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Hampshire Structure Plan Review
Land at Hook
Agricultural Land Classification
ALC Map and Report
Reconnaissance Survey
February 1995

AGRICULTURAL LAND CLASSIFICATION REPORT

HAMPSHIRE STRUCTURE PLAN REVIEW LAND AT HOOK RECONNAISSANCE SURVEY

1. Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of 'areas of search' in connection with MAFF's input to the Hampshire Structure Plan Review.
- 1.2 Land around Hook, in Hampshire, comprises approximately 634 hectares of land bounded by Newnham, Rotherwick, West Green and the railway track to the south. An Agricultural Land Classification (ALC) survey was carried out during February 1995. The survey was completed at a reconnaissance level of detail, on a 'free' survey basis, as it was undertaken primarily to update the 1:63,360 scale provisional ALC map for the 'area of search.' Consequently, the results are designed for strategic planning purposes only. For site specific proposals, further, more detailed surveys may be required. A total of 60 auger borings and two soil inspection pits were assessed 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. A detailed ALC survey on 22 hectares of land around Great Nightingales Copse was carried out in 1993, under the revised system, and this information was also used to compile the reconnaissance map (ADAS Ref: 1506/13/93). Details from the 1985, pre-revision, ALC survey were also considered when assessing the land quality in the west of the site (ADAS Ref: 1506/65/85).
- 1.3 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.
- 1.4 At the time of the survey the agricultural land was largely under permanent grassland and winter cereals with some smaller areas of oilseed rape, ley grass and orchard. Urban areas include farm buildings, private dwellings and commercial properties. Non-agricultural land is mapped in the south western corner of the site and comprises scrub land adjacent to a stream. Woodland occurs across the survey area in the form of small copses.
- 1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in Table 1 overleaf. The map has been drawn at a scale of 1:50,000. It is accurate at this scale, but any enlargement would be misleading.
- 1.6 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.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Land
2	47.7	7.5	8.6
3B	509.2	80.3	<u>91.4</u>
Non-Agricultural	2.5	0.4	100% (556.9 Ha)
Urban	18.7	2.9	
Woodland	<u>56.1</u>	<u>8.9</u>	
Total area of site	634.2	100%	

1.7 The vast majority of agricultural land in this 'area of search' has been classified as moderate quality (Subgrade 3b) due to soil wetness. Some very good quality (Grade 2) land was identified in the south eastern corner of the site where more freely draining profiles occur. The principal limitation here is soil droughtiness.

1.8 Most of the land surveyed is affected by soil wetness restrictions caused by the presence of poorly drained clayey subsoils. These soils are derived from the London Clay and as such comprise pale, gleyed, medium to heavy textured topsoils over slowly permeable clay at shallow depths. The resultant drainage restriction is mainly considered to be consistent with Subgrade 3b though occasional borings of slightly better quality were recorded where the clay occurs lower in the profile. These were not mapped separately due to their limited number and extent. In the south east of the site soils derived from the Bagshot and Bracklesham Beds are more freely draining, comprising slightly stony sandy loams over similar or coarser textured subsoils. This land is affected by a slight soil droughtiness limitation consistent with Grade 2.

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, 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 grid point 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, Field Capacity Days (FCD) range from 147 to 154 FCDs at this locality and therefore straddle the 150 FCD boundary used in Agricultural Land Classification. Nevertheless the soils on this site are such that agricultural land quality is not affected by this boundary. Other climatic factors do, however, interact with soil properties to influence soil wetness and droughtiness.

2.4 No local climatic factors such as exposure or frost risk affect this area.

Table 2 : Climatic Interpolations

Grid Reference	SU727554	SU737564	SU716550	SU711540
Altitude (m, AOD)	65	70	80	90
Accumulated Temperature (Day °C, Jan-June)	1456	1450	1440	1429
Average Annual Rainfall (mm)	696	696	713	727
Field Capacity (days)	148	147	152	154
Moisture Deficit, Wheat (mm)	108	108	106	104
Moisture Deficit, Potatoes (mm)	101	101	98	96
Overall Climatic Grade	1	1	1	1

3. Relief

3.1 The majority of this site is gently undulating with some lower, flatter land found along the floodplain of the River Whitewater. The higher land is situated in the south east and south west at an altitude of between 85-90m AOD. While the floodplain lies at about 60m AOD. Nowhere on the site do altitude or gradient affect the land use for agriculture.

