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Spring Farm, Rainham, London Borough of Havering. Statement of Physical Characteristics January 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

SPRING FARM, RAINHAM, LONDON BOROUGH OF HAVERING.

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) and site physical characteristics on 22.6 ha of land at Spring Farm, between the A13 and the Jew's Cemetery, Rainham in Essex. The survey was carried out in January 1996.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF), from its Land Use Planning Unit in Reading, in connection with proposals for mineral extraction and restoration to agriculture. ADAS was commissioned in order to determine the land quality and site physical characteristics of the land affected by the proposals. This survey supersedes a previous survey carried out in 1981 on the same land (ADAS Ref: H5).

3. The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. 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 all of the land on this site was in arable use.

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.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area
2	19.8	87.6
3b	2.8	12.4
Total survey area	22.6	100
Total site area	22.6	N/A

7. The field work was conducted at an average density of 1 boring per hectare. A total of 26 borings and 3 soil inspection pits were described.

8. The majority of this site has been classified as Grade 2, very good quality, on the basis of a minor soil droughtiness limitation. A small strip of Subgrade 3b, moderate quality, land has also been identified adjacent to the Common Sewer. Here the key limitation is soil wetness and workability.

FACTORS INFLUENCING ALC GRADE

Climate

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

10. 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	N/A	TQ 544 824	TQ 536 823
Altitude	m, AOD	5	6
Accumulated Temperature	day°C	1495	1494
Average Annual Rainfall	mm	564	561
Field Capacity Days	days	102	101
Moisture Deficit, Wheat	mm	125	125
Moisture Deficit, Potatoes	mm	123	122

11. 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.

12. 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.

13. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation (Climate Grade 1). However, climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations. At this locality the high crop adjusted soil moisture deficits may increase the likelihood of soil droughtiness while the correspondingly low average annual rainfall and field capacity days may reduce the likelihood of soil wetness.

14. Local climatic factors such as exposure or frost risk are not believed to affect the site.

Site

15. The site is relatively flat and low lying situated at approximately 5m AOD, falling gently towards the Common Sewer along the southern site boundary.

16. Though the site is situated adjacent to the Common Sewer, flooding does not appear to adversely affect this site.

Geology and soils

17. The relevant geological sheet for this site (BGS, 1976) maps the majority of the site as flood plain gravels with some London Clay along the south eastern edge. Alluvium is mapped along the margins of the Common Sewer.

18. The most recently published soil information for the site (SSEW, 1983) maps the entire area as the Hurst soil association. These soils are described as 'Coarse and fine loamy permeable soils mainly over gravel variably affected by groundwater.' (SSEW, 1983).

19. Detailed field examination broadly confirms the presence of such soils with the exception of some heavier, more poorly drained soils, associated with the alluvium near to the Common Sewer.

AGRICULTURAL LAND CLASSIFICATION

20. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

21. 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 III.

22. The majority of the site has been classified as Grade 2, very good quality, land on the basis of a slight soil droughtiness and occasional soil wetness limitation. A narrow strip of land adjacent to the Common Sewer has been mapped as Subgrade 3b, moderate quality, due to soil wetness and workability restrictions. The availability of irrigation water has been taken into account in the grading of this site.

Grade 2

23. Land mapped as Grade 2 comprises two distinct soil types. Soil inspection Pit 1 typifies those soils to the north east of the site. Across this area a very slightly stony (1-5% total flint by volume) medium sandy silt loam topsoils overlie poorly structured, slowly permeable, clay at approximately 30cm depth. This horizon impedes drainage through the profile but the effects of soil wetness, despite the shallow depth to clay, are partially offset by the light topsoil texture and dry climate. The resultant land use limitations are therefore considered to be consistent with Wetness Class III/II, Grade 2. Below the clay the lower subsoil horizons generally become less stony (2% total flint by volume) and progressively sandier. At 55cm depth the sandy clay loam

remains slowly permeable before passing to a moderately well structured medium sandy loam or loamy medium sand at around 75cm depth. At this locality the light soil textures and stone content combine to reduce the amount of profile available water for plants. This would normally restrict the level and range of crop yields to the extent that Subgrade 3a is appropriate. However, this site is irrigated which has the affect of partially alleviating drought risk and allowing this land to be classified as Grade 2. Soil wetness and soil droughtiness are therefore equally limiting in this area.

