A1

Hampshire Minerals and Waste Disposal Plan
Omission Site 18: Manor Farm, Lower Pennington.
Agricultural Land Classification
ALC Map and Report
June 1994

AGRICULTURAL LAND CLASSIFICATION REPORT.

HAMPSHIRE MINERALS AND WASTE DISPOSAL PLAN
OMISSION SITE 18: MANOR FARM, LOWER PENNINGTON.

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 Hampshire. The work formed part of MAFF's statutory input to the Hampshire Minerals and Waste Disposal Plan.

1.2 The site comprises a total of 30.2 hectares, 5.9 ha. of which were previously surveyed on a detailed basis in 1992 (ADAS Ref: 1508/29/92). This information has been used in the preparation of the current ALC map. A further 24.3 hectares of land relating to Omission Site 18, to the south of Manor Farm at Lower Pennington was surveyed in June 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 26 borings and three 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.

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 majority of the agricultural land on the site was under a grass ley for hay, with a small area of recently drilled linseed in the north of the site and some permanent grassland in the south. The area of land identified as non-agricultural surrounds a man-made pond.

1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas 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. This map supersedes any previous survey information for this site.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Land
2	4.7	15.6	15.7
3a	19.4	64.3	64.7
3b	5.9	19.5	19.6
Open Water	0.1	0.3	100%
Non agricultural	0.1	0.3	
Total area of Site	30.2	100%	

1.6 The majority of the agricultural land on the site has been classified as Subgrade 3a, good quality land, with soil droughtiness and wetness as the main limitations. Soils typically comprise fine loamy textures which can become heavier with depth, overlying a very stony coarse sand at a depth of between 65-90 cm. Above this, subsoils also tend to be moderately stony. Such soil properties, particularly stone contents and coarse textures, restrict the amount of profile available water for plant growth resulting in a moderate droughtiness limitation. Furthermore, the majority of the soils within this mapping unit show signs of imperfect drainage in the form of gleying. Some of the soils have slowly permeable sandy clay loam subsoils and are less stony; these are classified as Subgrade 3a with wetness as the overriding limitation. An area of very good quality Grade 2 land exists towards the south of the site. Soils in this mapping unit show similar textures to the Subgrade 3a land. However, the soils are less stony and more freely draining, such that droughtiness and wetness limitations are diminished and a classification of Grade 2 is more appropriate. Land on the northern and southern edges of the site has been classified as Subgrade 3b, with wetness as the main limitation. All of the soils within this mapping unit show signs of gleying from the topsoil, and slowly permeable subsoils at shallow depths. Soil drainage is sufficiently restricted for the land to be classified as Subgrade 3b, due to a significant wetness limitation.

2. Climate

2.1 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5km grid point dataset (Met. Office, 1989) for a representative location in the survey area.

2.2 The main parameters used in the assessment of the 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. The values obtained for this location show that there is no overall climatic limitation.

2.3 Although this site has a relatively high rainfall and accumulated temperature, its coastal location means that evapotransporation rates are also high. Consequently moisture deficits are high, and the likelihood of droughtiness limitations (particularly in the summer months) will be increased. The position of this site on the coast means that there is a slight risk of exposure, although on the site the limitation is not sufficiently significant to affect the final grades.

Table 2 : Climatic Interpolations

Grid Reference	SZ313939	SZ315935	SZ319928
Altitude (m)	10	5	1
Accumulated Temperature (degree days, Jan-June)	1556	1561	1566
Average Annual Rainfall (mm)	801	789	780
Field Capacity (days)	166	164	162
Moisture Deficit, Wheat (mm)	114	116	118
Moisture Deficit, Potatoes (mm)	110	112	114
Overall Climatic Grade	1	1	1

3. Relief

3.1 The site lies on the coastal plain at an altitude ranging between 1-10m, falling gently from north to south. Nowhere on the site do gradient or relief pose any limitation to agricultural use. Although the site is relatively flat and low-lying, anecdotal evidence suggests that flooding and high groundwater levels are not a major limiting factor.

