A1

Hampshire Minerals Plan
Site 6 : Hazleton Farm,
Horndean
Agricultural Land Classification
ALC Map and Report
November 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

HAMPSHIRE MINERALS PLAN
OMISSION SITE 6 : HAZLETON FARM HORNDEAN

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the county of Hampshire. The work forms part of MAFF's statutory input to the preparation of the Hampshire Minerals Plan.

1.2 Site 6 comprises 62.5 hectares of land to the east of Horndean, East Hampshire. An Agricultural Land Classification (ALC) survey was carried out during November 1994. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land surveyed. A total of 52 borings and three 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 long term limitations on its use for agriculture.

1.3 At the time of the survey the land use was rough grazing. Land mapped as Non-agricultural comprises scrub and bracken.

1.4 The distribution of the 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
4	61.4	98.2
Non-agricultural	1.1	1.8
Total area of site	62.5	100.0

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 All of the agricultural land surveyed has been classified as Grade 4, poor quality. Non-calcareous heavy silty clay loam and heavy clay loam topsoils overlie clay subsoils. The clay subsoils are slowly permeable and act to significantly impede drainage, resulting in severe soil wetness and workability limitations. Moderately steep slopes (12-15°) to the south of the site also influenced the grading of the land.

2. Climate

2.1 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 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. In addition no local climatic factors such as exposure or frost risk are believed to affect the site.

2.3 Climatic factors do, however interact with soil properties to influence soil wetness limitations.

Table 2 : Climatic Interpolation

Grid Reference	SU707110	SU710115
Altitude (m)	40	60
Accumulated Temperature (degree days, Jan-June)	1506	1482
Average Annual Rainfall (mm)	831	854
Field Capacity (days)	179	184
Moisture Deficit, Wheat (mm)	107	104
Moisture Deficit, Potatoes (mm)	100	96
Overall Climatic Grade	1	1

3. Relief

3.1 The site lies at an altitude of 40-60m (AOD), falling gently from north to south on the land in the north of the site. The topography in the south of the site is affected by a stream that cuts through the centre, forming steep valley sides, especially on its eastern slopes, with flatter plateau slopes along the western and eastern edges.

4. Geology and Soil

4.1 Published geological information (BGS, 1971) shows the entire site to be underlain by Reading Beds.

4.2 The published Soil Survey map, (SSEW, 1983) shows the majority of the site to comprise soils of the Wickham 3 Association. These are described as ' stagnogleys developed in fine loamy or fine silty drift over clay', (SSEW,1984). The remaining land in the southern most part of the site, south and west of the stream, is mapped as Wickham 4 Association. These are described as ' seasonally waterlogged soils with slowly permeable sub-surface horizons', (SSEW, 1984).

4.3 Detailed field examination found heavy silty or clayey loams over clay at variable depths. The soils are affected by imperfect drainage caused by the poorly structured clay horizons.

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 4

5.3 Land classed as poor quality is restricted by severe soil wetness and workability limitations.

5.4 Non-calcareous, shallow, heavy silty clay loam, heavy clay loam or clay topsoils overlie poorly structured clay subsoils. Pits 1 to 3 illustrate the range of wetness characteristics that occur on the site. Typically, the subsoils are slowly permeable with angular blocky or platy structures which act to severely impede the drainage through the profile. As a result, most of the soils show significant gleying within or just below the topsoil, and are placed in Wetness Class IV. This degree of wetness, together with the heavy nature of the topsoils, limits the land to Grade 4 at the prevailing field capacity level (179-184 days). Many of the soils were saturated at the time of the survey, with waterlogged hollows and widespread with vegetation species (juncus and sedges) ; the more steeply sloping valley sides often had water seeping out of the soil and running over the surface, almost like springs.

5.5 Pit 2 is actually classified as Subgrade 3b, given the slightly deeper occurrence of a slowly permeable layer, but is placed in a Grade 4 map unit as a result of the adjacent plateau soils showing clear evidence of shallower SPLs.

5.6 Some of the land in the flatter, northern part of the site shows variable evidence of disturbance. Shallow topsoils often overlie an anaerobic layer and may occasionally

be slightly to moderately stony. One spoil heap is still in evidence in this part of the site.