24. The north west of the site is principally limited by soil droughtiness though soil wetness occasionally occurs in combination with this. Soil inspection Pit 3 reflects the profiles in this unit where medium sandy silt loam topsoils overlie medium silty clay loam and heavy clay loam upper subsoils. The topsoil is only very slightly stony (1-2% > 2 & 6cm, 2-6% total flints by volume) but this increases with depth (10-20% total flints by volume). At approximately 50-70cm depth profiles became impenetrable to the soil auger. In Pit 3 a sandy clay loam horizon, containing 50% flints by volume, was found to continue to depth. The high flint content in the subsoil reduces water reserves thus causing drought stress in crops. Under these conditions Subgrade 3a would normally be appropriate but, as explained in paragraph 23., irrigation partially offsets such effects and Grade 2 has therefore been mapped. The depth to the gravelly sandy clay loam subsoil is variable. Therefore occasional borings of better or worse quality were also found in this mapping unit. These were not mapped separately, however, due to their limited number and extent.

Subgrade 3b

25. Along the Common Sewer moderate quality land has been mapped. Here heavy clay loam topsoils overlie shallow slowly permeable clay upper subsoils which impede drainage through the profile. In this dry climatic regime such land is considered to be consistent with Wetness Class III as crop germination and growth can be adversely affected by waterlogging. The heavy topsoils can also limit the timing of cultivations as trafficking by agricultural machinery or grazing by livestock may lead to structural damage. This land has therefore been classified as Subgrade 3b.

SOIL RESOURCES

Soil Units : Consideration for Restoration

26. The following section and the accompanying soil resources map describe the pattern of topsoil and subsoil resources on the site. It should be emphasised that the map is not a soil stripping map, but merely an illustration of the soil resources available for restoration on the site. Due to the natural variability of soils the depths and volumes of topsoil and subsoil units given in Table 3 below should be treated with caution. In general terms, all the available existing topsoil and subsoil resources should be retained for restoration purposes. When considering these details it is important to remember that soils were sampled to a maximum depth of 120 cm during survey work. In some cases soil resources will extend below this depth.

Unit 1

27. The topsoil in this unit comprises, on average, 30 cm (range = 25-38 cm) of soil resource and extends across 11.6 ha of the site. The soil consists of a dark or very dark greyish brown

(10YR 4/1, 4/2 or 10YR 3/1, 3/2), medium sandy silt loam which was found to be non-calcareous and very slightly to slightly stony (1-2% >2 & 6cm, 1-6% total flints by volume).

28. The subsoil resource in Unit 1 measures an average 90 cm (range = 85-95 cm) comprising a variety of textures, including medium sandy silt loam, medium sandy loam, heavy clay loam and sandy clay loam. Typically greyish brown (10YR 5/2) medium sandy silt loam or brown to pale brown (10YR 5/3 or 6/3) medium silty clay loam horizons overlie pale brown (10YR 6/3) heavy clay loams and very pale brown (10YR 7/3) sandy clay loam lower subsoils. Generally gleying is present from the upper subsoil where common to many ochreous mottles (75YR 5/6) are present. These subsoils were non-calcareous throughout. The upper subsoils contain 1-10% total flints but this increases to 20% at approximately 40-50 cm depth, in the heavy clay loam, and 50% at around 50-70cm depth, in the sandy clay loam.

29. Most of these subsoils have moderate structural conditions comprising moderately well developed coarse sub-angular blocky peds of friable consistence. However, the high stone content in the sandy clay loam lower subsoil makes it difficult to determine the structure, hence it has been assumed that this horizon is likely to have moderate structural conditions.