4. Geology and Soil

4.1 The published geology map for the site area, (BGS, Sheet 330, Lymington, 1975) shows the site to be underlain by Osborne and Headon Beds with Plateau Gravel in the west. On the southern boundary of the site, alluvium is mapped.

4.2 The published soils information for the area (SSEW, 1983, Sheet 6, Soils of South East England, 1:250,000) shows the site to comprise soils of the Efford 1 association. These are described as 'well drained fine loamy soils often over gravel, associated with similar permeable soils variably affected by groundwater' (SSEW, 1983).

4.3 Detailed field examination confirms the presence of slightly to moderately stony soils with gravelly subsoils across much of the site, the majority of soils showing signs of soil wetness problems and slowly permeable subsoils.

5.0 Agricultural Land Classification

5.1 Table 1 provides the details of the extent of 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 land towards the south of the site has been classified as Grade 2 , very good quality land, with soil droughtiness as the main limitation. Soil profiles in this mapping unit typically comprise medium sandy loam or medium clay loam topsoils, overlying similar textured upper subsoils which can become heavier with depth. The topsoils and subsoils tend to be very slightly stony to a depth of approximately 80-90 cm. At this depth, a very stony coarse sand horizon (containing approximately 50% v/v total hard rock gravel) commences. A combination of soil textures, sub-structural condition and stone contents along with the local climatic regime means that there is a slight restriction on the amount of profile available water for plant growth. Therefore this land can be classified as no better than grade 2, due to the effect that this slight droughtiness limitation will have upon crop yields. Furthermore due to fluctuating groundwater or deep slowly permeable layers, these soils show signs of a slight wetness imperfection, in the form of gleying, and are assigned to Wetness Class II. This has no overall effect on the final grading for these soils, particularly where topsoils are light and easily workable.

Subgrade 3a

5.4 The majority of the agricultural land on the site has been classified as Subgrade 3a, good quality land, with a combination of soil droughtiness and/or wetness as the main limitations. Soil profiles typically comprise a slightly stony medium clay loam topsoil, overlying subsoils which are of a variable texture. Generally, upper subsoils are of a similar texture to the topsoil, passing into both heavier and occasionally sandier lower subsoils. At depth, subsoils tend to become very stony, indicated by the number of soil observations which proved impenetrable at depths of between 65-100 cm. A soil inspection pit (Pit no. 1) was dug to assess soil conditions, particularly stone contents. The upper subsoil consisting of a medium clay loam, was found to contain approximately 30% total small flints v/v, rests upon a sandy clay loam containing approximately 45% total small flints and extends to 70 cm.. Below this depth, a coarse sand horizon containing approximately 50% total small flints was encountered. On the basis of these findings it has been assumed, for the purposes of calculating profile available water for soils across the site, that this horizon is present below the depths at which soil observations became impenetrable. Therefore it is evident that a combination of soil textures, stone contents, substructural conditions, and the local climatic regime, means that there is a moderate restriction on the amount of profile available water for plant growth which will limit crop yields. Therefore this land is appropriately placed in Subgrade 3a on this basis.

5.5 A large proportion of the soils within this mapping unit also show signs of mottling and gleying, which is indicative of soil wetness imperfections. A soil inspection pit (Pit no. 2) was dug to assess the nature of the wetness problem, and is typical of these soils. The soil profile is gleyed throughout with a slowly permeable sandy clay loam subsoil, and a water table was encountered at 85 cm. Such drainage characteristics equate the soil profile to Wetness Class III, and is appropriately placed in Subgrade 3a. This moderate wetness limitation means that plant growth and rooting may be slightly restricted, and soils may be more susceptible to structural damage through poaching by grazing livestock or trafficking by agricultural machinery. It should be noted however that within the Subgrade 3a mapping unit droughtiness tends to be the more overriding limitation, although in certain areas of the site where slowly permeable subsoils exist at relatively shallow depths, wetness is the main limitation.