5.7 The severity of the wetness limitation across the site acts to greatly restrict the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

ADAS Ref: 1513/115/94
MAFF Ref: EL15/00594

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1971), Sheet No. 316, Fareham, 1:63,360 (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 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 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 **ST** : strongly developed	**MD** : moderately developed
ped size	**F** : fine **C** : coarse	**M** : medium **VC** : very coarse
ped shape	**S** : single grain **GR** : granular **SAB** : sub-angular blocky **PL** : platy	**M** : massive **AB** : angular blocky **PR** : prismatic

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 : HANTS.MINS.SITE6 HAZLTN. Pit Number : 1P

Grid Reference: SU70691135 Average Annual Rainfall : 854 mm
Accumulated Temperature : 1482 degree days
Field Capacity Level : 184 days
Land Use : Permanent Grass
Slope and Aspect : 02 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 10	HZCL	10YR41 00	0	2	HR	F				
10- 22	HZCL	10YR52 00	0	0		C	MCSAB	FM	M	
22- 60	ZC	10YR62 00	0	0		M	MCAB	FM	P	

Wetness Grade : 4 Wetness Class : IV
Gleying :010 cm
SPL :022 cm

Drought Grade : APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 4
MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : HANTS.MINS.SITE6 HAZLTN. Pit Number : 2P

Grid Reference: SU70881085 Average Annual Rainfall : 854 mm
Accumulated Temperature : 1482 degree days
Field Capacity Level : 184 days
Land Use : Permanent Grass
Slope and Aspect : 03 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	C	10YR52 53	0	10	HR	C	MDCSAB	FR		
25- 55	C	10YR52 00	0	0		C	MDCSAB	FM	M	
55- 65	C	10YR53 00	0	0		C	MDCAB	FM	P	
65-120	SCL	10YR62 00	0	0		C	MDCSAB	FR	M	

Wetness Grade : 3B Wetness Class : II
Gleying :000 cm
SPL : No SPL

Drought Grade : APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : HANTS.MINS.SITE6 HAZLTN. Pit Number : 3P

Grid Reference: SU70521083 Average Annual Rainfall : 854 mm
Accumulated Temperature : 1482 degree days
Field Capacity Level : 184 days
Land Use : Rough Grazing
Slope and Aspect : 01 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 18	MCL	10YR42 00	4	15	HR			FR		
18- 26	HCL	10YR52 00	0	20	HR			FM	M	
26- 45	C	10YR62 00	0	0		M	MCSAB	FM	M	
45-120	C	10YR62 00	0	0		M	MCPL	FM	P	