Unit 2

30. The topsoil in Unit 2 is equivalent to that in Unit 1, as described in paragraph 27 above, as it covers a total of 16.8 ha of land. Unit 2 only comprises 5.2 ha of this however.

31. The subsoil resource in Unit 2 comprises an average 90 cm (range = 82-95 cm) commencing with a dark greyish brown (10YR 5/2) clay over a brown (10YR 5/3) sandy clay loam. At approximately 50-70cm depth the subsoil becomes distinctly sandier with a light olive grey (5Y 6/2) medium sandy loam or loamy medium sand. This unit is non-calcareous and contains little or no flint (0-5% total stones by volume).

32. These subsoils vary in structural composition and condition depending on the texture. The clay and sandy clay loam horizons comprise coarse angular blocky peds. In the clay these are moderately well developed which, with a firm consistence, result in poor structure which is considered to be slowly permeable. The sandy clay loam, on the other hand, comprises weakly developed peds of a friable nature thus giving rise to moderate structure. The lower sandy loam and loamy sand horizons comprise moderately developed coarse subangular blocky peds which are friable. These horizons are therefore of a moderate structure and are not slowly permeable.

Unit 3

33. Unit 3 occurs as a narrow strip (5.8 ha) along the edge of the Common Sewer. The topsoil is distinct from that in Units 1 and 2. Here it measures an average of 30cm (range = 25-40cm) but comprises a dark or very dark greyish brown (10YR 4/1, 4/2 or 3/1, 3/2), medium clay loam, medium silty clay loam or heavy clay loam. These topsoils were also found to be non-calcareous and contained little or no stone (0-1% total flint by volume).

34. The subsoil resource comprises an average of 90cm (range = 80-90cm) which ranges in texture from medium clay loam to clay. Typically a gleyed, greyish brown (10YR 5/2), or slightly gleyed, yellowish brown (10YR5/4), medium clay loam with common ochreous mottles

(75YR5/8, 5/6 or 4/6) overlies a light grey or light brownish grey clay (10YR 6/2, 7/2,7/1 or 25Y 6/2) with many ochreous mottles. Occasionally a heavy clay loam horizon occurs between the medium clay loam and clay or alternatively the clay occurs immediately below the topsoil. All of these horizons were found to be non-calcareous and contained a negligible amount of stone (1-3% total flint by volume).

35. The medium and heavy clay loam comprise a moderate structure as both are moderately well developed with coarse subangular blocky peds However, the former has a friable consistence while latter, in this unit, was firm. The clay peds are also moderately well developed but here they are angular blocky with a firm consistence and are thus poorly structured. In this unit both the heavy clay loam and clay are slowly permeable.

Table 3: Soil Resource Data

Unit	Average Depth (cm)	Typical Textures	Area (ha)	Volume (m^3)
Topsoil 1	30	MSZL	16.8	50,400
Topsoil 2	30	MCL, MZCL, HCL	5.8	17,400
Total Volume				67,800
Subsoil 1	90	MSZL, MSL. HCL, SCL	11.6	104,400
Subsoil 2	90	C, SCL, MSL, LMS	5.2	46,800
Subsoil 3	90	MCL, HCL, C	5.8	52,200
Total volume				203,400
Total Soil Resource				271,200

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SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No. 271*, Dartford. 1:50,000 scale (Drift Edition). 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) *Sheet 6, Soils of South East England.* SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England* 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 WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

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.