5.6 Some evidence of very good quality Grade 2 land was found within the Subgrade 3a mapping unit. However, this was not sufficiently extensive to warrant mapping as a separate unit.

Subgrade 3b

5.7 Areas of land on the northern and southern edges of the site have been classified as Subgrade 3b, moderate quality land, with soil wetness as the main limitation. Soils observed in the small area in the north of the site comprise a gleyed medium clay loam topsoil overlying slowly permeable heavy clay loam and clay subsoils. The more extensive area in the south of the site contains subsoils of a slightly lighter texture. Soil inspection pit no. 3 is typical of the soils in this mapping unit in the south of the site. Gleying within the profile along with the presence of a slowly permeable layer at a relatively shallow depth of 30 cm means that these soils are assigned to Wetness Class IV. Other soil profiles within this mapping unit show similar drainage characteristics and Wetness Class, such that a classification of Subgrade 3b is appropriate. These soils show a significant drainage and wetness imperfection, such that plant development and rooting may be inhibited. Furthermore, the sensitivity of the soil to structural damage from grazing livestock or the use of agricultural machinery is increased.

REFERENCES

* British Geological Survey (1975), Sheet No. 330 (Drift Edition), Lymington, 1:50,000 scale.

* 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 scale.

* Soil survey of England and Wales (1984), Bulletin 15, Soils of South East England.

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 OM. SITE 18 Pit Number : 1P

Grid Reference: SZ31439382 Average Annual Rainfall : 780 mm
Accumulated Temperature : 1566 degree days
Field Capacity Level : 164 days
Land Use : Ley
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 31	MCL	10YR41 42	5	10	HR		WKCSAB	FR		
31- 56	MCL	10YR42 52	0	30	HR	C	WKCSAB	FR	M	
56- 70	SCL	10YR52 41	0	45	HR	C			M	
70-120	LCS	75YR54 00	0	50	HR				M	

Wetness Grade : 2 Wetness Class : II
Gleying :031 cm
SPL : No SPL

Drought Grade : 3A APW : 98 mm MBW : -18 mm
APP : 91 mm MBP : -21 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : HANTS MINS OM. SITE 18 Pit Number : 2P

Grid Reference: SZ31509360 Average Annual Rainfall : 780 mm
Accumulated Temperature : 1566 degree days
Field Capacity Level : 164 days
Land Use : Ley
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 17	ZL	10YR41 00	3	6	HR	C	MDCSAB	FR		
17- 36	MCL	10YR42 00	0	5	HR	C	MDCSAB	FR	M	
36- 55	HCL	10YR53 52	0	10	HR	C	MDCSAB	FR	M	
55- 72	SCL	10YR52 41	0	15	HR	C	WKCSAB	FR	M	
72- 85	SCL	10YR41 51	0	25	HR	C	WKCSAB	FR	M	
85-120	SCL	10YR51 00	0	30	HR	C			M	

Wetness Grade : 3A Wetness Class : III
Gleying : 0 cm
SPL :055 cm

Drought Grade : 2 APW : 140mm MBW : 24 mm
APP : 113mm MBP : 1 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : HANTS MINS OM. SITE 18 Pit Number : 3P

Grid Reference: SZ31849275 Average Annual Rainfall : 780 mm
Accumulated Temperature : 1566 degree days
Field Capacity Level : 164 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MCL	10YR31 41	0	5	HR	C	WKCSAB	FR		
30- 40	MZCL	10YR41 42	0	5	HR	C	MDCPR	FM	P	
40- 64	SCL	10YR41 52	0	5	HR	C	WKCSAB	FM	P	
64- 70	LCS	10YR51 52	0	25	HR	C			M	
70-120	CS	25Y 52 00	0	20	HR	C			M	