Wetness Grade : 4 Wetness Class : IV
Gleying : cm
SPL :045 cm

Drought Grade : 2 APW : mm MBW : 0 mm
APP : mm MBP : 0 mm

FINAL ALC GRADE : 4
MAIN LIMITATION : Wetness

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
1	0-20	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	2						
	20-120	c	25Y 71 00	10YR68 00	C			Y	0	0	HR	2		P			Y	
1P	0-10	hzcl	10YR41 00	75YR56 00	F				0	0	HR	2						
	10-22	hzcl	10YR52 00	75YR56 00	C			Y	0	0		0	MCSAB	FM M		Y		
	22-60	zc	10YR62 00	10YR68 00	M			Y	0	0		0	MCAB	FM P		Y		Y
2	0-20	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	3						
	20-120	c	25Y 71 00	10YR68 00	C			Y	0	0	HR	2		P			Y	
2P	0-25	c	10YR52 53	75YR56 58	C			Y	0	0	HR	10	MDCSAB	FR				
	25-55	c	10YR52 00	75YR58 00	C			Y	0	0		0	MDCSAB	FM M				
	55-65	c	10YR53 00	75YR56 00	C			Y	0	0		0	MDCAB	FM P				
	65-120	scl	10YR62 00	75YR58 00	C			Y	0	0		0	MDCSAB	FR M				
3	0-20	hzcl	10YR42 00	75YR56 00	F			Y	0	0	HR	5						
	20-80	c	25Y 71 00	10YR58 00	C			Y	0	0	HR	7		P			Y	
3P	0-18	mcl	10YR42 00						4	0	HR	15		FR				
	18-26	hcl	10YR52 00						0	0	HR	20		FM M				
	26-45	c	10YR62 00	10YR56 00	M			Y	0	0		0	MCSAB	FM M		Y		
	45-120	c	10YR62 00	10YR56 00	M			Y	0	0		0	MCPL	FM P		Y		Y
5	0-20	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	2						
	20-120	c	05Y 71 00	10YR58 00	C			Y	0	0		0		P			Y	
6	0-10	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	3						
	10-120	c	05Y 71 00	10YR58 00	C			Y	0	0		0		P			Y	
7	0-20	hzcl	10YR51 00						0	0	HR	3						
	20-100	c	05Y 71 00	10R 56 00	C			Y	0	0	HR	2		P			Y	
8	0-10	hzcl	10YR42 00	75YR56 00	F			Y	0	0	HR	5						
	10-120	c	25Y 71 00	25Y 68 00	C			Y	0	0		0		P			Y	
9	0-20	hzcl	10YR51 00	75YR56 00	F			Y	0	0	HR	3						
	20-120	c	25Y 71 00	10YR68 00	C			Y	0	0	HR	2		P			Y	
10	0-40	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	10						
11	0-15	hzcl	10YR42 00	75YR56 00	F			Y	0	0	HR	2						
	15-120	c	75Y 71 00	25YR68 00	C			Y	0	0	HR	2		P			Y	
12	0-20	hzcl	10YR42 00	75YR56 00	F			Y	0	0	HR	3						
	20-120	c	25Y 71 00	10YR68 00	C			Y	0	0	HR	2		P			Y	
13	0-10	hzcl	10YR42 00	75YR56 00	C			Y	0	0	HR	3						
	10-120	c	25Y 71 00	25YR56 00	C			Y	0	0	HR	1		P			Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
14	0-10	hzcl	10YR41 00	75YR56 00	F			Y	0	0	HR	4						
	10-120	c	25Y 71 00	10YR68 00	C			Y	0	0	HR	3		P			Y	
15	0-15	hzcl	10YR41 00	75YR56 00	F			Y	0	0	HR	2						
	15-120	c	25Y 71 00	10YR58 00	C			Y	0	0		0		P			Y	
16	0-15	hzcl	10YR51 00	75YR56 00	C			Y	0	0		0						
	15-80	c	25Y 71 00	75YR56 00	C			Y	0	0		0		P			Y	
	80-120	c	25Y 71 00	25YR68 00	C			Y	0	0		0		P			Y	
17	0-40	c	25Y 71 00	25YR68 00	C			Y	0	0	HR	5					Y	
18	0-15	hzcl	10YR42 00	75YR56 00	F			Y	0	0	HR	2						
	15-120	c	25Y 71 00	25YR68 00	C			Y	0	0	HR	1		P			Y	
19	0-5	c	10YR51 00	25YR68 00	C			Y	0	0		0						
	5-120	c	25Y 71 00	25YR68 00	C			Y	0	0	SLST	2		P			Y	
20	0-20	hzcl	10YR51 00	75YR56 00	C			Y	0	0		0						
	20-120	c	25Y 71 00	25YR68 00	C			Y	0	0	HR	1		P			Y	
21	0-20	c	10YR52 00	10YR68 00	C			Y	0	0	HR	1					Y	
	20-120	c	25Y 71 00	25YR68 00	C			Y	0	0		0		P			Y	
22	0-20	hzcl	10YR51 00	75YR56 00	F			Y	0	0	HR	2						
	20-120	c	25Y 71 00	10YR68 00	C			Y	0	0	HR	1		P			Y	
23	0-15	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	1						
	15-120	c	25Y 71 00	10YR68 00	C			Y	0	0	SLST	1		P			Y	
24	0-10	hzcl	10YR51 00	75YR56 00	F			Y	0	0		0						
	10-120	c	25Y 71 00	05Y 56 00	C			Y	0	0	SLST	1		P			Y	
25	0-15	hzcl	10YR51 00	75YR56 00	C			Y	0	0	HR	2						
	15-120	c	25Y 71 00	25YR68 00	C			Y	0	0		0		P			Y	
27	0-5	hcl	10YR42 00						0	0	HR	0						
	5-50	c	10YR52 62	75YR56 58	C			Y	0	0	HR	2		P			Y	
	50-120	c	10YR31 41	75YR46 58	C			Y	0	0	HR	2		P			Y	
28	0-10	hzcl	10YR51 00	75YR46 00	C			Y	0	0	HR	2	FM					
	10-45	c	25Y 64 66	75YR58 56	C			Y	0	0	HR	0	VF	P	Y		Y	
	45-120	c	00N 76 00	75YR46 00	C			Y	0	0	HR	0	VF	P			Y	
30	0-15	hzcl	10YR41 31	75YR46 00	C			Y	0	0	HR	5	FM					
	15-50	c	10YR51 42	75YR56 58	C			Y	0	0	HR	0	VF	P	Y		Y	
	50-120	c	10YR51 62	75YR56 58	C			Y	0	0	HR	0	VF	P	Y		Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
31	0-10	hzcl	10YR41 00 75YR46 00 C					Y	0	0	HR	0	FM					
	10-60	c	75YR61 00 75YR58 56 C				75YR46 00	Y	0	0	HR	0	VF	P	Y		Y	
	60-120	c	75YR30 00 75YR58 00 C					Y	0	0	HR	0	VF	P			Y	
33	0-15	hzcl	10YR51 00 75YR56 00 C					Y	0	0	HR	2						
	15-80	c	10YR51 00 75YR56 00 C					Y	0	0	HR	2		P			Y	
34	0-20	c	10YR53 00 000C00 00 M					Y	0	0		0						
	20-55	c	05YR63 00 000C00 00 M					Y	0	0		0		P			Y	
	55-120	c	25Y 62 00 000C00 00 M					Y	0	0		0		P	Y		Y	
35	0-20	c	10YR53 52 000C00 00 M					Y	0	0		0						
	20-45	c	10YR62 63 000C00 00 M					Y	0	0		0		P	Y		Y	
	45-90	c	25Y 62 00 000C00 00 M					Y	0	0		0		P	Y		Y	
37	0-10	hcl	10YR42 00 000C00 00 C					Y	0	0		0						
	10-50	c	25Y 06 00 000C00 00 M					Y	0	0		0		P	Y		Y	
	50-55	c	25Y 06 00 000C00 00 M					Y	0	0	CH	5		P	Y		Y	
38	0-20	c	10YR52 00 000C00 00 M					Y	0	0		0						
	20-70	c	05YR53 00 000C00 00 M					Y	0	0		0		P	Y		Y	
	70-120	c	25YR46 00 000C00 00 M					Y	0	0		0		P	Y		Y	
39	0-15	hcl	10YR42 00 000C00 00 C					Y	0	0		0						
	15-80	c	05YR53 00 000C00 00 M					Y	0	0		0		P	Y		Y	
	80-120	c	25Y 62 00 000C00 00 M					Y	0	0		0		P	Y		Y	
40	0-15	hcl	10YR52 00 000C00 00 C					Y	0	0		0						
	15-35	c	10YR62 00 000C00 00 M					Y	0	0		0		P	Y		Y	
	35-50	c	10YR53 00 000C00 00 M					Y	0	0		0		P	Y		Y	
	50-120	c	25Y 62 00 000C00 00 M					Y	0	0		0		P	Y		Y	
41	0-20	hzcl	10YR32 00						0	0	HR	7						
	20-90	c	25Y 71 00 10YR58 00 C					Y	0	0		0		P			Y	
	90-120	c	25Y 71 00 25YR68 00 C					Y	0	0		0		P			Y	
42	0-20	hzcl	10YR51 00 75YR56 00 C					Y	0	0	HR	1						
	20-120	c	25Y 71 00 10YR58 00 C					Y	0	0		0		P			Y	
47	0-15	hzcl	10YR41 00						0	0	HR	5						
	15-35	c	10YR42 00 75YR46 58 C					Y	0	0	HR	5		M				
51	0-20	hzcl	10YR51 00 75YR56 00 C					Y	0	0		0						
	20-50	hzcl	25Y 71 00 75YR56 00 C					Y	0	0		0		P			Y	
	50-120	c	25Y 71 00 10YR58 00 C					Y	0	0		0		P			Y	
52	0-25	hzcl	10YR51 00 75YR58 00 C					Y	0	0	HR	5						

