE1P
30	TQ68105460	STB					1	1	75	-31	75	-37	3B				DR	3A	I50SST SEE1P
31	TQ67275451	STB					1	1	87	-19	99	-13	3A				DR	3A	I65SST SEE1P
32	TQ67405450	STB			S28		1	1	64	-42	64	-48	3B				DR	3A	I40SST SEE1P
38	TQ68035451	STB					1	1	50	-56	50	-62	4				DR	3A	I30SST SEE1P
39	TQ68105450	STB			060		1	1	115	9	113	1	2				DR	3A	I90SST
40	TQ67205440	STB					1	1	67	-39	67	-45	3B				ST	3B	I45SST
41	TQ67305440	STB					1	1	84	-22	88	-24	3B				ST	3B	I60SST
42	TQ67405440	STB	S				1	1	87	-19	94	-18	3A				DR	3A	I45SST SEE1P
43	TQ67505440	STB	N	01			1	1	84	-22	87	-25	3B				DR	3A	I55SST SEE1P
44	TQ67605440	STB					1	2	63	-43	63	-49	3B				DR	3A	I40SST SEE1P
45	TQ67705440	STB			S30		1	2	97	9	109	3	3A				DR	3A	I65SST SEE1P
46	TQ67825438	STB	N	03	S40		1	1	152	46	116	4	2				ST	2	
47	TQ67925440	STB	N	02			1	1	61	-45	61	-51	3B				DR	3A	I38SST SEE1P
48	TQ68005440	STB					1	1	151	45	113	1	2				DR	2	
50	TQ67105430	STB	S	03			1	1	76	-30	76	-36	3B				DR	3A	I50SST SEE1P
51	TQ67205430	STB	S	02			1	1	149	43	123	11	1					1	
52	TQ67305430	STB	S	04			1	1	152	46	115	3	2				DR	2	
53	TQ67405430	STB	S	03			1	1	48	-58	48	-64	4				DR	3A	I30SST SEE1P
54	TQ67505430	STB					1	1	49	-57	49	-63	4				DR	3A	I30SST SEE1P
55	TQ67605432	STB	S	02			1	2	74	-32	74	38	3B				DR	3A	I45SST SEE1P
61	TQ67205420	STB					1	1	88	-18	94	18	3A				DR	3A	I60SST SEE1P

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT		ALC	COMMENTS
62	TQ67305420	STB					1	2	118	12	103	-9	2				DR		2	I100SST
63	TQ67405420	STB	E	01			1	1	57	-49	57	-55	3B				DR		3A	I35SST SEE1P
64	TQ67505420	STB	E	02			1	2	58	-48	58	-54	3B				DR		3A	I35SST SEE1P
65	TQ67605420	STB					1	2	51	-55	51	-61	4				DR		3A	I35SST SEE1P
66	TQ67705420	STB					1	1	88	-18	96	-16	3A				DR		3A	I60SST SEE1P
69	TQ67205410	STB					1	1	69	-37	69	-43	3B				DR		3A	I45SST SEE1P
70	TQ67305410	STB					1	1	79	-27	79	-33	3B				DR		3A	I50SST SEE1P
71	TQ67405410	STB	E	01			1	1	113	7	113	1	2				DR		2	I82SST SEE2P
72	TQ67505410	STB	E	01			1	1	127	21	116	4	2				DR		2	I90SST SEE2P
73	TQ67605410	STB					1	1	99	-7	110	-2	3A				DR		2	I55SST SEE2P
74	TQ67705410	STB					1	1	151	45	114	2	2				DR		2	
75	TQ67405400	SAS					1	2	61	-45	61	-51	3B				DR		4	I40SST SEE1P
76	TQ67505400	SAS					1	1	151	45	115	3	2				DR		2	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL	PED GLEY	STONES >2	STONES 6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	CALC
1P	0-27	mcl	10YR43 00						10	0	HR	15						
	27-48	c	10YR56 44	00MN00 00	C				0	0	MSST	25		M				
	48-65	hcl	10YR44 56	00MN00 00	F				0	0	MSST	25		M				
	65-95	hcl	75YR54 53	00MN00 00	F				0	0	MSST	35		M				
	95-120	msl	25Y 53 00						0	0	MSST	35		M				
1S	0-25	mcl	10YR44 00						17	8	HR	20						SIEVED
2P	0 29	mcl	10YR42 00						3	0	HR	6						
	29 45	mcl	10YR53 54						0	0	MSST	8	MDCSAB FR	M		Y		
	45-90	mzcl	10YR54 00	10YR56 00	C			S	0	0		0	MDCSAB FR	M		Y		
	90-120	hzcl	75YR53 00	75YR56 00	C	00MN00 00		Y	0	0		0		M		Y		
2S	0-25	mcl	10YR43 00						18	3	HR	20						SIEVED
3S	0 25	mcl	10YR43 00						18	5	HR	25						SIEVED