Wetness Grade : 3B Wetness Class : IV
Gleying : 0 cm
SPL :030 cm

Drought Grade : 3A APW : 101mm MBW : -15 mm
APP : 96 mm MBP : -16 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

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
1P	SZ31439382	LEY		031		2	2	98	-18	91	-21	3A				DR	3A	PIT TO 90
2P	SZ31509360	LEY		0	055	3	3A	140	24	113	1	2				WE	3A	PIT TO 95
3	SZ31309390	LEY		045		1	1	104	-12	103	-9	3A				DR	3A	IMPEN 70
3P	SZ31849275	PGR		0	030	4	3B	101	-15	96	-16	3A				WE	3B	PIT TO 100
4	SZ31409390	LEY		022	030	4	3B	123	7	100	-12	3A				WE	3B	
5	SZ31509390	LEY		0	035	4	3B	119	3	101	-11	3A				WE	3B	
6	SZ31309380	LEY		030		2	2	104	-12	103	-9	3A				DR	3A	IMPEN 70
7	SZ31409380	LEY		045		1	1	99	-17	95	-17	3A				DR	3A	IMPEN 60
8	SZ31509380	LIN				1	1	118	2	115	3	3A				DR	3A	IMPEN 85
9	SZ31609380	LEY		024		2	2	109	-7	103	-9	3A				DR	3A	IMPEN 90
10	SZ31409370	LIN		045		1	1	126	10	117	5	2				DR	2	AUGER 120
11	SZ31509370	LIN				1	1	117	1	114	2	3A				DR	3A	IMPEN100
12	SZ31509360	LEY		020	060	3	3A	114	-2	107	-5	3A				WE	3A	DR ALSO
13	SZ31509350	LEY		055	075	3	3A	136	20	115	3	2				WE	3A	
14	SZ31609350	LEY		045		1	1	109	-7	108	-4	3A				DR	3A	IMPEN 80
15	SZ31509340	LEY		040		3	3A	106	-10	104	-8	3A				DR	3A	IMPEN 70 WE
16	SZ31609340	LEY		055	055			105	-11	103	-9	3A				DR	3A	IMPEN 65
17	SZ31509330	LEY		045	045	3	3A	108	-8	107	-5	3A				DR	3A	IMPEN 70 WE
18	SZ31429360	LIN		025		2	2	103	-13	100	-12	3A				DR	3A	IMPEN 75
19	SZ31909300	LEY		0	075	2	2	129	13	118	6	2				DR	2	WE ALSO
20	SZ31709290	LEY		030	045	4	3B	127	11	110	-2	2				WE	3B	BORDER 3A/3B
21	SZ31809290	LEY		020	062	3	3A	143	27	113	1	2				DR	3A	IMPEN 100
22	SZ31909290	LEY		0	030	4	3B	101	-15	99	-13	3A				WE	3B	IMPEN 90
23	SZ32009290	LEY		0	029	4	3B	118	2	104	-8	3A				WE	3B	IMPEN 100
24	SZ31709280	LEY		032	032	4	3B	109	-7	110	-2	3A				WE	3B	IMPEN 80
25	SZ31809280	LEY		025	040	4	3B	95	-21	105	-7	3B				WE	3B	IMPEN 70
26	SZ31909280	LEY		030	030	4	3B	101	-15	102	-10	3A				WE	3B	IMPEN 80
27	SZ31909310	LEY		025		2	2	126	10	116	4	2				DR	2	IMPEN 95
28	SZ31849275	PGR		0	037	4	3B	103	-13	103	-9	3A				WE	3B	IMPEN 80