4. Geology and Soil

4.1 Published geological information for the site (BGS, 1981), shows the majority of the site to comprise London Clay. Two small areas of the Bagshot and Bracklesham Beds are mapped in the south east and north east of the site while two very small areas of high level terrace deposits are shown in the extreme southwest corner and to the east of Borough Court Copse. Alluvium is mapped along the river floodplain.

4.2 The Soil Survey map for the area (SSEW, 1983) shows the majority of the site to comprise the Wickham 4 association. These soils are derived from the London Clay and are described as 'slowly permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils associated with similar clayey soils, often with brown subsoils' (SSEW, 1983). Frilford soils are mapped in association with the Bagshot Beds and comprise 'deep well drained sandy and coarse loamy soils. Some ferruginous sandy and some coarse loamy soils affected by groundwater' (SSEW, 1983). A small area of the Bursledon association is shown to correspond to the Bracklesham Beds and are described as 'deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging associated with deep coarse loamy soils variably affected by groundwater. Some slowly permeable seasonally waterlogged loamy over clayey soils' (SSEW, 1983). Fladbury 3 soils are shown along the river floodplain, in association with the alluvium, and are therefore described as being 'stoneless clayey, fine silty and fine loamy soils affected by groundwater' (SSEW, 1983).

4.3 Detailed field examination broadly confirmed the existence of soils similar to the Wickham 4 association across most of the site and some, more closely related to the Frilford association, in the south east corner.

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 In the south east corner of the site, between Totter's Farm and Trimmer's Farm, the land has been classified as very good quality (Grade 2), the key limitation being soil droughtiness. The soil profiles are deep and free draining, comprising fine to medium sandy loam topsoils over similar or slightly coarser textured upper subsoils. A mottled sandy clay loam lower subsoil is then generally encountered below 80 cm from the surface. In the topsoil the flint content varies from 1-6% >2 cm in diameter and 3-8% total stone (v/v). The upper subsoils are moderately stony with 18% v/v but this decreases to 10-15% in the lower horizons. The flint content, in combination with the coarse textured soils, acts to reduce profile available water for plants. The crop adjusted soil moisture deficits are already slightly high in this area therefore this land could be susceptible to a moderate soil droughtiness limitation. However, in soil inspection Pit 1 the loamy medium sands were shown to possess good subsoil structural conditions which retain profile water and therefore reduce drought risk. This land has been assessed as Grade 2 as a minor soil droughtiness limitation can slightly restrict crop establishment, growth and yields. In places, the topsoil stones, >2 cm in diameter, also limit the land to Grade 2 as they can reduce the level and consistency of yields as well as cause wear to tyres and agricultural machinery.

Subgrade 3b

- 5.4 The majority of this 'area of search' has been classified as moderate quality (Subgrade 3b) land due to a significant soil wetness limitation. Most soil profiles comprise medium clay loam topsoils over gleyed heavy clay loam upper subsoils and poorly structured, slowly permeable, clay lower subsoils. The slowly permeable horizons are generally encountered between 24-41 cm depth and therefore result in a significant drainage impedance. This land has been assessed as Wetness Class IV, and this, in combination with the topsoil textures and the prevailing field capacity level, limits this land to Subgrade 3b. Wet soils such as these experience restricted root development and plant growth. They are also susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.
- 5.5 Occasional borings were assessed as slightly higher quality where the slowly permeable layers occur deeper in the profile, improving the wetness status, or where the topsoils are lighter, improving the workability. However, these were not mapped separately due to their limited number and extent. In the southwest of the site, for example, Pit 1 was assessed as Subgrade 3a due to a very light topsoil texture. In general, surrounding profiles comprise heavier topsoils which, in

combination with the slowly permeable upper subsoils, are considered to be consistent with Subgrade 3b

ADAS Reference: 1506/003/95
MAFF Reference: EL15/518

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1981), Sheet No 284, Basingstoke, 1:50,000 (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), Soils of South-East England 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, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: 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.

