

**SOILS OF THE  
M.M.B.W. FARM WERRIBEE**

By J M Maher and J J Martin

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## INTRODUCTION

The M.M.B.W. farm lies within the Werribee Irrigation area which will become the subject of a broad scale soil survey by the Department. For this reason, and also because a detailed soil survey of the nearby State Research Farm was in progress at the same time, an examination of the soils of the M.M.B.W. farm was carried out. It is envisaged that the information collected will contribute to the data required for the regional report.

The purpose of the investigation was to sample, describe and classify soils selected as typical by M.M.B.W. staff following their extensive survey of the farm. As the soil map being prepared by M.M.B.W. staff was incomplete at the time of site selection, it is possible that more than one representative profile may be contained within any one map unit in the final map, or that a map unit may not contain a representative profile.

As will be shown in the description of soils in this report, a considerable range of soils exist on the M.M.B.W. farm. Following description, eighteen representative profiles were classified by the Great Soil Group System (Stace *et al*, 1968) and by the Factual Key Notation of Northcote (1971) as shown in Table 1. The soils are described according to their Great Soil Group and the Northcote key notation in that order. Terms used in these descriptions are defined in Appendix I.

**Table 1 - Classification of Soils of the M.M.B.W. Farm, Werribee**

Great Soil Group	Northcote Key Notation	Profile (Site No.)
Brown member of the Grey, Brown and Red Clays.	Ug 5.35/C+	14
Brown member of the Grey, Brown and Red Clays.	Ug 5.35/C	15
Red member of the Grey, Brown and Red Clays.	Ug 5.39/C	1
Solidized Solonetz and Solodic Soils	Dr 2.43/L, fsy (33)*	3
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+ denotes surface texture.

\* records the thickness of the A horizon in cm for duplex soils.

## DESCRIPTION OF THE SOILS

**SITE NO.:** 14 (p6)

**GREAT SOIL GROUP CLASSIFICATION:** Brown clay of the grey, brown and red clays.

**NORTHCOTE CLASSIFICATION:** Ug 5.35/C

### **Surface Soil**

**A** 0 to 30 cm dark brownish grey (5yr 3/2m) light clay with rusty root channel mottling; moderate medium sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, slightly sticky and very plastic moist; moderate organic matter (root hairs), shell grit traces and trace of fine angular and round quartz; field pH about 7.5; sharp to:

### **Subsoil**

**B** 30 to 45 cm dull greyish brown (7.5YR 5/6m) with yellowish brownish grey (2.5Y 5/2m) and bright reddish brown (5YR 5/8m) mottled light clay; moderate medium sub-angular blocky structure; smooth-ped fabrics; very hard dry, firm, moderately sticky and very plastic moist; moderate amount of soft calcium carbonate and trace of fine angular and round quartz; field pH about 9.0; clear to:

45 to 85 cm yellowish brownish grey (2.5Y 5/2m) with light yellowish brown (10YR 6/6m) mottled light clay; moderate coarse sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, moderately sticky and very plastic moist; trace of fine angular and round quartz; field pH about 9.0; gradual to:

85 to 105 cm yellowish brownish grey (2.5Y 5/2m) with yellow-brown (2.5Y 5/6m) mottled medium clay; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, moderately sticky and very plastic moist; occasional stone (vesicular basalt) and trace of fine angular and round quartz; field pH about 9.0.

**SITE NO.:** 15 (M2)

**GREAT SOIL GROUP CLASSIFICATION:** Brown clay of the grey, brown and red clays.

**NORTHCOTE CLASSIFICATION:** Ug 5.35/C

**Surface Soil**

**A**     0 to 20 cm     yellowish grey- brown (10YR 4/3m) light clay; moderate fine sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, and slightly sticky moist; light organic matter (root hairs) and trace of soft calcium carbonate; field pH about 6.0; sharp to:

**Subsoil**

**B**     20 to 45 cm     greyish brown (7.5YR 4/4m) with red- brown (2.5YR 4/6m) mottled light medium clay; strong medium sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; trace of dark inclusions field pH about 7.0; clear to:

45 to 65 cm     yellowish brown (10YR 5/6m) medium clay; strong medium sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; trace of dark inclusions; field pH about 9.0; gradual to:

65 to 105 cm     dull yellowish brown (10YR 5/4) heavy clay; moderate medium sub-angular blocky structure; rough-ped fabric; very hard dry, very firm, slightly sticky and slightly plastic moist; light amount of soft calcium carbonate; field pH about 9.0.

**SITE NO.:** 1 (O.P.A.A 1-10)

**GREAT SOIL GROUP CLASSIFICATION:** Red clay of the red, brown and grey clays.

**NORTHCOTE CLASSIFICATION:** Ug 5.39/C

**Surface Cover**

**0<sub>2</sub>** 0 to 2cm sludge mat:

**Surface Soil**

**A** 2 to 5 cm grey- brown (7.5YR 4/2m) light clay; moderate coarse sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; moderate organic matter (root hairs); field pH about 6.0; sharp to:

**Subsoil**

**B** 5 to 10 cm reddish grey-brown (5YR 4/m) medium clay; moderate coarse sub-angular blocky structure; smooth-ped fabric; very hard dry, firm, slightly sticky and very plastic moist; light organic matter (root hairs), field pH about 6.0; clear to:

10 to 45 cm brownish grey (5YR 4/2m) heavy clay; strong coarse sub-angular blocky structure; smooth-ped fabric; very hard dry, very firm, moderately sticky and very plastic moist; field pH about 6.5; gradual to:

45 to 85 cm dull yellowish brown (10YR 5/4m) medium clay; weak coarse sub-angular blocky structure; smooth-ped fabric; extremely hard dry, firm, slightly sticky and very plastic moist; field pH about 7.5; gradual to:

85 to 105 cm dull yellowish brown (10YR 5/4m) light clay; weak coarse sub-angular blocky structure; smooth-ped fabric; extremely hard dry, firm, slightly sticky and slightly plastic moist; field pH about 7.5.