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	POR	IMP	SPL	CALC
1P	0-31	mcl	10YR41 42						5	0	HR	10	WKCSAB FR					
	31-56	mcl	10YR42 52	75YR56 00	C			Y	0	0	HR	30	WKCSAB FR	M				
	56-70	scl	10YR52 41	75YR56 00	C			Y	0	0	HR	45		M				
	70-120	lcs	75YR54 00						0	0	HR	50		M				
2P	0-17	zl	10YR41 00	10YR58 00	C			Y	3	0	HR	6	MDCSAB FR					
	17-36	mcl	10YR42 00	10YR58 51	C			Y	0	0	HR	5	MDCSAB FR	M				
	36-55	hcl	10YR53 52	75YR58 61	C			Y	0	0	HR	10	MDCSAB FR	M				
	55-72	scl	10YR52 41	75YR58 00	C			Y	0	0	HR	15	WKCSAB FR	M	Y		Y	
	72-85	scl	10YR41 51	75YR58 00	C			Y	0	0	HR	25	WKCSAB FR	M	Y		Y	
	85-120	scl	10YR51 00	75YR58 00	C			Y	0	0	HR	30		M			Y	
3	0-30	mcl	10YR42 00						0	0	HR	2						
	30-45	mcl	10YR43 00						0	0	HR	10		M				
	45-70	mcl	10YR52 00	75YR56 00	C			Y	0	0	HR	30		M				
	70-120	cs	75YR54 00						0	0	HR	50		M				
3P	0-30	mcl	10YR31 41	75YR44 00	C			Y	0	0	HR	5	WKCSAB FR					
	30-40	mzcl	10YR41 42	10YR58 00	C			Y	0	0	HR	5	MDCPR FM	P	Y		Y	
	40-64	scl	10YR41 52	10YR58 00	C			Y	0	0	HR	5	WKCSAB FM	P	Y		Y	
	64-70	lcs	10YR51 52	75YR58 00	C				0	0	HR	25		M			Y	
	70-120	cs	25Y 52 00	10YR58 00	C				0	0	HR	20		M			Y	
4	0-22	mcl	10YR42 00						0	0	HR	2						
	22-30	hcl	10YR52 00	10YR58 61	C			Y	0	0	HR	2		P			Y	
	30-120	c	10YR72 00	10YR76 00	M			Y	0	0		0		P			Y	
5	0-19	mcl	10YR42 00	75YR56 00	C			Y	0	0	HR	2						
	19-35	mzcl	10YR41 00	75YR56 00	C			Y	0	0		0		M				
	35-55	hzcl	10YR41 00	75YR54 00	C			Y	0	0	HR	2		P			Y	
	55-70	c	10YR62 00	10YR78 72	C				0	0	HR	15		P			Y	
	70-120	c	10YR72 00	10YR76 00	M			Y	0	0	HR	20		P			Y	
6	0-30	mcl	10YR42 00						0	0	HR	5						
	30-55	mzcl	10YR42 53	10YR58 00	C			Y	0	0	HR	10		M				
	55-70	scl	10YR54 00	10YR58 00	C		00MN00 00	S	0	0	HR	45		M				
	70-120	cs	10YR54 00					Y	0	0	HR	50		M				
7	0-30	mcl	10YR42 00						0	0	HR	3						
	30-45	mzcl	10YR43 00						0	0	HR	10		M				
	45-60	mcl	10YR42 00	10YR58 00	C			Y	0	0	HR	30		M				
	60-120	cs	10YR54 00						0	0	HR	50		M				
8	0-30	mcl	10YR42 00						3	0	HR	5						
	30-65	mszl	10YR43 00						0	0	HR	5		M				
	65-75	scl	10YR44 00						0	0	HR	10		M				
	75-85	lcs	10YR63 64						0	0	HR	30		M				
	85-120	cs	10YR54 00						0	0	HR	50		M				