¹The 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

- GRID REF** : national 100 km grid square and 8 figure grid reference.
- 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		
- GRDNT** : Gradient as estimated or measured by a hand-held optical clinometer.
- GLEY/SPL** : Depth in centimetres (cm) to gleying and/or slowly permeable layers.
- AP (WHEAT/POTS)** : Crop-adjusted available water capacity.
- MB (WHEAT/POTS)** : Moisture Balance. (Crop adjusted AP - crop adjusted 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		

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. **GLEYS** : 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 appropriate 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 STRUCT PLAN,HOOK Pit Number : 1P

Grid Reference: SU71205390 Average Annual Rainfall : 696 mm
 Accumulated Temperature : 1456 degree days
 Field Capacity Level : 148 days
 Land Use : Permanent Grass
 Slope and Aspect : 02 degrees W

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	FSZL	25Y 42 00	6	10	HR	C				
28- 50	MCL	25Y 63 62	0	6	HR	M	WKCSAB	FR	P	
50- 75	C	25Y 71 00	0	2	HR	M	MASSVE	FM	P	

Wetness Grade : 3A Wetness Class : IV
 Gleying : 000 cm
 SPL : 028 cm

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

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : HANTS STRUCT PLAN,HOOK Pit Number : 2P

Grid Reference: SU74455450 Average Annual Rainfall : 696 mm
 Accumulated Temperature : 1456 degree days
 Field Capacity Level : 148 days
 Land Use : Ley
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	FSL	10YR42 00	6	8	HR					
30- 50	MSL	10YR53 00	0	18	HR	C	MDCSAB	FR	M	
50- 90	LMS	10YR62 53	0	10	HR	M	MDCSAB	FR	G	
90-120	MSL	10YR54 00	0	15	HR	M			M	

Wetness Grade : 1 Wetness Class : I
 Gleying : 030 cm
 SPL : No SPL

Drought Grade : 2 APW : 129mm MBW : 21 mm
 APP : 092mm MBP : -9 mm

FINAL ALC GRADE : 2
 MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
1	SU73025637	PGR		025 038	4	3B		0	0	3B			WE	3B	SPL 38
1P	SU71205390	PGR W	02	000 028	4	3A		0	0				WE	3A	3B Soil unit
2	SU73205655	CER		025 035	4	3B		0	0	3B			WE	3B	SPL 35
2P	SU74455450	LEY		030	1	1	129	21	092	-9	2		DR	2	
3	SU73455635	PGR		028 028	4	3B		0	0	3B			WE	3B	SPL 28
4	SU73805637	CER		030 040	4	3B		0	0	3A			WE	3B	SPL 40
5	SU71505570	PGR		030 035	4	3B		0	0	3B			WE	3B	SPL 35
6	SU71705585	CER		025 035	4	3B		0	0	3A			WE	3B	SPL 35
7	SU72105580	PGR		025 038	4	3B		0	0	3A			WE	3B	SPL 38
8	SU72355565	PGR		000 035	4	3B		0	0	3B			WE	3B	SPL 35
9	SU72625580	LEY		025 035	4	3B		0	0	3A			WE	3B	SPL 35
10	SU73055582	OSR		025 035	4	3B		0	0	3B			WE	3B	SPL 35
11	SU73205605	OSR		025 035	4	3B		0	0	3B			WE	3B	SPL 35
12	SU73455585	CER		025 038	4	3B	083	-25	089	-12	3B		WE	3B	SPL 38
13	SU73525577	CER		025	2	1	046	-62	046	-55	4		DR	4	Imp 30 flints
14	SU73605572	CER		025	1	1	061	-47	061	-40	3B		DR	3B	Imp 40 flints
15	SU74025607	LEY		028 038	4	3B		0	0	3B			WE	3B	SPL 38
16	SU71515540	PGR		025 038	4	3B		0	0	3A			WE	3B	SPL 38
17	SU71805525	PGR		025 038	4	3B		0	0	3A			WE	3B	SPL 38
18	SU72075545	PGR		025 038	4	3B		0	0	3A			WE	3B	SPL 38
19	SU72605550	PGR		030 040	4	3B		0	0	3A			WE	3B	SPL 40
20	SU72855560	OSR		028 028	4	3B		0	0	3B			WE	3B	SPL 28
21	SU73525565	CER		024 024	4	3B		0	0				WE	3B	SPL 24
22	SU73525550	CER		000 026	4	3B		0	0				WE	3B	SPL 26
23	SU73675542	PGR		000 028	4	3B		0	0				WE	3B	SPL 28
24	SU74005550	CER		026 037	4	3B		0	0				WE	3B	SPL 37
25	SU74325535	CER S	01	000 080	2	2	140	32	114	13	1		WE	2	SPL 80
26	SU74425542	CER		025 035	4	3B		0	0	3B			WE	3B	SPL 35
27	SU74375565	ORC N	02	000 035	4	3B		0	0				WE	3B	SPL 35
28	SU71775487	CER		020 040	4	3B		0	0	3B			WE	3B	SPL 40
29	SU72775512	BAR		025 025	4	3B	090	-18	100	-1	3A		WE	3B	SPL 25
30	SU72905507	PGR		020 020	4	3B		0	0				WE	3B	SPL 20
31	SU73105497	BAR NW	02	000 022	4	3B		0	0				WE	3B	SPL 22
32	SU73175517	PGR NW	02	022 042	3	3A		0	0				WE	3A	SPL 42
33	SU73475525	CER		024 038	4	3B		0	0				WE	3B	SPL 38
34	SU73405495	PGR		025 040	4	3B		0	0				WE	3B	SPL 40
35	SU73555485	PGR E	03	000	4	3B		0	0				WE	3B	SPL 35
36	SU73805500	PGR		022 038	4	3B		0	0				WE	3B	SPL 38
37	SU73925482	PGR		025 025	4	3B		0	0	3B			WE	3B	SPL 25
38	SU74055507	PGR		055 075	2	2	112	4	102	1	3A		DR	3A	SPL 75
39	SU74305495	PGR		000 038	4	3B		0	0				WE	3B	SPL 38
40	SU74625532	CER N	01	000 050	3	3A		0	0				WE	3A	SPL 50