**SITE NO.:** 3 (15E- 70- 80W)

**GREAT SOIL GROUP CLASSIFICATION:** Solodized solonetz and Solodic Soils.

**NORTHCOTE CLASSIFICATION:** Dr 2.43/L, fsy (33)

**Surface Cover**

**0<sub>2</sub>** 0 to 2 cm sludge mat:

**Surface Soil**

**A<sub>1</sub>** 2 to 5 cm brownish grey (5YR 4/2m) loam, fine sandy; weak fine sub-angular blocky structure; rough-ped fabric; hard dry, very friable, slightly sticky and slightly plastic moist; moderate organic matter (root hairs) and trace of fine angular and round quartz; field pH about 6.5; gradual to:

**A<sub>2</sub>** 5 to 35 cm conspicuously bleached reddish grey-brown (5YR 4/4m, 10YR 7/3d) fine sandy clay loam; moderate coarse sub-angular blocky structure; rough-ped fabric; hard dry, firm, slightly sticky and slightly plastic moist; light organic matter (root hairs) and trace of fine angular and round quartz; field pH about 7.0; clear to:

**Subsoil**

**B** 35 to 60 cm dark red- brown (2.5YR 3/6m) medium clay; strong coarse sub-angular blocky structure; rough-ped fabric, very hard dry, firm, moderate sticky and very plastic moist; field pH about 7.5; gradual to:

60 to 80 cm dull greyish brown (7.5YR 5/6m) heavy clay; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, very firm, moderately sticky and very plastic moist; moderate amount of soft calcium carbonate; field pH about 8.5; gradual to:

80 to 105 cm dull yellowish brown (10YR 5/4m) fine sandy clay loam; weak coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and slightly plastic moist; trace of soft calcium carbonate; field pH about 8.5.

**SITE NO.:** 10 (L 16)

**GREAT SOIL GROUP CLASSIFICATION:** Solodized solonetz and Solodic Soils.

**NORTHCOTE CLASSIFICATION:** Dr 2.43/FSCL (10)

**Surface Soil**

**A<sub>1</sub>**     0 to 2 cm           dark brownish grey (5YR 3/2m) fine sandy clay loam; moderate medium sub- angular blocky structure; smooth- ped fabric; extremely hard dry and extremely friable moist; moderate organic matter (root hairs); field pH about 7.0; sharp to:

**A<sub>2</sub>**     2 to 10 cm           conspicuously bleached yellowish grey- brown (10YR 4/3m, 10YR 7/2d) light clay; moderate coarse angular blocky structure; smooth-ped fabric; extremely hard dry, friable, slightly sticky and very plastic moist; field pH about 7.0; clear to:

**Subsoil**

**B**       10 to 35 cm           dark, slightly reddish, grey-brown (5YR 3/4m) medium clay; moderate coarse sub-angular blocky structure; smooth-ped fabric; extremely hard dry, firm, slightly sticky and very plastic moist; slight amount of soft calcium carbonate; field pH about 7.5; clear to:

35 to 85 cm           dull yellowish brown (10YR 5/4m) light clay; moderate coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and very plastic moist; field pH about 9.0; gradual to:

85 to 105 cm          dull yellowish brown, slightly dark (10YR 4/4m) light clay; weak very coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and very plastic moist; field pH about 8.5.

**SITE NO.:** 11 (B1-9)

**GREAT SOIL GROUP CLASSIFICATION:** Solodized solonetz and Solodic Soils.

**NORTHCOTE CLASSIFICATION:** Dr 2.43/L, fsy (38)

**Surface Cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat:

**Surface Soil**

**A<sub>1</sub>**      2 to 5 cm      dark, slightly reddish, grey- brown (5YR 3/3m) loam, fine sandy; moderate medium crumb structure; rough-ped fabric; hard dry and extremely friable moist; moderate organic matter (root hairs); field pH about 7.0; sharp to:

**A<sub>2</sub>**      5 to 40 cm      conspicuously bleached reddish grey- brown (5YR 4/4m, 7.5YR 6/4d) fine sandy clay loam; moderate medium angular blocky structure; rough-ped fabric; extremely hard dry and friable moist; field pH about 8.0; clear to:

**Subsoil**

**B**      40 to 60 cm      dull red-brown (2.5YR 4/6m) medium clay; strong coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, very firm, slightly sticky and slightly plastic moist; field pH about 8.0; clear to:

60 to 105 cm      dull greyish brown (7.5YR 5/6m) lightly clay; strong coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and slightly plastic moist; trace of soft calcium carbonate; field pH about 9.0

**SITE NO.:** 8 (U 20)

**GREAT SOIL GROUP CLASSIFICATION:** Solodized solonetz and Solodic Soils.

**NORTHCOTE CLASSIFICATION:** Dy 3.43/L, fsy (18)

**Surface Cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat.

**Surface Soil**

**A<sub>1</sub>**      2 to 5 cm      dark yellowish grey-brown (10YR 3/2m) loam, fine sandy; moderate medium granular structure; smooth-ped fabric; extremely friable dry and moist; moderate organic matter (root hairs); field pH about 6.0; sharp to:

**A<sub>2</sub>**      5 to 20 cm      conspicuously bleached greyish brown (7.5YR 5/4m, 10YR 7/2d) fine sandy clay loam, heavy; unaggregated massive breaking down to moderate medium sub-angular blocky structure; rough-ped fabric; very hard dry, very friable, slightly sticky and slightly plastic moist; light organic matter (root hairs) and trace of fine angular and round quartz; field pH about 7.0; sharp to:

**Subsoil**

**B**      20 to 65 cm      dull greyish brown (7.5YR 5/6m) with dull red-brown (2.5YR 4/6m) mottled medium clay; strong coarse sub-angular blocky structure; rough- ped fabric; very hard dry, firm, slightly sticky and very plastic moist; slight amount of soft calcium carbonate; field pH about 7.5; clear to:

65 to 80 cm      greyish brown (7.5YR 4/4m) medium clay; weak medium sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and moderately plastic moist; slight amount of soft calcium carbonate; field pH about 9.0; gradual to:

80 to 105 cm      greyish brown (7.5YR 4/4m) with reddish brown (5YR 4/6m) light clay; weak medium sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and very plastic moist; trace of soft calcium carbonate; field pH about 8.5.

**SITE NO.:** 13 (105 Rd- 190- 200E)

**GREAT SOIL GROUP CLASSIFICATION:** Solodized solonetz and Solodic Soils.

**NORTHCOTE CLASSIFICATION:** Dd 1.13/L, fsy (3)

**Surface Cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat

**Surface Soil**

**A**      2 to 5 cm      dark brownish grey (5YR 3/2m) loam, fine sandy; moderate medium granular structure; smooth-ped fabric; very hard dry and friable moist; moderate organic matter (root hairs); field pH about 7.0; sharp to:

**Subsoil**

**B**      5 to 35 cm      dark brownish grey (5YR 3/2m) light clay; strong coarse angular blocky structure; smooth-ped fabric; extremely hard dry, firm, slightly sticky and slightly plastic moist; light organic matter (root hairs); field pH about 7.0; clear to:

35 to 105 cm      dull yellowish brown (10YR 5/4m) medium clay; strong coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and moderately plastic moist; trace of soft calcium carbonate; field pH about 9.0.

**SITE NO.:** 17 (C 27)

**GREAT SOIL GROUP CLASSIFICATION:** Solodized solonetz and Solodic Soils.

**NORTHCOTE CLASSIFICATION:** Dd 1.13/FSCL (20)

**Surface Soil**

**A** 0 to 20 cm dark grey- brown (7.5YRr 3/2m) fine sandy clay loam; unaggregated massive breaking down to moderate coarse sub-angular blocky structure; rough-ped fabric; hard dry, very friable and slightly plastic moist; moderate organic matter (root hairs); field pH about 6.0; sharp to:

**Subsoil**

**B** 20 to 50 cm dark brownish grey (5YR 3/2m) medium clay; moderate medium sub-angular blocky structure; smooth-ped fabric; hard dry, firm and moderate plastic moist; field pH about 7.0; gradual to:

50 to 85 cm greyish brown (7.5YR 4/4m) fine sandy clay loam; moderate coarse sub-angular blocky structure; smooth-ped fabric; hard dry, very friable and slightly plastic moist; field pH about 7.5; gradual to:

85 to 105 cm reddish grey-brown (5YR 4/4m) fine sandy clay loam; moderate medium sub-angular blocky structure; smooth-ped fabric; hard dry, firm and very plastic moist; field pH about 8.5

**SITE NO.:** 4 (105W Road – 60 – 70W)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Dr 2.13/FSCL (23)

**Surface cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat:

**Surface Soil**

**A**      2 to 4 cm      dark brownish grey (5YRr 3/2m) fine sandy clay loam with rusty root channel mottling; weak fine sub-angular blocky structure; rough-ped fabric; hard dry, very friable, slightly sticky and slightly plastic moist; moderate organic matter (root hairs); field pH about 6.0; cleat to:

4 to 25 cm      dark brownish grey (5YR 3/3m) with reddish brown (5YR 4/6m) mottled light medium clay with fine sand; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; light organic matter (root hairs); field pH about 6.0; gradual to:

**Subsoil**

**B**      25 to 45 cm      grey- brown (5YR 4/2m) with bright reddish brown (5YR 4/8m) mottled light clay; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; field pH about 7.5; clear to:

45 to 65 cm      dull yellowish brown (10YR 5/4m) heavy clay; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, very firm, slightly sticky and moderately plastic moist; field pH about 8.5; gradual to:

65 to 105 cm      dull yellowish brown (10YRF 5/4m) light clay; weak medium sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and very plastic moist; trace of soft calcium carbonate; field pH about 9.0.

**SITE NO.:** 5 (145W- 110- 120)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Dr 2.13/FSCL (25)

**Surface Soil**

**A** 0 to 2 cm greyish brown (7.5YR 4/4m) fine sandy clay loam, heavy; moderate sub-angular blocky structure; rough-ped fabric, hard dry, very friable, slightly sticky and slightly plastic moist; moderate organic matter (root hairs); field pH about 7.0; clear to:

2 to 25 cm grey- brown (7.5YR 4/2m) fine sandy clay loam, heavy; moderate coarse sub-angular blocky structure; rough-ped fabric; hard dry, very friable, slightly sticky and slightly plastic moist; light organic matter (root hairs); field pH about 6.5; sharp to:

**Subsoil**

**B** 25 to 45 cm reddish grey- brown (5YR 4/4m) heavy clay; strong coarse sub-angular blocky structure; rough-ped fabric; very hard dry, very firm, slightly sticky and moderately plastic moist; field pH about 7.5; clear to:

45 to 60 cm dull greyish brown (7.5YR 5/6m) heavy clay; strong coarse sub-angular blocky structure; rough-ped fabric, very hard dry, very firm, slightly sticky and very plastic moist; field pH about 8.0; clear to:

60 to 105 cm dull yellowish brown (10YR 5/4m) fine sandy clay loam; weak medium sub-angular blocky structure; rough-ped fabric, extremely hard dry, very firm, slightly sticky and slightly plastic moist; trace of soft calcium carbonate; field pH about 9.0.