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
53	0-25	c	25Y 52 00	000C00	00	M		Y	0	0		0						
	25-80	c	25Y 62 00	000C00	00	M		Y	0	0	HR	2		P	Y		Y	
	80-90	c	25Y 63 00	000C00	00	M		Y	0	0		0		P	Y		Y	
54	0-5	hzcl	10YR31 00						0	0		0						
	5-100	c	25Y 71 00	10YR58	00	C		Y	0	0	HR	3		P			Y	
55	0-10	mzcl	10YR51 00	75YR56	00	C		Y	0	0		0						
	10-45	hzbl	10YR52 00	75YR56	00	C		Y	0	0		0		P				
	45-120	c	10YR51 00	10YR58	00	C		Y	0	0		0		P			Y	
56	0-20	mzcl	10YR32 00						0	0		0						
	20-120	c	25Y 71 00	75YR56	00	C		Y	0	0		0		P			Y	
57	0-25	hzcl	10YR30 00						0	0	HR	2						
	25-45	c	75YR54 00	75YR58	00	C		Y	0	0	HR	0		M				
	45-120	c	10YR62 51	75YR58	56	C		Y	0	0	HR	0	VF	P	Y		Y	
58	0-15	hcl	10YR52 00	000C00	00	C		Y	0	0		0						
	15-80	c	10YR62 00	000C00	00	M		Y	0	0		0		P	Y		Y	
60	0-15	mzcl	10YR31 00						0	0		0						
	15-30	hzcl	10YR54 00						0	0		0		P				
	30-120	c	25Y 71 00	10YR58	00	C		Y	0	0		0		P			Y	
61	0-5	mzcl	10YR31 00						0	0		0						
	5-120	c	25Y 71 00	10YR58	00	C		Y	0	0		0					Y	
63	0-15	hcl	10YR52 00	000C00	00	C		Y	0	0		0						
	15-70	c	25Y 63 00	000C00	00	M		Y	0	0		0		P	Y		Y	
	70-120	c	25Y 62 00	000C00	00	M		Y	0	0		0		P	Y		Y	
66	0-10	hzcl	10YR31 00						0	0		0						
	10-120	c	25Y 71 00	10YR58	00	M		Y	0	0		0		P			Y	
68	0-10	hzcl	10YR31 00						0	0		0						
	10-120	c	25Y 71 00	10YR58	00	C		Y	0	0		0		P			Y	
69	0-25	mzcl	10YR31 00						0	0		0						
	25-120	c	25Y 71 00	10YR58	00	C		Y	0	0		0		P			Y	