SAMPLE NO.	GRID REF	ASPECT		--WETNESS--				-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS	
		USE	GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT			
41	SU74755520	CER	W	02	000	028	4	3B			0		0	3B			WE	3B	SPL 28
42	SU71155460	PGR	S	01	000	025	4	3B			0		0				WE	3B	SPL 25
43	SU71305450	CER	N	02	030	045	3	3A			0		0				WE	3A	SPL 45
44	SU71375442	CER	N	01	025	025	4	3B			0		0				WE	3B	SPL 25
45	SU71605450	CER	N	02	028	045	3	3A			0		0				WE	3A	SPL 45
46	SU74955487	LEY			040		1	1	113	5	110	9	2				DR	2	WT AT 55
47	SU71105440	PGR	N	01	0	020	3	3B			0		0				WE	3B	SPL 20
48	SU71405440	CER	N	02	030	030	4	3B			0		0				WE	3B	SPL 30
49	SU71605420	PGR	W	04	0	038	4	3B			0		0				WE	3B	SPL 38
50	SU73775437	LEY			038	038	4	3B			0		0	3B			WE	3B	SPL 38
51	SU74145442	PGR	W	03	027	045	3	3A			0		0				WE	3A	SPL 45
52	SU74375447	PGR					1	1	119	11	102	1	2				DR	2	
53	SU74475462	PGR			080		1	1	149	41	107	6	2				DR	2	
54	SU74455450	PGR			045		1	1	105	-3	086	-15	3A				DR	3A	
55	SU74925457	LEY					1	1	130	22	089	-12	3A				DR	3A	Grade 2 unit
56	SU71005410	CER	E	02	030	040	4	3B			0		0				WE	3B	SPL 40
57	SU71305410	PGR			0	030	4	3B			0		0				WE	3B	SPL 30
58	SU71205390	PGR	W	01	030	050	4	3B			0		0				WE	3B	SPL 30
59	SU71205382	PGR	W	02	030	055	3	3A			0		0				WE	3A	SPL 55
60	SU73755425	LEY			028	042	3	3A			0		0	3A			WE	3A	SPL 42