**SITE NO.:** 12 (105 Road 0-10E)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Dr 2.13/FSCL (10)

**Surface Soil**

**A** 0 to 10 cm brownish grey (5YR 4/2m) fine sandy clay loam; moderate fine sub-angular blocky structure; smooth-ped fabric; very hard dry, friable, slightly sticky and slightly plastic moist; moderate organic matter (root hairs); field pH about 7.0; clear to:

**Subsoil**

**B** 10 to 35 cm bright reddish brown (5YR 4/8m) medium clay with fine sand; strong medium sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; light organic matter (root hairs); field pH about 7.0; clear to:

35 to 60 cm greyish brown (7.5YR 5/4m) medium clay; strong coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and moderately plastic moist; field pH about 7.0; clear to:

60 to 105 cm dull yellowish brown (10YR 5/4m) medium clay; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and moderately plastic moist; trace of soft calcium carbonate; field pH about 8.5.

**SITE NO.:** 18 (Exp. Site A)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Dr 2.13/FSCL (10)

**Surface Soil**

**A** 0 to 20 cm reddish grey- brown (5YR 4/4m) fine sandy clay loam; unaggregated massive breaking down to strong coarse sub- angular blocky structure; smooth- ped fabric; hard dry, very friable and moderately plastic moist; moderate organic matter (root hairs), trace of dark inclusions and occasional amount of fine angular and rough quartz; field pH about 4.5; sharp to:

**Subsoil**

**B** 20 to 40 cm dark, slightly reddish, grey- brown (5YR 3/4m) heavy clay; moderate coarse sub-angular blocky structure; smooth-ped fabric; hard dry, very firm, moderately sticky and moderately plastic moist; trace of dark inclusions; field pH about 6.0; clear to:

40 to 50 cm reddish brown (5YR 4/6m) medium to heavy clay; moderate coarse sub-angular blocky structure; rough ped fabric; hard dry, very firm, slightly sticky and moderately plastic moist; trace of dark inclusions; field pH about 8.5; clear to:

50 to 85 cm yellowish brownish grey (2.5Y 5/2m) heavy clay; weak very coarse sub-angular blocky structure; rough-ped fabric; hard dry, very firm, moderately sticky and moderately plastic moist; moderate amount of soft calcium carbonate and trace of dark inclusions; field pH about 9.0; gradual to:

85 to 105 cm yellowish brownish grey (2.5Y 5/2m) medium clay; moderate very coarse sub-angular blocky structure; rough-ped fabric; hard dry, very firm, slightly sticky and moderate plastic moist; moderate amount of soft calcium carbonate; field pH about 9.0.

**SITE NO.:** 2 (O.P.C.B 1-5)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Dr 2.23/FSCL (28)

**Surface cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat

**Surface Soil**

**A<sub>1</sub>**      2 to 5 cm      yellowish grey- brown (10YR 4/3m) fine sandy clay loam; weak medium sub-angular blocky structure; rough-ped fabric; hard dry, very friable, slightly sticky and slightly plastic moist; moderate organic matter (root hairs); field pH about 6.0; gradual to:

**A<sub>2</sub>**      5 to 30 cm      reddish grey- brown (5YR 4/4m) fine sandy clay loam; weak medium sub-angular blocky structure; rough-ped fabric; hard dry, slightly sticky and slightly plastic moist; light organic matter (root hairs); field pH about 6.0; clear to:

**Subsoil**

**B**      30 to 50 cm      dark red- brown (2.5YR 3.6m) heavy clay; moderate coarse sub-angular blocky structure; rough-ped fabric; hard dry, very firm, slightly sticky and very plastic moist; field pH about 6.5; clear to:

50 to 65 cm      reddish grey- brown (5YR 4/4m) medium clay; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and very plastic moist; field pH about 7.5; sharp to:

65 to 105 cm      greyish brown (7.5YR 5/4m) medium clay; weak coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and very plastic moist; light amount of soft calcium carbonate; field pH about 9.0.

**SITE NO.:** 6 (15E-160-170W)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Dd 1.13/L, fsy (3)

**Surface cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat:

**Surface Soil**

**A**      2-5 cm      very dark brownish grey (5YR 2/2m) loam, fine sandy; moderate medium granular structure; smooth-ped fabric; hard dry, extremely friable moist; moderate organic matter (root hairs); field pH about 6.0; sharp to:

**Subsoil**

**B**      5 to 45 cm      dark yellowish brown (10YR 3/4m) medium clay with fine sand; moderate coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; light organic matter (root hairs) and trace of fine angular and round quartz; field pH about 7.0; clear to:

45 to 75 cm      yellowish grey-brown (10YR 4/3m) with dark red-brown (2.5YR 3/5m) mottled medium clay; weak coarse sub-angular blocky structure; rough- ped fabric; very hard dry, firm, slightly sticky and slightly plastic moist; trace of dark inclusions; field pH about 7.0; sharp to:

75 to 95 cm      yellowish brownish grey (2.5Y 5/2m) with reddish brown (5YR 4/6m) mottled medium clay; weak coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, slightly sticky and moderately plastic moist; trace of soft calcium carbonate and trace of dark inclusions; field pH about 8.0; sharp to:

95 to 105 cm      yellowish grey- brown (10YR 5/3m) with reddish grey-brown (5YR 5/4m) mottled medium clay; weak coarse sub-angular blocky structure; rough- ped fabric; very hard dry, firm, slightly sticky and moderately plastic moist; field pH about 8.0

**SITE NO.:** 16 (L6)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Db 1.13/L, fsy (2)

**Surface cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat:

**Surface Soil**

**A**      1 to 3 cm      dark brownish grey (5YR 3/2m) loam; fine sandy; weak fine sub-angular blocky structure; smooth-ped fabric; friable dry, very friable, slightly sticky and moderately plastic moist; moderate organic matter (root hairs); field pH about 7.0; sharp to:

**Subsoil**

**B**      3 to 5 cm      yellowish grey-brown (10YR 4/3m) medium clay; moderate coarse sub-angular blocky structure; smooth-ped fabric; extremely hard dry, firm, slightly sticky and moderately plastic moist; light organic matter (root hairs) and slight amount of soft calcium carbonate; field pH about 7.0; sharp to:

5 to 30 cm      yellowish grey-brown (10YR 4/3m) with bright yellowish brown (10YR 5/8m) mottled medium clay; moderate coarse sub-angular blocky structure; rough-ped fabric; extremely hard dry, firm, slightly sticky and moderately plastic moist; light amount of soft calcium carbonate; field pH about 8.0; clear to:

30 to 65 cm      light yellowish grey- brown (2.5Y 6/4m) heavy clay; unaggregated massive structure; extremely hard dry, very firm, moderately sticky and very plastic moist; trace of dark inclusions and occasional fine angular and round quartz; field pH about 9.0; gradual to:

65 to 105 cm      light yellowish grey- brown (2.5Y 6/4m) heavy clay; unaggregated massive structure; extremely hard dry, very firm, moderately sticky and very plastic moist; occasional amount of soft calcium carbonate; field pH about 9.0

**SITE NO.:** 7 (Tyquins Lane 210-220E)

**GREAT SOIL GROUP CLASSIFICATION:** Red- Brown Earths.

**NORTHCOTE CLASSIFICATION:** Um 6.32/L, fsy

**Surface cover**

**0<sub>2</sub>**      0 to 2 cm      sludge mat:

**Surface Soil**

**A**      2 to 4 cm      dark yellowish grey- brown (10YR 3/2m) loam, fine sandy; moderate medium granular structure; smooth-ped fabric; friable dry and extremely friable moist; moderate organic matter (root hairs); field pH about 8.0; sharp to:

**Subsoil**

**B**      4 to 35 cm      greyish brown (7.5YR 4/4m) fine sandy clay loam; unaggregated massive breaking down to moderate medium sub-angular blocky structure; smooth-ped fabric; very hard dry, very friable, slightly sticky and slightly plastic moist; field pH about 9.0; clear to:

35 to 55 cm      dull yellowish brown (10YR 5/4m) fine sandy clay loam, heavy; strong coarse sub-angular blocky structure; smooth-ped fabric; very hard dry, very friable, slightly sticky and very plastic moist; field pH about 9.0; gradual to:

55 to 105 cm      light dull yellowish brown (10YR 6/4m) fine sandy clay loam, heavy; unaggregated massive structure; extremely hard dry, firm, slightly sticky and very plastic moist; field pH about 9.5

**SITE NO.:** 9 (E 13)

**GREAT SOIL GROUP CLASSIFICATION:** No Suitable Group.

**NORTHCOTE CLASSIFICATION:** Dy 3.13/FSCL

**Surface Soil**

**A**     0 to 10 cm     yellowish grey- brown (10YR 5/2m) fine sandy clay loam, heavy, with rusty root channel mottling; moderate medium angular blocky structure; rough- ped fabric; very hard dry, very friable, slightly sticky and moderate plastic moist; light organic matter (root hairs); field pH about 5.0; sharp to:

10 to 25 cm     yellowish grey- brown, slightly dark (10YR 4/3m) fine sandy clay loam with rusty root channel mottling; moderate medium angular blocky structure; rough-ped fabric; very hard dry, very friable, slightly sticky and slightly plastic moist; light organic matter (root hairs); field pH about 5.0; clear to:

**Subsoil**

**B**     25 to 40 cm     yellowish grey-brown (10YR 4/2m) with bright yellowish brown (10YR 5/8m) mottled medium clay; strong coarse sub-angular blocky structure; rough-ped fabric; very hard dry, firm, moderately sticky and moderately plastic moist; trace of soft calcium carbonate; field pH about 6.0

40 to 85 cm     dull yellowish brown (10YR 5/4m) medium clay; moderate medium sub-angular blocky structure; rough-ped fabric; very hard dry, very firm, moderately sticky and moderately plastic moist; trace of soft calcium carbonate and trace of dark inclusions; field pH about 8.5; gradual to:

85 to 105 cm     bright yellowish brown (10YR 5/8m) with dull red-brown (2.5YR 5/6m) light clay; weak medium sub-angular blocky structure; rough- ped fabric; very hard dry, firm, moderate sticky and moderately plastic moist; field pH about 8.5

## PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

The profiles described show that the area consists mainly of hard duplex soils (dominantly hard, red duplex) with significantly different thicknesses of surface soils, and sodic to strong sodic subsoils. These are the main properties that will influence soil management practices.