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.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.
[2] 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

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 : SPRING FARM, RAINHAM Pit Number : 1P

Grid Reference: TQ54208240
Average Annual Rainfall : 561 mm
Accumulated Temperature : 1495 degree days
Field Capacity Level : 101 days
Land Use : Cereals
Slope and Aspect : 01 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	MSZL	10YR41 00	0	1	HR					
28- 56	C	10YR52 00	0	0		C	MDCOAB	FM	P	
56- 75	SCL	10YR53 00	0	0		M	WKCOAB	FR	M	
75-120	MSL	05 Y62 00	0	0		M	MDCSAB	FR	M	

Wetness Grade : 2
Wetness Class : III
Gleying :028 cm
SPL :028 cm

Drought Grade : 3A
APW : 154mm MBW : 29 mm
APP : 110mm MBP : -13 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : SPRING FARM, RAINHAM Pit Number : 2P

Grid Reference: TQ50748220
Average Annual Rainfall : 561 mm
Accumulated Temperature : 1495 degree days
Field Capacity Level : 101 days
Land Use : Cereals
Slope and Aspect : 01 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 32	MSZL	10YR41 00	0	3	HR					
32- 42	MCL	10YR62 00	0	0		C	MDCSAB	FR	M	
42- 66	MZCL	10YR63 00	0	0		M	MDCSAB	FR	M	
66-120	C	75YR64 00	0	0		M	MDCOAB	FM	P	

Wetness Grade : 1
Wetness Class : II
Gleying :032 cm
SPL :066 cm

Drought Grade : 2
APW : 142mm MBW : 17 mm
APP : 121mm MBP : -2 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : SPRING FARM, RAINHAM Pit Number : 3P

Grid Reference: TQ54628238 Average Annual Rainfall : 561 mm
Accumulated Temperature : 1495 degree days
Field Capacity Level : 101 days
Land Use : Ploughed
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MSZL	10YR32 00	1	4	HR					
30- 40	MZCL	10YR42 00	0	4	HR		MDCSAB	FR	M	
40- 52	MZCL	10YR63 00	0	10	HR	C	MDCSAB	FR	M	
52- 72	HCL	10YR63 00	0	20	HR	M	MDCSAB	FR	M	
72-120	SCL	10YR73 00	0	50	HR	M			M	

Wetness Grade : 1 Wetness Class : I
Gleying :040 cm
SPL : No SPL

Drought Grade : 2 APW : 130mm MBW : 5 mm
APP : 113mm MBP : -10 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	DRT	M.REL FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	TQ54308250	CER	SW	02	045		1	1	144	19	114	-9	2				DR	2	Irrig 1
1P	TQ54208240	CER	SE	01	028	028	3	2	154	29	110	-13	3A				DR	3A	Irrig 2
2	TQ53628238	PLO			040		1	1	101	-24	110	-13	3B				DR	2	Irrig 1 See 3P
2P	TQ50748220	CER	SE	01	032	066	2	1	142	17	121	-2	2				DR	2	Irrig 1
3	TQ54108240	CER			020	020	3	3A	127	2	96	-27	3A				WD	3A	
3P	TQ54628238	PLO			040		1	1	130	5	113	-10	2				DR	2	Irrig 1
4	TQ54208240	CER	SW	02	028	028	3	2	158	33	106	-17	3A				DR	3A	Irrig 2 See 1
5	TQ54308240	CER	SW	01	025		2	1	138	13	110	-13	3A				DR	3A	Irrig 2
6	TQ54408240	CER	SW	02	025	055	2	1	130	5	107	-16	3A				DR	3A	Irrig 2
7	TQ54508240	CER	SW	02	025	090	2	1	123	-2	108	-15	3A				DR	3A	Irrig 2
8	TQ53608230	PLO			038	068	2	1	149	24	121	-2	2				WD	2	
9	TQ53708230	PLO			045		1	1	108	-17	120	-3	3A				DR	2	Irrig 1
10	TQ53808230	CER			030		2	1	94	-31	97	-26	3B				DR	3A	Irrig 2
11	TQ54008230	CER					1	1	119	-6	119	-4	3A				DR	3A	Irrig 2
12	TQ54108230	CER	SE	03	040		1	1	163	38	120	-3	2				DR	2	Irrig 1
13	TQ53708220	CER			030		2	1	81	-44	81	-42	3B				DR	3A	Irrig 2
14	TQ53808220	CER			030		2	1	100	-25	104	-19	3B				DR	2	Irrig 1
15	TQ53908220	CER	SE	01	030		2	1	95	-30	99	-24	3B				DR	3A	Irrig 2
16	TQ54008220	CER	SE	02	030	048	3	3A	134	9	111	-12	3A				WD	3A	
17	TQ50748220	CER	SE	01	035	055	2	2	142	17	120	-3	2				WD	2	See 2P
18	TQ53808210	CER			030		2	1	83	-42	83	-40	3B				DR	3A	Irrig 2
19	TQ53908210	CER			030		2	1	104	-21	114	-9	3B				DR	2	Irrig 1
20	TQ54008210	CER			035	045	3	3A	148	23	117	-6	2				WE	3A	
21	TQ53908200	CER			055	065	2	2	155	30	117	-6	2				WD	2	
22	TQ54508234	CER	SW	01	035	075	2	2	138	13	114	-9	2				WD	2	
23	TQ54038220	CER			030	030	3	3B	128	3	105	-18	3A				WE	3B	
24	TQ53538228	PLO			050		1	1	118	-7	122	-1	3A				DR	2	Irrig 1
25	TQ54128220	CER			040	040	3	3B	134	9	111	-12	3A				WE	3B	
26	TQ54028240	CER	SE	01	045		1	1	157	32	117	-6	2				DR	2	Irrig 1