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- PED			----STONES----			STRUCT/ CONSIST	SUBS							
				COL	ABUN	CONT	COL.	GLE	>2		>6	LITH	TOT	STR	POR	IMP	SPL	CALC
1	0-25	mc1	10YR42 00						0	0	HR	2						
	25-38	c	10YR53 00 000C00 00 C					Y	0	0		0		M				
	38-55	c	10YR53 00 000C00 00 M					Y	0	0		0		P	Y		Y	
1P	0-28	fsz1	25Y 42 00 75YR46 00 C					Y	6	0	HR	10						hand text z1
	28-50	mc1	25Y 63 62 75YR58 00 M					Y	0	0	HR	6	WKCSAB	FR	P	Y		hand text hzc1
	50-75	c	25Y 71 00 75YR58 00 M					Y	0	0	HR	2	MASSVE	FM	P	Y		Y
2	0-25	mc1	10YR42 00						0	0	HR	2						
	25-35	hc1	10YR53 00 000C00 00 C					Y	0	0		0		M				
	35-55	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	
2P	0-30	fs1	10YR42 00						6	0	HR	8						hand text ms1
	30-50	ms1	10YR53 00 10YR56 00 C					Y	0	0	HR	18	MDCSAB	FR	M			
	50-90	lms	10YR62 53 10YR68 72 M					Y	0	0	HR	10	MDCSAB	FR	G			
	90-120	ms1	10YR54 00 10YR68 72 M					S	0	0	HR	15			M			
3	0-28	c	10YR52 00						0	0		0						
	28-50	c	10YR51 00 000C00 00 M					Y	0	0		0		P	Y		Y	
4	0-30	mc1	10YR42 00						0	0	HR	2						
	30-40	hc1	10YR53 00 000C00 00 C					Y	0	0	HR	2		M				
	40-60	c	10YR53 00 000C00 00 M					Y	0	0	HR	2		P	Y		Y	
5	0-30	hc1	10YR42 00						0	0		0						
	30-35	c	10YR53 00 000C00 00 C					Y	0	0		0		M				
	35-55	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	
6	0-25	mzc1	10YR42 00						0	0		0						
	25-35	c	10YR53 00 000C00 00 C					Y	0	0		0		M				
	35-60	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	
7	0-25	mzc1	10YR42 00						0	0	HR	2						
	25-38	hc1	10YR53 00 000C00 00 C					Y	0	0	HR	2		M				
	38-60	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	
8	0-25	hc1	10YR42 00 000C00 00 C					Y	0	0		0						
	25-35	c	25Y 52 00 000C00 00 C					Y	0	0		0		M				
	35-60	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	
9	0-25	mzc1	10YR42 00						0	0	HR	2						
	25-35	hc1	10YR53 00 000C00 00 C					Y	0	0	HR	2		M				
	35-60	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	
10	0-25	hc1	10YR42 00						0	0		0						
	25-35	c	10YR53 00 000C00 00 C					Y	0	0		0		M				
	35-55	c	25Y 52 00 000C00 00 M					Y	0	0		0		P	Y		Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED COL.	-----STONES-----			STRUCT/ CONSIST	SUBS			CALC	
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		POR
11	0-25	mc1	10YR42 00					0	0	HR	1					
	25-35	c	10YR53 00 000C00 00 C					Y	0	0	HR	1	M			
	35-55	c	25Y 52 00 000C00 00 M					Y	0	0		0	P	Y	Y	
12	0-25	mc1	10YR42 00					2	0	HR	8					
	25-38	hc1	10YR53 00 000C00 00 C					Y	0	0	HR	10	M			
	38-60	c	25Y 63 00 000C00 00 M					Y	0	0	HR	2	P	Y	Y	Imp flints
13	0-25	ms1	10YR42 00					8	0	HR	10					
	25-30	mc1	10YR52 00 10YR58 00 C					Y	0	0	HR	10	M			Imp flints
14	0-25	mc1	10YR42 00					3	0	HR	10					
	25-40	hc1	10YR53 00 000C00 00 C					Y	0	0	HR	15	M			Imp flints
15	0-28	mc1	10YR42 00					0	0	HR	2					
	28-38	hc1	10YR53 00 000C00 00 C					Y	0	0	HR	5	M			
	38-60	c	25Y 52 00 000C00 00 M					Y	0	0	HR	2	P	Y	Y	
16	0-25	mc1	10YR42 00					0	0		0					
