

**Proposed Minerals Site,
Bath Road, Midgham, Berkshire**

**Agricultural Land Classification &
Statement of Site Physical
Characteristics**

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**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION & STATEMENT OF SITE PHYSICAL CHARACTERISTICS

PROPOSED MINERALS SITE, BATH ROAD, MIDGHAM, BERKSHIRE

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey and assessment of site physical characteristics of approximately 25 hectares of land at Bath Road, Berkshire. The survey was carried out during April 1998.
2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). The work was carried out in order to determine the land quality and site physical characteristics of land affected by proposals for gravel extraction. Parts of the site will be subsequently restored to agriculture. This survey supersedes any previous ALC information for this land.
3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey the agricultural land was in either permanent grassland or maize stubble. The eastern part of the site comprises a disused watermeadow system and is still dissected by numerous man-made drainage channels (which have dried up) as well as a natural stream which contains running water. Parts of the site mapped as 'Other land' comprise existing mineral workings, soil bunding and access tracks and roads.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.
6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1 overleaf.
7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. In total 20 borings and 2 soil inspection pits were described.

¹ FRCA is an executive agency of MAFF and the Welsh Office.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% survey area	% site area
2	2.3	12.9	9.1
3a	9.1	50.8	35.8
3b	6.5	36.3	25.6
Other land	7.5	-	29.5
Total Survey Area	17.9	100.0	70.5
Total Site Area	25.4	-	100.0

8. The agricultural land on this site has been classified in the range Grade 2, very good quality, to Subgrade 3b, moderate quality, with more than half of the site being 'best and most versatile'. A complex, interbedded pattern of soils occur which lie over gravel deposits at variable depths. Across the majority of the site, the combination of soil textures, structures and stone contents acts to restrict the amount of profile available water for crops. Crop growth and yields will therefore be adversely affected restricting the land to Grade 2 and Subgrade 3a on the basis of a soil droughtiness limitation with soil wetness being equally or more restricting on occasion.

9. Land graded as 2 (very good quality) occurs in a limited area to the west of the site. Soil profiles are variable but typically comprise very slightly stony or stoneless, calcareous, medium clay loam topsoils. These overlie similar or slightly heavier upper subsoils. Below this, profiles are often interbedded and vary in nature. Textures range from medium sandy loam through to clay with additional lenses of algal marl and peaty loam. Profiles within the Grade 2 unit rest over gravel at depth between 85 and 105cm. This land is restricted by soil droughtiness and/or minor soil wetness.

10. The Subgrade 3a (good quality land) mapping unit has similar soil types to those described above. Here, soils are shallower over gravel (the soils becoming impenetrable to the auger as shallow as 55cm) such that the severity of soil droughtiness restriction is greater.

11. The area to the east of the site is limited to Subgrade 3b on the basis of microrelief. Complex changes of slope and direction occur over short distances mainly as a result of the numerous dried up watercourses which once formed part of the old watermeadow system. This has the effect of limiting the use of agricultural machinery on this area significantly.

FACTORS INFLUENCING ALC GRADE

Climate

12. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

13. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference		SU 555 665
Altitude	m, AOD	63
Accumulated Temperature	day°C (Jan-June)	1458
Average Annual Rainfall	mm	701
Field Capacity Days	days	150
Moisture Deficit, Wheat	mm	109
Moisture Deficit, Potatoes	mm	102
Overall climatic grade		Grade 1

14. 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.

15. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

16. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Other local climatic factors such as exposure and frost risk are not believed to have a significant effect on the site. The site is climatically Grade 1.

Site

17. The site is relatively flat or slightly undulating, ranging from 60m A.O.D to 65m A.O.D. Gradient restrictions do not affect land quality. There are a large number of drainage ditches in the central and eastern parts of the site (all of which are disused and dried up) which once formed part of a watermeadow system. A running stream also occurs in this area (running in an east-west direction). Land immediately adjacent to the stream may suffer from high groundwater levels and possibly localised flooding restrictions. The dissected nature of this area means that a microrelief limitation exists which prevents the land being classified any higher than Subgrade 3b. Landuse is restricted to permanent pasture. Land to the extreme east of the site is currently being worked for minerals and is therefore not in agricultural use.