4S	0 25	mcl	10YR43 00						11	3	HR	18						SIEVED
5S	0-25	mcl	10YR44 00						18	6	HR	25						SIEVED
6S	0 25	mcl	10YR43 00						9	0	HR	15						SIEVED
7S	0-25	mcl	10YR43 00						13	3	HR	16						SIEVED
8S	0-25	mcl	10YR44 43						16	2	HR	18						SIEVED
9S	0-25	mcl	10YR43 44						6	0	HR	10						SIEVED
10S	0 25	mcl	10YR43 00						10	0	HR	16						SIEVED
11S	0-25	mcl	10YR43 00						8	0	HR	12						SIEVED
12S	0-25	mcl	10YR43 00						6	0	HR	12						SIEVED
13S	0-25	mcl	10YR42 00						16	8	HR	25						SIEVED
14S	0-25	mcl	10YR43 00						7	0	HR	12						SIEVED
15S	0-25	mcl	10YR43 00						8	0	HR	13						SIEVED
22	0-20	mcl	10YR43 00						14	0	MSST	20						SIEVED
24	0 25	hcl	10YR43 00						5	0	MSST	10						
	25-45	c	75YR56 00	10YR58 00	C	00MN00 00		S	0	0	MSST	10		M				
	45-50	c	75YR56 00	10YR58 00	C	00MN00 00		S	0	0	MSST	20		M				
28	0-25	mcl	10YR43 00						16	0	HR	25						SIEVED

SAMPLE	DEPTH	TEXTURE	COLOUR	-- MOTTLES --- COL	ABUN	CONT	PED COL	GLEY	--- STONES---- 2	6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
29	0-25	hcl	10YR43 44						5	0	HR	10							
	25 45	c	10YR56 00	05Y 54	00	C		S	0	0	MSST	15		M					IMP SANDSTONE
30	0-22	mcl	10YR43 00						8	0	HR	12							
	22-40	mcl	10YR56 00						0	0	MSST	10		M					
	40-50	hcl	75YR56 00						0	0	MSST	25		M					IMP SANDSTONE
31	0-28	mcl	10YR43 00						10	0	HR	15							
	28-40	hcl	10YR56 00						0	0	MSST	20		M					
	40-65	c	10YR54 66						0	0	MSST	5		M					IMP SANDSTONE
32	0-28	mcl	10YR43 00						5	0	HR	10							
	28-40	hcl	10YR56 00	10YR68 00		C	00MN00 00	S	0	0	MSST	10		M					IMP SANDSTONE
38	0-30	mcl	10YR42 52						5	0	HR	10							IMP SANDSTONE
39	0-30	mcl	10YR43 00						2	0	HR	3							
	30-60	hcl	10YR56 66	10YR58 00		C		S	0	0	MSST	5		M					
	60-90	c	10YR54 64	10YR68 00		C		S	0	0	MSST	10		M					IMP SANDSTONE
40	0-30	mcl	10YR42 00						15	0	HR	25							
	30-45	hcl	10YR56 00						0	0	MSST	20		M					IMP SANDSTONE
41	0-24	mcl	10YR42 00						14	0	HR	20							
	24-50	hcl	10YR56 00						0	0	MSST	15		M					
	50-60	scl	10YR56 00						0	0	MSST	20		M					IMP SANDSTONE
42	0-27	mcl	10YR43 00						5	0	HR	8							
	27-45	hcl	10YR54 00						0	0	MSST	10		M					
	45-60	c	75YR44 00						0	0	MSST	10		M					IMP SANDSTONE
43	0-27	mcl	10YR43 00						5	0	HR	8							
	27-55	mcl	10YR54 00						0	0	MSST	10		M					IMP SANDSTONE
44	0-27	mcl	75YR43 00						5	0	HR	10							
	27-40	c	10YR56 54						0	0	MSST	15		M					IMP SANDSTONE
45	0-30	hcl	10YR43 00						2	0	HR	5							
	30-38	hzcl	10YR54 00	10YR56 00		C		S	0	0	MSST	5		M					
	38 65	c	10YR54 53	75YR56 58		M		S	0	0	MSST	10		M					IMP SANDSTONE
46	0 30	mcl	10YR43 00						5	0	HR	8							
	30 40	mcl	10YR54 00						0	0	MSST	8		M					
	40-80	hzcl	10YR54 00	10YR56 00		C	10YR63 00	S	0	0		0		M					
	80-120	hcl	10YR54 00	10YR56 63		C		S	0	0		0		M					
47	0-28	mcl	10YR42 00						2	0	HR	8							
	28-38	hcl	10YR56 00						0	0	MSST	10		M					IMP SANDSTONE

SAMPLE	DEPTH	TEXTURE	COLOUR	--MOTTLES-- COL	ABUN	CONT	PED COL	GLEY	>2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