	25-38	hc1	10YR53 00 000C00 00 C					Y	0	0		0	M			
	38-60	c	10YR53 00 000C00 00 C					Y	0	0		0	P	Y	Y	
17	0-25	mzc1	10YR42 00					0	0		0					
	25-38	c	10YR53 00 000C00 00 C					Y	0	0		0	M			
	38-60	c	25Y 52 00 000C00 00 M					Y	0	0	HR	1	P	Y	Y	
18	0-25	mzc1	10YR42 00					0	0		0					
	25-38	c	10YR53 00 000C00 00 C					Y	0	0		0	M			
	38-60	c	10YR53 00 000C00 00 M					Y	0	0		0	P	Y	Y	
19	0-30	mzc1	10YR42 00					0	0		0					
	30-40	c	10YR52 00 000C00 00 C					Y	0	0		0	M			
	40-60	c	25Y 52 00 000C00 00 M					Y	0	0	HR	1	P	Y	Y	
20	0-28	hzc1	10YR42 00					0	0		0					
	28-55	c	10YR53 00 000C00 00 C					Y	0	0		0	P	Y		
21	0-24	mc1	10YR42 00					8	0	HR	10					
	24-50	c	10YR61 00 10YR68 62 C					Y	0	0	HR	10	P		Y	
	50-60	c	10YR61 00 10YR68 62 C					Y	0	0	HR	20	P		Y	
22	0-26	mc1	10YR41 42 10YR56 00 C					Y	0	0	HR	3				
	26-60	c	10YR62 00 10YR68 61 C					Y	0	0	HR	8	P		Y	
23	0-28	mc1	10YR41 42 10YR56 00 C					Y	0	0	HR	2				
	28-60	c	10YR52 51 10YR68 00 C					Y	0	0		0	P		Y	
24	0-26	mc1	10YR42 00					6	0	HR	8					
	26-37	hc1	10YR52 00 10YR58 00 C					Y	0	0	HR	10	M			
	37-60	c	10YR62 00 10YR68 61 C					Y	0	0	HR	3	P		Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR	POR
25	0-30	mzc1	10YR52 00 75YR58 00 C					Y	2	0	HR	6			
	30-80	hc1	10YR53 00 10YR58 00 C					Y	0	0	HR	6	M		
	80-120	c	25Y 72 00 75YR58 00 M					Y	0	0	HR	2	P	Y	Y
26	0-25	hc1	10YR42 00						0	0	HR	2			
	25-35	c	10YR53 00 000C00 00 C					Y	0	0	HR	2	M		
	35-60	c	25Y 52 00 000C00 00 M					Y	0	0		0	P	Y	Y
27	0-30	mc1	10YR52 00 75YR58 00 C					Y	6	0	HR	8			
	30-35	mc1	25Y 63 00 75YR58 00 M					Y	0	0	HR	4	M		
	35-60	c	25Y 62 00 75YR58 00 M					Y	0	0	HR	2	P		Y
28	0-20	mc1	10YR42 00						6	0	HR	8			
	20-40	mc1	10YR53 00 000C00 00 C					Y	0	0	HR	10	M		
	40-60	c	25Y 52 00 000C00 00 M					Y	0	0	HR	2	P	Y	Y
29	0-25	mzc1	10YR43 00						0	0	HR	3			
	25-55	c	10YR52 00 10YR68 72 C					Y	0	0	HR	3	P		Y
	55-70	c	10YR52 00 10YR68 72 C					Y	0	0	HR	20	P		Y
30	0-20	mzc1	10YR42 00 10						0	0	HR	2			
	20-30	hzc1	10YR42 00 10YR68 61 C					Y	0	0		0	P		Y
	30-70	c	25Y 62 00 10YR68 71 C					Y	0	0		0	P		Y
31	0-22	mc1	10YR41 42 10YR58 00 C					Y	0	0	HR	3			
	22-40	hc1	10YR52 00 10YR68 61 C					Y	0	0	HR	5	P		Y
	40-65	c	10YR62 63 10YR68 61 C					Y	0	0	HR	5	P		Y
32	0-22	mc1	10YR42 43						0	0	HR	2			
	22-42	mc1	10YR52 00 10YR58 00 C					Y	0	0	HR	5	M		
	42-70	c	10YR62 00 10YR68 61 C					Y	0	0		0	P		Y
33	0-24	mc1	10YR43 00						0	0	HR	3			
	24-38	hc1	10YR52 00 10YR58 00 C					Y	0	0	HR	3	M		
	38-70	c	10YR62 00 75YR68 62 C					Y	0	0		0	P		Y
34	0-25	mc1	10YR43 00						0	0	HR	3			
	25-40	mc1	10YR52 00 10YR58 00 C					Y	0	0	HR	5	M		
	40-50	c	10YR62 00 10YR68 61 C					Y	0	0	HR	10	P		Y
	50-70	c	10YR62 00 10YR68 61 C					Y	0	0		0	P		Y
35	0-28	mc1	10YR42 00 10YR56 00 C					Y	0	0	HR	3			
	28-35	mc1	10YR52 00 10YR58 00 C					Y	0	0	HR	5	M		
	35-65	c	10YR62 00 10YR68 61 C					Y	0	0	HR	20	P		
36	0-22	mc1	10YR42 00 10YR56 00 F						0	0	HR	2			
	22-38	hc1	10YR42 41 10YR58 00 C					Y	0	0		0	M		
	38-60	c	05Y 31 00 10YR58 00 C				00M00 00	Y	0	0		0	P		Y