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
9	0-24	mcl	10YR41 00						0	0	HR	2						
	24-45	mcl	10YR41 00	75YR56 00	C			Y	0	0	HR	5		M				
	45-80	mcl	10YR42 62	75YR56 00	C			Y	0	0	HR	30		M				
	80-120	cs	10YR62 00	75YR56 00	C			Y	0	0	HR	50		M				
10	0-29	mcl	10YR42 00						2	0	HR	4						
	29-45	mzcl	10YR42 00						0	0	HR	2		M				
	45-60	mzcl	10YR42 00	75YR56 00	F				0	0	HR	2		M				
	60-75	mszl	10YR52 00	75YR56 00	C			Y	0	0	HR	10		M				
	75-120	lcs	10YR63-72	75YR58 00	C			Y	0	0	HR	30		M				
11	0-29	mcl	10YR42 00						3	0	HR	5						
	29-45	mzcl	10YR42 00						0	0	HR	10		M				
	45-65	mszl	10YR42 54						0	0	HR	10		M				
	65-90	lcs	10YR54 00						0	0	HR	30		M				
	90-120	cs	10YR56 00						0	0	HR	40		M				
12	0-20	mcl	10YR41 00						0	0	HR	2						
	20-33	mcl	10YR41 00	75YR54 00	C			Y	0	0	HR	2		M				
	33-60	hcl	10YR52 00	10YR58 62	C			Y	0	0	HR	10		M				
	60-90	scl	10YR62 00	10YR58 72	M		00MN00 00	Y	0	0	HR	20		M			Y	
13	0-32	mcl	10YR42-00						0	0	HR	2						
	32-55	hcl	10YR43 00						0	0	HR	2		M				
	55-75	hcl	10YR42 00	75YR54 00	C			Y	0	0	HR	5		P			Y	
	75-120	c	10YR52 00	75YR56 00	C			Y	0	0	HR	15		P			Y	
14	0-30	mcl	10YR42 00						5	0	HR	7						
	30-45	mszl	10YR43 00						0	0	HR	5		M				
	45-65	mcl	10YR41 00	10YR58 00	C			Y	0	0	HR	5		M				
	65-80	lcs	25Y 54 00						0	0	HR	30		M				
	80-120	cs	10YR54 00						0	0	HR	50		M				
15	0-25	mcl	10YR42 00						0	0	HR	2						
	25-40	hcl	10YR41 00						0	0	HR	5		M				
	40-55	hcl	10YR42 00	10YR58 00	C			Y	0	0	HR	5		M				
	55-65	scl	10YR52 00	10YR58 00	C			Y	0	0	HR	15		M				
	65-120	cs	25Y 54 00						0	0	HR	50		M				
16	0-32	mcl	10YR41 00						0	0	HR	5						
	32-55	mszl	10YR41 62						0	0	HR	5		M				
	55-65	scl	10YR63 00	10YR58 00	C			Y	0	0	HR	25		P			Y	
	65-120	cs	10YR54 00						0	0	HR	50		M				
17	0-30	mcl	10YR41 00						0	0	HR	2						
	30-45	mcl	10YR42 00						0	0	HR	2		M				
	45-70	scl	10YR52 41	10YR68 00	C			Y	0	0	HR	20		M	Y		Y	
	70-120	cs	10YR56 00						0	0	HR	50		M				