48	0-27	mcl	10YR42 00						2	0	HR	5							
	27-38	mcl	10YR54 43						0	0	MSST	4		M					
	38 55	mcl	10YR44 54						0	0	MSST	5		M					
	55-120	mcl	10YR44 00	10YR63 00	C		00MN00 00		0	0		0		M					
50	0-27	mcl	10YR43 00						6	0	HR	10							
	27-50	msl	25Y 53 00						0	0	MSST	10		M			IMP	SANDSTONE	
51	0-27	mzcl	10YR43 00						1	0	HR	3							
	27-70	hzcl	75YR44 00						0	0		0		M					
	70-120	zc	75YR44 00						0	0		0		M					
52	0-25	mzcl	10YR43 00						0	0	HR	2							
	25-60	zc	75YR56 00						0	0		0		M					
	60 120	hcl	10YR56 00	10YR63 00	F				0	0		0		M					
53	0 25	mcl	10YR43 00						6	0	HR	10							
	25-30	c	10YR56 54						0	0	MSST	15		M			IMP	SANDSTONE	
54	0-27	mcl	75YR43 00						6	0	HR	10							
	27-30	hcl	10YR54 00						0	0	MSST	15		M			IMP	SANDSTONE	
55	0-30	hcl	10YR42 00						2	0	HR	5							
	30-45	hcl	10YR54 00						0	0	MSST	10		M			IMP	SANDSTONE	
61	0-27	mcl	10YR42 00						5	0	HR	8							
	27-50	hcl	10YR54 00	00MN00 00	F				0	0	MSST	10		M					
	50-60	hcl	10YR54 00	00MN00 00	F				0	0	MSST	10		M			IMP	SANDSTONE	
62	0-26	hcl	10YR43 00						5	0	HR	10							
	26-50	hcl	10YR54 00						0	0	MSST	15		M					
	50-100	hcl	10YR54 00						0	0	MSST	20		M			IMP	SANDSTONE	
63	0-27	mcl	10YR42 00						3	0	HR	8							
	27-35	c	10YR56 54						0	0	MSST	10		M			IMP	SANDSTONE	
64	0-27	hcl	10YR43 00						2	0	HR	5							
	27-35	hcl	10YR56 68						0	0	MSST	15		M			IMP	SANDSTONE	
65	0-27	hcl	10YR43 44						2	0	HR	5							
	27-30	hcl	10YR56 68						0	0	MSST	15		M			IMP	SANDSTONE	
66	0-28	mcl	10YR43 44						2	0	HR	5							
	28-50	c	10YR56 00						0	0	MSST	8		M					
	50-60	c	10YR56 00						0	0	MSST	12		M			IMP	SANDSTONE	
69	0-27	mcl	10YR42 43						8	0	HR	12							
	27-45	hcl	10YR54 00						0	0	MSST	15		M			IMP	SANDSTONE	

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES- COL	ABUN	CONT	PED COL	GLEY	-STONES- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
70	0-28	mcl	10YR42 43						5	0	HR	10							
	28-40	mzcl	10YR54 00						0	0	MSST	10		M					
	40-50	mcl	10YR56 00						0	0	MSST	15		M					IMP SANDSTONE
71	0-30	mcl	10YR43 00						1	0	HR	3							
	30-50	c	10YR44 54						0	0	MSST	5		M					
	50-82	hcl	10YR54 00						0	0	MSST	8		M					IMP SANDSTONE
72	0-28	mcl	10YR43 00						1	0	HR	4							
	28-40	mcl	10YR54 00						0	0	MSST	8		M					
	40-50	mcl	10YR56 00						0	0	MSST	8		M					
	50-95	hzcl	10YR56 00						0	0	MSST	15		M					IMP SANDSTONE
73	0-30	mcl	10YR43 00						3	0	HR	6							
	30-38	mcl	10YR43 54						0	0	MSST	10		M					
	38-70	mcl	10YR56 54						0	0	MSST	10		M					IMP SANDSTONE
74	0-30	mcl	10YR43 00						1	0	HR	4							
	30-60	mcl	10YR44 00						0	0	MSST	4		M					
	60-80	mcl	10YR44 00						0	0	MSST	8		M					
	80-120	mcl	10YR44 00						0	0	MSST	2		M					
75	0-26	hcl	10YR43 00						5	0	HR	10							
	26-40	scl	25Y 53 00						0	0	MSST	15		M					IMP SANDSTONE
76	0-25	mcl	10YR42 43						3	0	HR	6							
	25-40	hcl	10YR56 00						0	0	MSST	15		M					
	40-70	hzcl	10YR54 00						0	0		0		M					
	70-120	mzcl	10YR54 00	00MN00	00	F			0	0		0		M					