The surface soils (A horizons) vary from 2 to mainly 40 cm thick. In duplex soils with relatively impermeable subsoils, profiles with shallow A horizons will store and supply less water to plant than those soils with deeper surface horizons. A feature of the surfaces of the duplex soils is the relatively high fine sand and silt contents which contribute to their hard setting character. The sludge mat which is present at the surface of 10 of the 18 profiles will reduce water infiltration. In any one bay the depth of the sludge mat decreases from the head to the foot of the bay.

### *(a) Exchangeable Cations*

For the eighteen representative profiles, the exchangeable calcium, magnesium, potassium, sodium and “acidity” (at pH values less than 8) and the sum of these cations, representing the exchange capacity, are given appendix II.

The factor which is of main agricultural interest is the exchangeable sodium percentage (ESP). Values less than 6 are associated with normal soils, but values of 6 or more indicate the presence of sodium salts as an important factor in affecting the physical properties of the soils adversely (3). Sodic soils generally have an ESP of 6 or more whilst those with an ESP of 15 or greater are considered to be strongly sodic. The soils at sites 1, 3, 4, 5, 10 and 17 are sodic and the soils at the other sites are strongly sodic. Exchangeable sodium, at relatively high levels, ESP 6 or above, causes clay dispersion which then results in either coarsely or massively structured soil material and associated problems of soils permeability and root penetration.

The term exchangeable acidity is used because hydrogen ion will dissolve aluminium, iron etc. from the clay and it is these hydrated ions which are responsible for acidity in soils.

Although the cation exchange capacity (CEC) increases with an increase in clay content, the CEC figures (dominated by “hydrogen”) are higher in the surface soils when sludge mats are present. This is due to the high organic matter content associated with these surface horizons.

Assuming 0.2 milliequivalents of K/100g soil as the minimum value for sufficient supply of potassium to pasture plants (1), the figures for exchangeable potassium are high with the exception of those determined at site 11 which indicated a moderate to low supply.

### *(b) Organic carbon, nitrogen and phosphorus*

The general level of organic matter in the soils is illustrated, by the values of total nitrogen and organic carbon reported in appendix II. The level of Organic matter in many of the surface soils at the selected sites was high to very high. However, the soils at site 10, 15, and 18 had low to moderate contents. It is possible to separate soils into the following three general classes on the basis of organic matter content (1):

Class (a)-	High organic matter content (>0.25 percent N).
Class (b)-	Moderate organic matter content (0.25 to 0.1 percent N).
Class (c)-	Low organic matter content (>0.1 percent N).

The surface soils at the representative sites had moderate to high amounts of total phosphorus.

### *(c) pH*

The increase in pH with depth shows an alkaline trend at all the representative sites examined. In profiles with “alkaline trends” surface soils have pH values higher than 5.0 and deep subsoils have pH values higher than 8.0.



#### **(d) Salinity**

The measurements of electrical conductivity (EC) and chloride (Cl) reported in appendix II are used as a means of appraising soil salinity. High EC figures indicate potential salinity hazard as a result of high content of total soluble salts (TSS). The Cl figures indicate the extent to which chloride ions themselves represent a hazard (4).

Topsoils and subsoils are examined for salinity in dryland soils should they be irrigated, and in irrigated soils should water-table develop (Table 2). This investigation is carried out because the “salt” content of the topsoil will give an indication of the immediate risk to plant growth and the salt level in the subsoil will indicate potential hazard to plant productivity. The figures for the subsoil were obtained from samples taken from the 60–90cm depth.

**Table 2 - Salt Hazard and Salt Content (Cl and EC) of surface Soils and Subsoils**

	Salt Hazard %Cl		Salt Content EC in $\mu\text{S cm}^{-1}$ at 20°C	
	Surface	Subsoil	Surface	Subsoil
<b>Low</b>	0-0.06%	0-0.06%	0-460	0-460
<b>Slight</b>	0-0.09%	0.06-0.18%	0-1080	460-2015
<b>Moderate</b>	0.09-0.18%	0.09-0.18%	1080-2015	1080-2015
<b>High</b>	0.18-0.30%	0.18-0.30%	>2015	>2015
	>0.30%	>0.30%		

The extent to which plant growth is retarded at any one of these salt levels varies with the soil type and with the salt tolerance of the crop growth. With regard to the TSS, the salinity hazard is low at sites 1 to 5, 9 to 13 and 17; slight at sites 6, 8, 14 to 16 and 18; and high at site 7. The salinity hazard arising from the presence of chloride is low at sites 1 to 6, 8 to 14 and 17; slight at sites 15, 16, and 18; and high at site 7.

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## ***Appendix 1 - Explanation of Terms***

**Bleached horizon:** This is an A<sub>2</sub> horizon that has become pale in colour due to leaching. A sporadic bleach is one in which the bleached portions appear irregularly through the A<sub>2</sub> horizons, or as blotches at the interface of the A and B horizons, or as nests of bleached grains of soils material often at the interface of the A and B horizons, when no other evidence of an A<sub>2</sub> horizon may occur.

**Condition of surface soil:** This refers to the natural condition of the A horizon and its reaction to the usual wetting and drying cycle, hence,

**Hard setting** A horizons are considered to be hard setting when a compact, hard, and apparently apedal condition prevails on the drying- out of the soil periodically.

**Consistence:** Consistence comprises the attributes of soil material that are expressed by the degree and kind of cohesion and adhesion or by the resistance to deformation or rupture. It is affected markedly by the moisture state of the soil.

**Duplex soils:** These are soils with contrasting texture profiles. The characteristic feature is the high content of clay in the B horizon relative to the A horizon.

**Fabric:** Fabric describes the appearance of the soil material (under 10x hand lens). Differences in fabric are associated with the presence or absence of peds and the lustre, or lack thereof, of the ped surfaces, and the presence, size and arrangement of pores (voids) in the soil mass.