Imp flints

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS						
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR	POR	IMP	SPL	CALC
37	0-25	hc1	10YR32 00						0	0	HR	2						
	25-55	c	10YR41 00	00C000	00	C		Y	0	0		0	P	Y		Y		
38	0-25	mc1	10YR42 00						6	0	HR	8						
	25-55	mc1	10YR42 44	00M000	00	C			0	0	HR	10	M					
	55-75	sc1	10YR53 00	10YR68	61	C		Y	0	0	HR	25	M					
	75-100	c	10YR62 00	10YR68	61	C		Y	0	0	HR	20	P		Y	Imp flints		
39	0-24	mc1	10YR42 00	10YR58	61	C		Y	0	0	HR	2						
	24-38	mc1	10YR52 00	10YR58	61	C		Y	0	0		0	M					
	38-60	c	10YR62 00	10YR68	61	C		Y	0	0		0	P		Y			
40	0-28	mc1	10YR52 00	75YR58	00	C		Y	2	0	HR	6						
	28-50	hc1	25Y 63 00	75YR58	00	C		Y	0	0	HR	4	M					
	50-70	c	25Y 62 00	75YR58	00	M		Y	0	0	HR	2	P	Y		Y		
41	0-28	mc1	10YR52 00	10YR58	00	C		Y	0	0	HR	2						
	28-60	c	25Y 62 00	75YR38	00	M		Y	0	0		0	P	Y		Y		
42	0-25	c	10YR52 00	75YR58	00	M		Y	0	0	HR	1						
	25-55	c	25Y 62 00	75YR58	00	M		Y	0	0	HR	2	P	Y		Y		
43	0-30	mc1	10YR53 00	10YR58	00	F			2	0	HR	3						
	30-45	mc1	25Y 63 00	75YR46	00	C	00M000	Y	0	0	HR	2	M					
	45-70	c	10YR72 00	75YR58	00	M		Y	0	0	HR	1	P	Y		Y		
44	0-25	mzc1	10YR42 00						2	0	HR	3						
	25-60	c	25Y 62 00	75YR58	00	M		Y	0	0	HR	0	P	Y		Y		
45	0-28	mc1	10YR53 00	10YR58	00	F			1	0	HR	2						
	28-45	mc1	25Y 63 00	75YR46	00	C	00M000	Y	0	0	HR	2	M					
	45-70	c	10YR72 00	75YR58	00	M		Y	0	0	HR	1	P	Y		Y		
46	0-30	ms1	10YR43 00						0	0	HR	2						
	30-40	ms1	10YR53 00						0	0		0	M					
	40-60	ms1	10YR63 00	10YR58	00	C		Y	0	0		0	M					
	60-80	ms1	10YR62 00	10YR68	00	C		Y	0	0		0	M				WT at 55 Imp flints	
47	0-20	hc1	25Y 61 00	75YR46	00	C		Y	0	0	HR	2						
	20-60	hc1	25Y 71 00	75YR46	00	M		Y	0	0	HR	2	P	Y		Y		
48	0-30	mc1	25Y 52 00	10YR58	00	F			3	0	HR	6						
	30-60	c	25Y 72 00	75YR58	00	M		Y	0	0	HR	2	P	Y		Y		
49	0-28	mzc1	25Y 52 00	75YR46	00	M		Y	0	0	HR	5						
	28-38	hc1	10YR53 00	75YR58	00	C		Y	0	0	HR	5	M					
	38-70	c	10YR63 00	75YR58	00	C		Y	0	0	HR	2	P	Y		Y		