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
1	SU70801175	PGR	S		000	020	4	4	000	0	000	0					WE	4	
1P	SU70691135	PGR	S	02	010	022	4	4	000	0	000	0					WE	4	AUG120
2	SU70801160	PGR	S		000	020	4	4	000	0	000	0					W	4	
2P	SU70881085	PGR	N	03	000		2	3B	000	0	000	0					WE	3B	
3	SU70901160	PGR	S		000	020	4	4	000	0	000	0					WE	4	IMP80STN
3P	SU70521083	RGR	S	01		045	4	4		0	·	0	2				WE	4	HEAVYTOP
5	SU70601150	PGR	S	02	000	020	4	4	000	0	000	0					W	4	
6	SU70701150	PGR	S	02	000	010	4	4	000	0	000	0					W	4	
7	SU70801150	PGR	S	02	020	020	4	4	000	0	000	0					W	4	
8	SU70901150	PGR	S		000	010	4	4	000	0	000	0					WE	4	
9	SU71001150	PGR	S	03	000	020	4	4	000	0	000	0					WE	4	
10	SU71101150	PGR	S	03	000	000	4	4	069	-35	069	-27	3B				DR	4	
11	SU70601140	PGR	S	02	000	015	4	4	000	0	000	0					WE	4	
12	SU70701140	PGR	S	02	000	020	4	4	000	0	000	0					WE	4	
13	SU70801140	PGR	S	02	000	010	4	4	000	0	000	0					WE	4	
14	SU70901140	PGR	S	02	000	010	4	4	000	0	000	0					WE	4	
15	SU71001140	PGR	S	02	000	015	4	4	000	0	000	0					WE	4	
16	SU71101140	PGR	W	03	000	015	4	4	000	0	000	0					WE	4	
17	SU71201140	PGR	W	04	000	000	4	4	000	0	000	0				Y	WE	4	DISTD.
18	SU70601130	PGR	S	02	000	015	4	4	000	0	000	0					WE	4	V.WET TS
19	SU70701130	PGR	S	02	000	005	4	4	000	0	000	0					WE	4	
20	SU70801130	PGR	S		000	020	4	4	000	0	000	0					WE	4	
21	SU70901130	PGR	S		000	000	4	4	000	0	000	0					WE	4	
22	SU71001130	PGR	S		000	020	4	4	000	0	000	0					WE	4	
23	SU71101130	PGR	W	03	000	015	4	4	000	0	000	0					WE	4	
24	SU71201130	PGR	W	02	000	010	4	4	000	0	000	0					WE	4	
25	SU71301130	PGR	W	02	000	015	4	4	000	0	000	0					WE	4	
27	SU70701120	RGR	N	06	000	000	4	4	000	0	000	0	2				WE	4	
27	SU70701120	RGR	N	06	005	005	4	4	115	11	092	-4	2				WE	4	
28	SU70801120		S	03	000	010	4	4	120	16	097	1	2				WE	4	
30	SU71001120	RGR	S	01	000	015	4	4	122	18	099	3	2				WE	4	
31	SU71101120	RGR	S	03	000	010	4	4	120	16	097	1	2				WE	4	
33	SU71301120	PGR	W	02	000	015	4	4	000	0	000	0					WE	4	IMP80STN
34	SU70601110	PGR			000	020	4	4	122	15	099	-1	2				WE	4	
35	SU70701110	PGR	NE	04	000	020	4	4	101	-6	099	-1	3A				WE	4	DEEPER
37	SU70901110	PGR	SW	04	000	010	4	4	074	-33	076	-24	3B				WE	4	IMPCHLKY
38	SU71001110	PGR	SW		000	020	4	4	122	15	099	-1	2				WE	4	WET 20CM
39	SU71101110	PGR	W	04	000	015	4	4	122	15	099	-1	2				WE	4	
40	SU71201110	PGR	W	05	000	015	4	4	122	15	099	-1	2				WE	4	
41	SU70601100	PGR	E	02	020	020	4	4	000	0	000	0					WE	4	
42	SU70701100	PGR	E	02	000	020	4	4	000	0	000	0					WE	4	
47	SU70501090	RGR	N		015		4	4	058	-46	058	-38	3B				WE	4	