**Mottles:** Mottles are considered to be masses, blobs or blotches of subdominant colours.

**Munsell colour:** This is the soil colour determined by matching against the Munsell colour chart and expressed in its notation of hue, value and chroma. The notations given are for moist (m) or dry (d) soil where indicated.

**Ped:** A ped is an individual, nature soil aggregate.

**Seasonal cracking:** This refers to those shrinkable clay soils which develop and exhibit during a dry-season or period cracks as wide, or wider than 6mm and which penetrate at least 30 cm into the soil profile.

**Soil horizon:** A soil horizon is a layer within the soil profile having morphological characteristics and properties different from those layers which occur below and/ or above it.

**Soil profile:** The soil profile is the face of soil exposed in a vertical section. More realistically it is a column or prism of soil of small cross- sectional area and extending from the soil surface to the parent material.

**Structure:** This refers to the arrangement of all soil particles. Particles refer to all peds and non- peds and may be described in terms of the grade, class and form of the soil aggregates.

**Texture:** Soil texture, in the field, is a measure of the behaviour of a small handful of soil when moistened and kneaded into a ball and then passed out between thumb and forefinger. Although strongly influenced by clay content, texture is also affected by other soil properties such as, the type of clay mineral, silt, organic matter, oxides, calcium-magnesium carbonates, exchangeable cations, and strong, fine- structural aggregation.

**Uniform soils:** These are soils with small, if any, texture differences throughout the profile.

**Appendix 2 – Analytical Data for Representative Profiles**

Lab No. 1976	Depth cm	Field Texture	pH	Particle Size					Organic C %	Tot. N %	Tot. P %	EC µS cm-1	Cl- x 10-2 %	Exchangeable Cations me % - milliequivalents per 100 g of soil % - percentage o total metal ions										
				CS %	FS %	Si %	C %	LAT %						CEC me %	Ca		Mg		K		Na		Acidity	
															me %	%	me %	%	me %	%	me %	%	me %	%
<b>Red Clay - Ug 5.35 - Site 14</b>																								
11800	0-30	LC	7.0	5.4	11.2	14.0	52.2	2.8	3.8	0.38	0.05	1040	3.0	35.5	14.3	40	6.3	18	3.0	8	3.1	9	8.8	25
11801	30-45	LC	8.3	5.9	12.7	12.1	66.6	5.9	0.4	0.07	0.03	840	2.9	33.5	14.3	43	11.3	34	3.5	10	4.4	13	-	-
11802	45-85	LC	8.9	5.9	16.2	15.3	61.7	2.0	0.1	0.04	0.02	750	3.8	33.3	4.7	14	15.9	48	2.5	8	10.2	30	-	-
11803	85-105	MC	9.2	11.8	24.8	18.7	46.2	1.2				740	4.7	24.1	2.0	8	9.7	40	1.7	7	10.7	45	-	-
<b>Red Clays - Ug 5.35 - Site 15</b>																								
11804	0-20	LC	7.1	9.8	17.9	25.9	37.6	1.0	1.7	0.16	0.03	380	3.20	19.0	3.3	17	4.7	25	0.4	4	3.2	17	7	37
11805	20-45	LMC	7.4	3.5	10.0	15.1	73.4	1.5	1.5	0.15	0.03	540	4.30	32.0	3.8	12	11.1	35	1.7	5	7.8	24	7.6	24
11806	45-65	MC	8.3	3.2	9.6	17.5	70.3	1.8	0.4	0.09	0.03	870	7.00	28.9	3.6	12	14.1	49	1.7	6	9.5	33	-	-
11807	65-105	HC	9.2	2.2	7.4	25.0	64.1	4.7				1080	6.60	29.0	3.6	12	13.4	46	1.6	6	10.4	36	-	-
<b>Red Clays - Ug 5.39 - Site 1</b>																								
11738	2-5	LC	6.6	13.1	3.4	27.8	29.6	3.3	13.4	1.41	0.13	430	2.7	36.9	6.4	17	7.6	21	1.2	3	3.7	10	18	49
11739	5-10	MC	7.1	2.7	11	39.4	44	1.9	1.7	0.2	0.05	190	1.3	18.6	3.7	20	4.7	25	0.8	4	1.7	9	7.7	42
11740	10-45	HC	7.3	1.1	7.1	36.8	51.5	1.8	1.4	0.16	0.06	230	1.4	24.3	5.6	23	7.9	33	1.1	5	2.5	10	7.2	29
11741	45-85	MC	7.8	0.9	19.1	41.4	37.8	1				180	1.3	17.7	4.9	28	7.1	40	1.2	7	1.3	7	3.2	18
11742	85-105	LC	8.1	5.5	27.5	30.5	34.3	0.7				160	1.2	12.3	4.7	38	5.4	44	0.7	6	1.5	12	-	-
<b>Solodized Solonetz and Solodic Soil - dr 2.43 - Site 3</b>																								
11748	2-5	Lfsy	6.8	11.2	20.2	20.6	25.3	2.6	11.8	1.17	0.13	430	2.4	27.5	6.3	23	6.5	24	2.0	7	0.45	2	12.2	44
11749	5-35	FSCL	7.2	10.8	30.6	27.4	28.5	1.6	2.2	0.26	0.07	190	0.9	14.7	3.7	25	3	20	1.3	9	1.2	8	5.5	38
11750	35-60	MC	7.7	1.4	14.7	23.2	60.4	1	0.9	0.13	0.05	250	1.2	25.0	6.6	27	7.1	28	2.8	11	2.5	10	6	24
11751	60-80	HC	8.5	1.5	13	39.2	43.6	2.1				330	1.3	15.7	7.1	45	5.4	34	1.3	8	1.9	13	-	-
11752	80-105	FSCL	8.7	7.9	34	28.2	28.4	1.1				250	1.2	9.9	4.6	46	3.2	32	0.9	9	1.2	13	-	-