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
1	0-25	mszl	10YR42 00						0	0	HR	2							
	25-45	msl	10YR56 58						0	0		0		M					
	45-75	msl	10YR64 00	10YR56 00	M			Y	0	0		0		M					
	75-120	lms	10YR63 00	10YR56 00	M			Y	0	0		0		G					
1P	0-28	mszl	10YR41 00						0	0	HR	1							At Boring 4
	28-56	c	10YR52 00	75YR58 00	C		10YR71 00	Y	0	0		0	MDCOAB FM	P		Y			
	56-75	scl	10YR53 00	75YR58 00	M		00MN00 00	Y	0	0		0	WKCOAB FR	M		Y			
	75-120	msl	05 Y62 00	75YR68 00	M			Y	0	0		0	MDCSAB FR	M					
2	0-30	mszl	10YR42 32						2	0	HR	6							
	30-40	mzcl	10YR42 00						0	0	HR	10		M					
	40-55	mzcl	10YR63 73	75YR56 00	C		00MN00 00	Y	0	0	HR	5		M					
	55-68	hcl	10YR63 73	75YR56 00	M		00MN00 00	Y	0	0	HR	20		M					Imp Gravelly: 3P
2P	0-32	mszl	10YR41 00						0	0	HR	3							At Boring 17
	32-42	mcl	10YR62 00	75YR58 00	C			Y	0	0		0	MDCSAB FR	M					
	42-66	mzcl	10YR63 00	75YR58 00	M			Y	0	0		0	MDCSAB FR	M					
	66-120	c	75YR64 00	75YR58 00	M			Y	0	0		0	MDCOAB FM	P		Y			
3	0-20	mcl	10YR31 00						0	0	HR	3							
	20-30	c	05Y 51 00	25Y 46 00	M			Y	0	0	HR	3		P		Y			
	30-50	scl	05Y 51 00	25Y 46 00	M			Y	0	0	HR	3		M		Y			
	50-120	lms	05Y 61 00	10YR56 00	C			Y	0	0		0		M					
3P	0-30	mszl	10YR32 00						1	0	HR	4							At Boring 2
	30-40	mzcl	10YR42 00						0	0	HR	4	MDCSAB FR	M					
	40-52	mzcl	10YR63 00	75YR56 00	C		00MN00 00	Y	0	0	HR	10	MDCSAB FR	M					
	52-72	hcl	10YR63 00	75YR56 00	M			Y	0	0	HR	20	MDCSAB FR	M					
	72-120	scl	10YR73 00	75YR56 00	M			Y	0	0	HR	50		M					
4	0-28	mszl	10YR31 00						0	0	HR	5							
	28-55	c	25Y 52 00	75YR58 66	M			Y	0	0	HR	5		P		Y			
	55-75	scl	25Y 53 00	75YR58 66	M			Y	0	0	HR	2		M		Y			
	75-120	msl	25Y 53 00	75YR58 66	M			Y	0	0	HR	2		M					
5	0-25	mszl	10YR31 00						0	0	HR	5							
	25-50	scl	10YR53 00	75YR56 64	M			Y	0	0	HR	5		M					
	50-75	msl	10YR64 00	75YR58 63	M			Y	0	0	HR	5		M					
	75-120	lms	10YR62 00	75YR46 58	M		00MN00 00	Y	0	0	HR	5		M					Wet
6	0-25	mszl	10YR31 00						0	0	HR	5							
	25-55	msl	10YR53 00	10YR56 58	M			Y	0	0	HR	5		M					
	55-120	c	25Y 62 53	10YR58 66	M			Y	0	0	HR	5		P		Y			
7	0-25	mszl	10YR31 00						0	0	HR	5							
	25-55	msl	10YR64 53	10YR58 56	M			Y	0	0	HR	10		M					
	55-90	scl	10YR63 53	75YR58 66	M		00MN00 00	Y	0	0	HR	5		M					
	90-100	c	05Y 51 00	75YR58 53	M		00MN00 00	Y	0	0	HR	20		P		Y			Imp Gravelly