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
51	SU70901080	PGR	NE	08	000	020	4	4	000	0	000	0					WE	4	
52	SU70501080	RGR	S		000		2	4	000	-104	000	-96	4				DR	4	
53	SU71201110	PGR	E	05	000	025	4	4	102	-5	100	0	3A				WE	4	DEEPER
54	SU70701080	PGR	W	11	005	005	4	4	000	0	000	0					WE	4	
55	SU70801080	PGR	W	06	000	045	4	4	000	0	000	0					WE	4	
56	SU70901080	PGR	NE		020	020	4	4	000	0	000	0					WE	4	
57	SU70501070	RGR	S		025	045	4	4	134	30	111	15	1				WE	4	
58	SU70601070	PGR	E	05	000	015	4	4	094	-13	099	-1	3A				WE	4	DEEPER
60	SU70801070	PGR	W		030	030	4	4	000	0	000	0					WE	4	
61	SU70901070	PGR	W		005	005	4	4	000	0	000	0					WE	4	
63	SU70501060	PGR	S	05	000	015	4	4	122	15	099	-1	2				WE	4	
66	SU70801060	PGR	W		010	010	4	4	000	0	000	0					WE	4	
68	SU70701050	PGR	NW	02	010	010	4	4	000	0	000	0					WE	4	
69	SU70801050	PGR	W		025	025	4	4	000	0	000	0					WE	4	