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS					
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	CONSIST	STR	POR	IMP	SPL
50	0-28	mc1	10YR52 00						0	0	HR	2						
	28-38	hc1	10YR53 00						0	0	HR	2		M				
	38-55	c	10YR53 00	000C00	00	M		Y	0	0		0		P	Y		Y	
51	0-27	mc1	10YR42 00						0	0		0						
	27-45	mc1	10YR52 53	10YR56	00	C		Y	0	0		0		M				
	45-70	c	10YR62 00	10YR68	61	C		Y	0	0		0		P			Y	
52	0-27	ms1	10YR42 00						0	0	HR	2						
	27-60	ms1	10YR53 00						0	0		0		M				
	60-120	lms	10YR54 00	10YR68	00	C		S	0	0		0		M				
53	0-24	ms1	10YR42 43						0	0		0						
	24-45	ms1	10YR44 00						0	0	HR	5		M				
	45-80	ms1	10YR54 00						0	0	HR	5		M				
	80-120	sc1	10YR62 63	10YR68	00	C		25YR46	00	Y	0	0	0		M			
54	0-27	ms1	10YR42 00	10YR56	00	F			0	0	HR	3						
	27-45	ms1	10YR54 43	10YR56	00	C		S	0	0	HR	10		M				
	45-120	lms	10YR63 00	10YR58	72	C		Y	0	0	HR	5		M				
55	0-30	ms1	10YR43 00						0	0	HR	3						
	30-35	ms1	10YR43 00	10YR56	00	F			0	0	HR	3		M				
	35-60	lms	10YR54 00						0	0	HR	5		G				See 2P
	60-85	lms	10YR54 00	10YR68	73	C		S	0	0		0		G				See 2P
	85-120	sc1	10YR54 00	10YR68	73	C		S	0	0		0		M				
56	0-30	mc1	25Y 52 00	10YR58	00	F			6	0	HR	8						
	30-40	hc1	25Y 73 00	75YR46	00	C		00M00	00	Y	0	0	HR	20		M		
	40-60	c	25Y 61 00	75YR58	00	M			Y	0	0	HR	5		P	Y		Y
57	0-30	mc1	25Y 42 00	75YR46	00	C			Y	0	0	HR	5					
	30-60	c	25Y 73 00	75YR46	00	M		00M00	00	Y	0	0	HR	10		P	Y	
58	0-30	mc1	25Y 52 00	10YR58	00	F			0	0	HR	5						
	30-50	hc1	25Y 61 00	75YR58	00	M			Y	0	0	HR	5		P	Y		Y
	50-70	c	25Y 71 00	75YR58	00	M			Y	0	0	HR	2		P	Y		Y
59	0-30	z1	10YR52 00	10YR58	00	F			0	0	HR	5						
	30-45	fsz1	25Y 71 00	10YR58	00	C			Y	0	0	HR	8		M			
	45-55	mzc1	25Y 72 00	10YR58	00	C			Y	0	0	HR	2		M			
	55-75	c	25Y 61 00	75YR58	00	M			Y	0	0	HR	2		P	Y		Y
60	0-28	mc1	10YR42 00						0	0	HR	2						
	28-42	hc1	10YR53 00	000C00	00	C			Y	0	0	HR	2		M			
	42-60	c	10YR53 00	000C00	00	M			Y	0	0		0		P	Y		Y