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
8	0-38	mszl	10YR42 00						2	0	HR	6							
	38-50	mzcl	10YR53 00	10YR56 00	C			Y	0	0	HR	2		M					
	50-68	mzcl	10YR63 73	75YR56 00	C			Y	0	0	HR	2		M					
	68-95	hcl	10YR63 73	75YR56 00	C			Y	0	0	HR	15		M			Y		
	95-120	scl	10YR64 66	75YR56 00	M			Y	0	0	HR	20		M			Y		
9	0-30	mszl	10YR42 00						2	0	HR	6							
	30-45	mszl	10YR53 00	10YR56 00	F				0	0	HR	1		M					
	45-65	mszl	10YR63 73	75YR56 00	C		00MN00 00	Y	0	0	HR	1		M					
	65-70	mzcl	10YR63 73	75YR56 00	C		00MN00 00	Y	0	0	HR	10		M					Imp Gravelly: 2P
10	0-30	mszl	10YR42 00						1	0	HR	3							
	30-50	mszl	10YR63 73	75YR56 00	C			Y	0	0	HR	1		M					
	50-55	mzcl	10YR63 73	75YR56 00	M			Y	0	0	HR	10		M					Imp Gravelly: 2P
11	0-30	mszl	10YR41 00						0	0	HR	5							
	30-60	mszl	10YR54 00						0	0	HR	2		M					
	60-80	msl	10YR54 00						0	0	HR	5		M					Imp Gravelly: 2P
12	0-30	mszl	10YR41 00						1	0	HR	1							
	30-40	mcl	10YR54 00						0	0		0		M					
	40-70	hcl	10YR54 00	10YR58 00	M			Y	0	0		0		M					
	70-120	msl	10YR54 00	10YR58 00	M			Y	0	0		0		M					
13	0-30	mszl	10YR42 00						0	0	HR	1							
	30-45	mszl	10YR52 00	75YR56 58	C			Y	0	0	HR	5		M					Imp Gravelly: 2P
14	0-30	mszl	10YR42 00						0	0	HR	1							
	30-45	fszl	10YR53 00	75YR58 00	C			Y	0	0	HR	3		M					
	45-55	mzcl	10YR53 00	75YR58 00	C			Y	0	0	HR	3		M					Imp Gravelly: 2P
15	0-30	mszl	10YR41 42						1	0	HR	4							
	30-50	mszl	10YR53 00	75YR58 00	C			Y	0	0	HR	10		M					
	50-60	mszl	10YR53 00	75YR58 00	C			Y	0	0	HR	20		M					Imp Gravelly: 2P
16	0-30	mcl	10YR41 00						0	0	HR	1							
	30-48	mcl	10YR52 00	75YR58 00	C			Y	0	0		0		M					
	48-120	c	10YR62 00	75YR68 00	M			Y	0	0		0		P			Y		
17	0-30	mzcl	10YR41 00						0	0	HR	1							
	30-35	mcl	10YR54 00	10YR58 00	F				0	0	HR	2		M					
	35-55	mcl	10YR52 00	75YR58 00	C			Y	0	0	HR	6		M					
	55-70	hzcl	10YR52 00	75YR58 00	C			Y	0	0		0		M			Y		
	70-120	zc	75YR64 00	75YR58 00	M			Y	0	0		0		P			Y		
18	0-30	mszl	10YR43 00						0	0	HR	2							
	30-40	mszl	10YR53 00	75YR56 00	C		00MN00 00	Y	0	0	HR	2		M					
	40-48	mzcl	10YR63 00	75YR56 00	M			Y	0	0	HR	25		M					Imp Gravelly: 2P