Geology and soils

18. The most detailed published geological information (BGS, 1946) maps the entire site as being underlain by alluvium with the possibility of River Terrace drift deposits occurring along the northern edge of the site.

19. The most recently published soil information for the site (SSEW, 1983) shows the entire site to be mapped as Frome Association, with the possibility of the Wickham 4 Association occurring along the northern edge of the site. The former is described as 'Shallow calcareous and non-calcareous loamy soils over flint gravel affected by groundwater. Small areas of peat. Risk of flooding.' (SSEW, 1983). The latter is 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).

20. Upon detailed field examination, soils broadly consistent with the description of the Frome association were found across the site. Localised lenses of clay material were also observed.

AGRICULTURAL LAND CLASSIFICATION

21. The details of the classification of the site are shown on the attached ALC map and the are statistics for each grade are given in Table 1.

22. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Grade 2

23. Land of very good quality has been mapped in a limited area and occurs towards the west of the site. The principal limitation is minor soil droughtiness and /or soil wetness.

24. Within the Grade 2 mapping unit the soil profiles are relatively deep and calcareous, but variable in composition. Topsoils consist of calcareous, medium clay loams which are stoneless or very slightly stony, containing approximately 1% total flints. Subsoils are variable, but most profiles contain fine to coarse textured fragments of algal marl within the soil matrix (up to 35% algal marl). Occasional profiles comprise interbedded layers of algal marl and peaty loam, the extent and depth of which varies across the site. Soil textures are, on the whole, variable ranging from medium sandy loam to clay in the lower subsoil. Most profiles show evidence of imperfect drainage in the form of gleying, found at variable depths, as a result of fluctuating groundwater. Such profiles are assigned to Wetness Class I or II depending on the degree of inferred waterlogging. All profiles are impenetrable to the soil auger at depths between 85 and 105cm due to the presence gravel. The soils within this unit are similar to soil pit 1 (Appendix II). The existence of gravel at moderate to deep depths imparts a droughtiness limitation thereby reducing reserves of available water slightly for plant growth. A combination of both minor soil droughtiness and/or soil wetness restrictions may adversely affect the level and consistency of yields in this area.

Subgrade 3a

25. Good quality land has been mapped across much of the site, in association with land to the west which experiences more significant soil droughtiness than land classified as Grade 2.

26. Soils within the Subgrade 3a mapping unit are similar to those described above. They comprise medium clay loam and medium silty clay loam (with occasional fine sandy silt loam) topsoils which are calcareous and stoneless to very slightly stony (0-2% total flints). These overlie calcareous upper subsoils which are often similar to the topsoils in texture (sometimes becoming heavier (heavy silty clay loam) or lighter (loamy coarse sand) with depth. The upper subsoils are variably stony (containing between 0-2% flints and/or up to 20% algal marl). Lower subsoils are similar in texture but are often stonier (containing up to 54% total flint and/or 35% algal marl). The soils within this unit become impenetrable at a depth between 55cm and 98cm. Pit 1 and Pit 2 (Appendix II) shows that this is due to gravel horizons. In addition to this, some of the profiles show evidence of slightly imperfect drainage in the form of gleying at shallow to moderate depths (between 24cm and 40cm). Despite this, the profiles were found to be well drained (Wetness Class I or II). The principal limitation in the Subgrade 3a unit is therefore soil droughtiness as indicated by the moisture balance calculations which take into account the depth of soil resource over gravel horizons. Given the local climatic regime, such soils have inadequate reserves of available water, such that the land experiences a slight droughtiness restriction.

Subgrade 3b

27. Moderate quality land has been mapped in the central and eastern part of the site in the area which a disused watermeadow system. Numerous channels and ditches (which are now dried up) dissect this area which has subsequently led to complex changes of slope and direction over short distances. This, in turn, may lead to restricted use of agricultural machinery such that the land can be graded no higher than Subgrade 3b. Despite this, soil profiles are similar to those described in the Grade 2 and Subgrade 3a sections above in that they are calcareous, variably textured, and rest over gravel horizons at depths between 40cm and 97cm.