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
18	0-25	mcl	10YR42 00						5	0	HR	7						
	25-45	mcl	10YR42 00	10YR58 00	C			Y	0	0	HR	10		M				
	45-50	hzcl	10YR52 00	10YR58 00	C			Y	0	0	HR	10		M				
	50-60	mzcl	10YR52 00	10YR58 00	C			Y	0	0	HR	30		M				
	60-75	scl	10YR52 41	75YR56 00	C			Y	0	0	HR	45		M				
	75-120	cs	10YR54 00					Y	0	0	HR	50		M				
19	0-30	mcl	10YR42 00	75YR56 00	C			Y	0	0	HR	2						
	30-46	mcl	10YR42 41	75YR56 00	C			Y	0	0	HR	2		M				
	46-75	mszl	10YR41 71	75YR56 00	C			Y	0	0	HR	2		M				
	75-90	scl	25Y 63 00	75YR58 72	C			Y	0	0	HR	5		P			Y	
	90-120	cs	10YR54 00						0	0	HR	50		M				
20	0-30	mcl	10YR42 00						0	0	HR	2						
	30-45	mcl	10YR42 00	75YR56 00	C			Y	0	0	HR	2		M				
	45-63	scl	10YR41 00	75YR46 00	C			Y	0	0	HR	2		P			Y	
	63-75	csl	10YR41 52	75YR46 00	C			Y	0	0	HR	2		M				
	75-120	lcs	25Y 54 00	-					0	0	HR	2		M				
21	0-20	mcl	10YR42 00						0	0	HR	2						
	20-45	mszl	10YR42 00	75YR54 00	C			Y	0	0	HR	2		M				
	45-62	mcl	10YR42 00	75YR58 00	C			Y	0	0	HR	2		M				
	62-80	hcl	10YR52 00	75YR66 61	C			Y	0	0	HR	5		P			Y	
	80-120	scl	25Y 42 00	75YR56 00	C			Y	0	0	HR	15		M			Y	
22	0-30	mcl	10YR42 41	75YR58 00	C			Y	0	0	HR	2						
	30-63	scl	10YR42 63	75YR56 00	C			Y	0	0	HR	2		P			Y	
	63-90	lcs	25Y 42 00	75YR56 00	C			Y	0	0	HR	5		M				
23	0-29	mcl	10YR42 00	75YR58 00	C			Y	0	0	HR	2						
	29-40	mzcl	10YR41 00	75YR58 00	C			Y	0	0	HR	2		P			Y	
	40-70	hcl	10YR41 00	75YR58 62	C			Y	0	0	HR	2		P			Y	
	70-100	scl	25Y 62 00	25Y 68 00	C			Y	0	0	HR	2		P			Y	
24	0-32	mcl	10YR41 00						0	0	HR	2						
	32-50	hcl	10YR42 00	75YR58 00	C			Y	0	0	HR	2		P			Y	
	50-75	sc	10YR62 00	75YR58 00	C			Y	0	0	HR	2		P			Y	
	75-80	scl	25Y 42 00	75YR58 00	C			Y	0	0	HR	10		M			Y	
25	0-25	mcl	10YR41 00						0	0	HR	2						
	25-40	mcl	10YR52 42	75YR56 00	C			Y	0	0	HR	2		M				
	40-55	scl	10YR52 00	75YR56 62	C			Y	0	0	HR	2		P			Y	
	55-70	scl	25Y 42 00	75YR56 00	C			Y	0	0	HR	10		P			Y	
26	0-30	mcl	10YR41 00						0	0	HR	2						
	30-53	hcl	10YR42 00	75YR58 61	C			Y	0	0	HR	2		P			Y	
	53-70	scl	10YR63 00	75YR58 61	C	00MN00	00	Y	0	0	HR	2		P			Y	
	70-80	scl	25Y 43 00	75YR58 00	C			Y	0	0	HR	10		M			Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
27	0-25	mcl	10YR42 00						0	0	HR	2						
	25-45	mcl	10YR42 00	75YR56	00	C		Y	0	0	HR	2		M				
	45-75	mszl	10YR62 00	75YR56	00	C		Y	0	0	HR	5		M				
	75-95	scl	10YR63 00	75YR58	00	C		Y	0	0	HR	15		P			Y	
	95-120	cs	10YR54 00						0	0	HR	50		M				
28	0-20	mcl	10YR41 00	75YR56	00	C		Y	0	0	HR	2						
	20-37	mcl	10YR41 52	75YR56	00	C		Y	0	0	HR	2		M			Y	
	37-65	hcl	10YR62 00	10YR68	71	M		Y	0	0	HR	2		P			Y	
	65-80	csl	25Y 52 00	10YR68	00	C		Y	0	0	HR	5		M				