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
19	0-30	mszl	10YR42 00	10YR42 00					2	0	HR	6							
	30-40	mzcl	10YR53 00	75YR56 00	C		00MN00 00	Y	0	0	HR	2		M					
	40-70	mszl	10YR63 73	75YR56 00	C			Y	0	0	HR	15		M					Imp Gravelly: 2P
20	0-35	mcl	10YR42 00						1	0	HR	2							
	35-45	mcl	10YR53 00	10YR56 00	C			Y	0	0	HR	2		M					
	45-98	hcl	10YR63 73	75YR56 00	M		00MN00 00	Y	0	0	HR	2		M		Y			Firm
	98-120	lms	10YR64 00	10YR56 00	C			Y	0	0	HR	2		M					
21	0-30	mcl	10YR32 00						0	0	HR	1							
	30-55	mcl	10YR42 00						0	0	HR	1		M					
	55-65	mcl	10YR42 00	75YR56 00	C			Y	0	0	HR	1		M					
	65-100	hcl	10YR63 00	75YR56 00	M			Y	0	0		0		M		Y			Firm
	100-120	scl	10YR64 00	75YR56 00	C			Y	0	0		0		M		Y			Firm
22	0-25	mcl	10YR31 00						0	0	HR	3							
	25-35	mcl	10YR54 44						0	0	HR	3		M					
	35-75	mcl	25Y 63 00	75YR58 61	M		00MN00 00	Y	0	0	HR	2		M					
	75-120	c	25Y 62 00	75YR56 00	M			Y	0	0	HR	2		P		Y			
23	0-30	hcl	10YR42 00						0	0	HR	1							
	30-65	c	25Y 42 00	75YR56 00	M		00MN00 00	Y	0	0	HR	1		P		Y			
	65-88	c	10YR72 00	75YR46 00	M		00MN00 00	Y	0	0		0		P		Y			
	88-120	c	10YR71 00	75YR46 00	M		00MN00 00	Y	0	0		0		P		Y			
24	0-30	mszl	10YR42 00						2	0	HR	4							
	30-50	mzcl	10YR43 44						0	0	HR	2		M					
	50-80	mzcl	10YR52 00	75YR56 00	C			Y	0	0	HR	2		M					Imp gravelly: 2P
25	0-40	hcl	10YR41 00						0	0		0							
	40-120	c	10YR61 00	75YR46 00	M			Y	0	0		0		P		Y			
26	0-32	mszl	10YR41 00						0	0	HR	1							
	32-45	scl	10YR43 00						0	0	HR	2		M					
	45-120	scl	10YR64 00	75YR58 00	C			Y	0	0		0		M					