SOIL RESOURCES

28. This section describes the soil resources identified on the site. It should be emphasised that this is not intended as a prescription for soil stripping, but merely as an illustration of the soil resources available for restoration on the site. Due to the natural variability of soils, the depths of topsoil and subsoil given should be treated with caution. Soils were sampled to a maximum depth of 120cm, where possible, during survey work. In some cases soil resources will extend below this depth. Textures described relate *predominantly to hand texturing, incorporating the results of laboratory analysis (particle size distribution), where taken.*

Soil Units : considerations for restoration

Soil Unit 1

29. This unit comprises moderately deep to deep loamy soils, sometimes becoming more sandy or clayey with depth, lying over gravel horizons.

30. The topsoils and subsoils of this unit extend across 13.6 hectares of the site to the north and west. The topsoil in this unit comprises an average 30cm of very dark and dark greyish brown (10YR 3/2, 10YR 4/2, 10YR 4/3) calcareous medium clay loam or medium silty clay loam (with occasional fine sandy silt loam or silt loam). The topsoils are stoneless or very slightly stony, containing up to 3% total flints. The topsoils comprise a combination of moderately developed coarse sub-angular or weakly developed medium sub-angular peds of friable consistence.

31. These topsoils overlie subsoils of variable nature which extend to about 80cm depth and comprise mainly medium and heavy clay loam, medium and heavy silty clay loam and fine sandy silt loam textures (with occasional horizons of sandier or heavier textures). These subsoils are variably stony, containing up to 58% flints and/or 35% algal marl fragments, making them impenetrable to the soil auger at depths between 55cm and 105cm. The subsoils also vary in colour, being a combination of grey, light grey, light brownish grey or light olive brown matrix (25Y 5/1, 25Y 5/3, 25Y 6/1, 25Y 6/2, 25Y 7/1, 25Y 7/2) often with common ochreous mottles (10YR 5/6, 5/8). The subsoils are permeable and moderately structured, comprising moderately developed coarse sub-angular blocky and moderately developed coarse prismatic peds of friable consistence. Pits 1 and 2 (Appendix II) are typical of this soil unit. Poorly structured gravel deposits occur below depths of approximately 80cm in this unit (see Pit 1). The matrix colour tends to be brown (10YR 5/3), often with common ochreous mottles (10YR 5/8).

Representative soil profile for Soil Unit 1

Horizon	Average Depth (cm)	Description
Topsoil	0-30	medium clay loam, or silty clay loam, occasionally fine sandy silt loam or silt loam; very dark and dark greyish brown (10YR 3/2, 4/2 or 4/3); stoneless to very slightly stony (0-3% flints); moderately developed coarse sub-angular blocky or weakly developed medium sub-angular blocky structure; friable.
Subsoil	30-80	medium or heavy clay loam, or silty clay loam or fine sandy silt loam; grey to light olive brown (25Y 5/1-7/2) often with common ochreous mottles (10YR 5/6, 5/8); variably stony (0-58% flints); moderately developed coarse sub-angular blocky and coarse prismatic structures; friable.
	80-120	gravel; 25Y 5/3 matrix often with 10YR 5/8 common ochreous mottles; poorly structured.

Soil Unit 2

32. The soils of this unit tend to have coarser textured and more gravelly subsoils than Unit 1.

33. The topsoils and subsoils of this unit extend across 4.9 hectares in the south-eastern corner of the site. The topsoil across this unit is the same as that described in paragraph 30 above.

34. The subsoils in this unit extend to an average depth of 60cm. These subsoils were impenetrable to the soil auger, at depths between 40cm and 70cm, due to the underlying gravelly deposits occurring at shallower depths than in Unit 1. Consequently, the majority of the lower subsoil information for this unit is based upon information from Pits 1 and 2 (see Appendix II). The lower subsoils within this unit comprise a combination of silt loam, loamy medium sand and medium sandy loam textures (with occasional slightly heavier or sandier textures). The colours range from light grey to light olive brown (25Y 5/1, 25Y 5/2, 25Y 5/3, 25Y 7/1) often with common ochreous mottles (10YR5/6, 5/8). These subsoils are variably stony and moderately structured (see Pits 1 and 2). Poorly structured gravel deposits occur below depths of approximately 60cm in this unit (see Pit 2). The matrix colour tends to be brown (10YR 5/3), often with common ochreous mottles (10YR 5/8).

Representative soil profile for Soil Unit 2

Horizon	Average Depth (cm)	Description
Topsoil	0-30	medium clay loam, or silty clay loam, or occasionally fine sandy silt loam or silt loam; very dark and dark greyish brown (10YR 3/2, 4/2 or 4/3); stoneless to very slightly stony (0-3% flints); moderately developed coarse sub-angular blocky or weakly developed medium sub-angular blocky structure; friable.
Subsoil	30-60	silt loam, loamy medium sand and medium sandy loam; light grey to light olive brown (25Y 5/1-7/1) often with common ochreous mottles (10YR 5/6, 6/8); variably stony (0-58% flints); moderately developed coarse sub-angular blocky and coarse prismatic structures; friable.
	60-120	gravel; 25Y 5/3 matrix often with 10YR 5/8 common ochreous mottles; poorly structured.

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SOURCES OF REFERENCE

British Geological Survey (1946) *Sheet No. 268, Reading, Drift Edition*, 1:36,360 scale.
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land*. MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification*.
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Soils of England and Wales, Sheet 6, Soils of South East England*. 1:250,000 scale, and accompanying legend.
SSEW: Harpenden.

DESCRIPTIONS 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 (e.g. 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.

APPENDIX II

SOIL DATA

Contents:

Sample location map

Soil abbreviations - explanatory note

Soil pit descriptions

Soil boring descriptions (boring and horizon levels)

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	OTH: Other
DCW: Deciduous woodland	BOG: Bog or marsh	SAS: Set-Aside
HTH: Heathland	HRT: Horticultural crops	PLO: Ploughed

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

4. **GLEYSPL:** 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	ST: Topsoil Stoniness
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
EX: Exposure		

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	FSST:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	CH:	chalk
MSST:	soft, medium grained sandstone	GS:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock	GH:	gravel with non-porous (hard) stones

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	
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

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						DRT
1	SU55206660	PGR		35	2	2	139	30	128	25	1			WE	2	I90 ASS.GRAVEL
2	SU55306660	PGR		24	2	2	102	-7	114	11	3A			DR	3A	IMP 68 SEE 1P
3	SU55406660	PGR			1	1	87	-22	90	-13	3B			DR	3A	IMP 55 SEE 2P
4	SU55506660	PGR		30	1	1	149	40	131	29	1	Y		MR	3B	Q W/T 70CM
5	SU55606660	PGR		57	1	1	120	11	117	14	2	Y		MR	3B	I95 ASS.GRAVEL
6	SU55706660	PGR			1	1	136	27	130	27	2	Y		MR	3B	I87 ASS.GRAVEL
7	SU55206650	PGR		62	1	1	122	13	114	11	2			DR	2	I105 SEE 1P
8	SU55306650	PGR		40	1	1	106	-3	118	15	3A			DR	3A	IMP 70 SEE 1P
9	SU55406650	PGR			1	1	86	-23	77	-25	3B			DR	3A	I98 ASS.GRAVEL
10	SU55506650	PGR		25	1	1	115	6	121	18	2			DR	3A	IMP 60 SEE 2P
11	SU55606650	PGR			1	1	96	-13	96	-7	3A	Y		MR	3B	IMP 50 SEE 2P
12	SU55706650	PGR		20	30	4	3B	103	-6	110	7	3A	Y	MR	3B	GRAVEL 65+
13	SU55806650	PGR		50	1	1	136	27	128	25	2	Y		MR	3B	IMP 90 SEE 1P
14	SU55206640	MZE		30	2	2	96	-13	102	-1	3A			DR	3A	IMP 60 SEE 2P
15	SU55306640	MZE		32	60	2	2	120	11	119	16	3A		WD	2	I90 SEE 1P
16	SU55406640	MZE			1	1	133	24	126	23	2			DR	2	I85 SEE SEE 1P
17	SU55506640	PGR		32	1	1	99	-10	103	1	3A			DR	3A	I70 ASS.GRAVEL
18	SU55606640	PGR		35	1	1	121	12	134	31	2			DR	2	I70 ASS.GRAVEL
19	SU55706640	PGR			1	1	106	-3	113	10	3A	Y		MR	3B	IMP 60 SEE 2P
20	SU55806640	PGR			1	1	73	-36	73	-30	3B	Y		MR	3B	IMP 40 SEE 2P
1P	SU55306660	PGR		24	2	2	113	4	115	12	3A			DR	3A	GRAVEL 90+
2P	SU55506650	PGR		16	1	1	109	0	113	10	3A			DR	3A	GRAVEL

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES-----			STRUCT/ CONSIST	SUBS			CALC		
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR		IMP	SPL
1	0-25	MCL	10YR43						0	0	HR	1				Y		
	25-35	MCL	10YR53						0	0	HR	1		M		Y		
	35-45	MCL	10YR6263	10YR46	C	D			Y	0	0	HR	1		M		Y	
	45-78	FSZL	10YR81	10YR56	C	D			Y	0	0	HR	1		M		Y	
	78-90	MSL	10YR81	10YR46	F					0	0	HR	20		M		Y	ASS. GRAVEL 90+
2	0-24	MCL	10YR43						0	0	HR	1				Y		
	24-44	HCL	10YR6162	10YR56	C	D			Y	0	0	HR	1		M		Y	
	44-60	HZCL	10YR6162	10YR56	M	D			Y	0	0	CH	5		M		Y	ALG. MARL +5%HR
	60-68	HZCL	10YR41	10YR46	C	F			Y	0	0	CH	5		M		Y	IMP GRAVELLY
3	0-28	MCL	10YR43						0	0	HR	2				Y		
	28-48	MCL	10YR53						0	0	HR	2		M		Y		
	48-55	SCL	10YR6364						0	0	HR	15		M		Y	IMP GRAVELLY	
4	0-30	MZCL	10YR4142						0	0		0				Y		
	30-40	HZCL	10YR53	10YR56	C				Y	0	0		0		M		Y	
	40-90	FSZL	25Y 6272	10YR56	C				Y	0	0	CH	5		M		Y	IMP GRAVELLY
5	0-28	MZCL	10YR32						0	0		0				Y		
	28-38	MZCL	25Y53						0	0		0		M		Y		
	38-57	FSZL	25Y71	10YR58	F				0	0		0		M		Y	W/T 700M	
	57-95	LMS	25Y72	10YR58	C				Y	0	0	HR	25		M		Y	ASS. GRAVEL 95+
6	0-25	MZCL	10YR32						0	0		0				Y		
	25-52	MZCL	10YR53						0	0		0		M		Y		
	52-68	FSZL	25Y71						0	0		0		M		Y		
	68-87	FSZL	25Y71						0	0	HR	30		M		Y	IMP GRAVELLY	
7	0-27	MCL	10YR43						0	0	HR	1				Y		
	27-62	HZCL	10YR54						0	0	CH	10		M		Y	ALGAL MARL	
	62-105	HZCL	10YR41	10YR46	C				Y	0	0	CH	2		M		Y	IMP GRAVELLY
8	0-30	MZCL	10YR32						0	0		0				Y		
	30-40	MCL	25Y53						0	0		0		M		Y		
	40-60	HCL	25Y51	10YR58	C				Y	0	0		0		M		Y	SANDY
	60-70	C	25Y51	10YR58	C				Y	0	0	HR	10		P	Y	Y	IMP GRAVELLY
9	0-27	MCL	10YR53						0	0	HR	1				Y		
	27-65	LCS	10YR72						0	0	CH	20		M		Y	ALGAL MARL	
	65-98	LCS	10YR82						0	0	CH	20		M		Y	ASS GRAVEL 98+	
10	0-25	MZCL	10YR32						0	0		0				Y		
	25-60	FSZL	25Y71	10YR68	C				Y	0	0		0		M		Y	IMP GRAVELLY
11	0-25	ZL	10YR32						0	0	HR	2				Y		
	25-40	MZCL	25Y53						0	0	CH	2		M		Y	ALGAL MARL +2%HR	
	40-50	MZCL	25Y53						0	0	HR	15		M		Y	IMP GRAVELLY	

SAMPLE	DEPTH	TEXTURE	COLOUR	---MOTTLES---			PED		---STONES---			STRUCT/ CONSIST	SUBS		CALC	
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR		POR
12	0-20	ZL	10YR42						0	0	0				Y	
	20-30	HZCL	10YR52	10YR58	C			Y	0	0	0		M		Y	
	30-50	C	10YR52	10YR58G1	M			Y	0	0	0		P		Y	
	50-65	MSZL	25Y6171						0	0	CH 30		M		Y	ALGAL MARL
13	0-25	ZL	10YR32						0	0	HR 2				Y	
	25-40	MZCL	10YR43						0	0	HR 2		M		Y	
	40-50	MSL	10YR61	10YR58	F				0	0	CH 5		M		Y	ALGAL MARL
	50-90	HCL	25Y51	10YR58	C			Y	0	0	0		M		Y	IMP GRAVELLY
14	0-30	MCL	10YR32						0	0	0				Y	
	30-60	HCL	10YR42	75YR56	C			Y	0	0	0		M		Y	IMP GRAVELLY
15	0-32	MCL	10YR32						0	0	0				Y	
	32-42	HCL	25Y5261	75YR56	C			Y	0	0	CH 5		M		Y	
	42-60	ZL	25Y81	75YR56	C			Y	0	0	CH 35		M		Y	ALGAL MARL
	60-90	C	N3	75YR56	M			Y	0	0	0		P		Y	IMP GRAVELLY
16	0-27	MCL	10YR43						0	0	0				Y	
	27-40	MCL	10YR54						0	0	0		M		Y	
	40-50	MCL	10YR54						0	0	CH 20		M		Y	ALGAL MARL
	50-80	ZL	25Y71						0	0	CH 10		M		Y	ALGAL MARL
	80-85	PL	25Y251						0	0	0		M		Y	IMP GRAVELLY
17	0-32	MZCL	10YR32						0	0	0				Y	
	32-45	FSZL	25Y7172	10YR58	C			Y	0	0	0		M		Y	
	45-60	LMS	25Y71	10YR58	C			Y	0	0	CH 5		M		Y	ALGAL MARL
	60-70	MS	25Y71	10YR58	C			Y	0	0	HR 20		M		Y	IMP GRAVELLY
18	0-35	MZCL	10YR3132						0	0	0				Y	
	35-45	ZL	25Y 5152	10YR58	C			Y	0	0	CH 5		M		Y	
	45-65	ZL	25Y 5152						0	0	CH 10		M		Y	+3% HR
	65-70	MSL	25Y 5152						0	0	HR 30		P		Y	ASS GRAVEL 70+
19	0-30	MZCL	10YR32						0	0	HR 2				Y	+2% CH
	30-55	ZL	10YR43						0	0	CH 12		M		Y	ALGAL MARL +2%HR
	55-60	MZCL	25Y 52						0	0	HR 15		M		Y	IMP GRAV +10% CH
20	0-38	MZCL	25Y 7263						0	0	HR 5				Y	ALGAL MARL
	38-40	ZL	25Y 7263						0	0	HR 5		M		Y	IMP GRAVEL
1P	0-24	MZCL	10YR3132						0	0	0	MDCSAB	FR M		Y	
	24-48	HZCL	10YR52	10YR5651	C			Y	0	0	CH 15	MDCSAB	FR M		Y	ALGAL MARL
	48-60	MZCL	25Y4131	10YR46	F				0	0	CH 5	MDCOPR	FR M		Y	ALGAL MARL
	60-80	HZCL	25Y41	10YR46	F				0	0	HR 38		M		Y	
	80-85	HZCL	25Y41	10YR46	F				0	0	HR 47		M		Y	MOIST
	85-90	LMS	25Y53	10YR58	C			Y	0	0	HR 58		P		Y	WET-ROOTS 90CM

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES-----			STRUCT/ CONSIST	SUBS STR POR IMP SPL	CALC	
				COL	ABUN	CONT		GLY	>2	>6				LITH
2P	0-16	FSZL	10YR4142					0	0	HR	3	WDMSAB FR	Y	
	16-46	FSZL	25Y 61	10YR56	C	D		Y	0	0	HR	3	MDCSAB FR M	Y +10% SHELLS
	46-63	FSZL	25Y 5161	10YR46	C			Y	0	0	HR	54	M	Y GRAVEL AT 63CM
	63-77	GH	25Y 61						0	0	HR	77	FR P	Y ROOTS TO 77CM