Lab No. 1976	Depth cm	Field Texture	pH	Particle Size					Organic C %	Tot. N %	Tot. P %	EC µS cm-1	Cl- x 10-2 %	Exchangeable Cations me % - milliequivalents per 100 g of soil % - percentage of total metal ions										
				CS %	FS %	Si %	C %	LAT %						CEC me %	Ca		Mg		K		Na		Acidity	
															me %	%	me %	%	me %	%	me %	%	me %	%
11786	35-85	LC	8.6	0.4	5.5	52.3	40.5	2.9				300	1.5	15.7	8.2	52	4.7	30	1.0	6	1.8	12	-	-
11787	85-105	LC	8.4	1.2	19.3	42	37.4	1.5				230	1.6	14.4	6.8	47	4.9	34	1.1	8	1.6	11	-	-
Solodized Solonetz and Solodic Soils - Dr 2.43 - Site 11																								
11788	2-5	Lfsy	6.9	25.4	36.6	14	13.2	1.6	5.4	0.58	0.08	240	1.3	17.7	4.7	27	3.8	21	0.4	2	1.8	10	7	40
11789	5-40	FSCL	7.6	18.3	47.5	16.7	15.7	0.5	1.1	1.2	0.04	110	0.6	8.1	2.4	30	1.7	21	0.2	2	0.9	11	2.9	36
11790	40-60	MC	10.9	10.9	22.8	10.9	54.3	1.4	0.9	1.2	0.04	280	1.4	22.3	5.3	24	6.3	28	1.7	8	3.3	15	5.7	25
11791	60-105	LC	8.8	16.4	33.1	25.2	26.5	1.3				300	1.3	11.2	5.0	45	3.9	35	0.6	5	1.7	15	-	-
Solodized Solonetz and Solodic Soils - Dy 3.43 - Site 8																								
11773	2-5	Lfsy	6.2	17.2	19.8	18.6	20.7	2.8	12.5	1.28	0.1	990	2.0	32.5	6.4	20	6.8	21	2.4	7	3.7	11	13.2	41
11774	5-20	FSCL (h)	7.2	9.2	40.2	24.8	23.8	0.6	0.8	0.09	0.04	170	1.0	9.2	1.8	20	1.9	21	0.7	8	1.1	12	3.8	39
11775	20-65	MC	8	4.9	24.1	17.1	54.8	1.1	0.6	0.09	0.03	190	1.3	17.8	4.0	22	7.9	44	1.7	10	4.2	24	-	-
11776	65-80	MC	9.1	3.3	28.1	25.8	41.2	2.2				370	1.3	19.7	4.9	25	9.6	49	0.9	5	4.3	21	-	-
11777	80-105	LC	9.1	8.3	36.2	24.5	31.1	0.8				240	1.3	13.3	3.5	26	6.4	48	0.4	3	3	23	-	-
Solodized Solonets and Solodic Soils - Dd 1.13 - Site 13																								
11792	2-5	Lfsy	6.4	3.8	11.7	25.1	35.6	2.6	14.2	1.47	0.11	390	1.2	38.9	8.1	21	8.1	21	2.3	6	2.7	7	17.7	45
11797	5-35	LC	7	2.8	12.9	37.4	41.5	1.3	2.6	0.27	0.05	160	0.8	22.0	5.2	24	5.3	24	1.0	6	1.8	8	8.7	38
11798	35-65	MC	8.1	1	6	40.4	52.5	1.7	0.6	0.09	0.04	250	1.2	16.7	4.7	28	8.4	50	1.1	7	2.5	15	-	-
11799	76-105	MC	8.9	1.7	8.8	46.7	39	3.2				370	1.8	16.1	4.8	30	8	50	0.6	4	2.7	16	-	-
Solodized Solonetz and Solodic Soils - Dd 1.13 - Site 17																								
11813	0-20	FSCL	6.6	1.6	30	30.6	31.1	1.5	3.1	0.31	0.04	150	0.5	21.9	6.5	30	4.8	22	1.7	8	0.3	1	8.6	39
11814	20-50	MC	7.6	2.1	40.3	23.6	32.3	0.7	1.1	0.12	0.03	90	0.4	20.1	7.5	37	5.9	29	0.5	2	1.0	5	5.2	27
11815	50-85	FSCL	7.7	5.1	56.8	14.5	24.5	0.5	0.4	0.06	0.06	270	1.9	15.5	5.0	32	5.1	33	1.7	11	1.1	7	2.6	17
11816	85-105	FSC	8.2	4.9	56	17.3	20.8	3.4				380	3.0	12.2	4.5	37	5.6	46	0.5	4	1.6	13	-	-

Lab No. 1976	Depth cm	Field Texture	pH	Particle Size					Organic C %	Tot. N %	Tot. P %	EC µS cm-1	Cl- x 10-2 %	Exchangeable Cations me % - milliequivalents per 100 g of soil % - percentage of total metal ions										
				CS %	FS %	Si %	C %	LAT %						CEC me %	Ca		Mg		K		Na		Acidity	
															me %	%	me %	%	me %	%	me %	%	me %	%
11756	45-60	HC	8.3	0.3	14.9	34.5	49.4	1.4				230	1.5	17.9	4.5	25	9.8	55	1.6	9	2.0	11	-	-
11757	60-106	LC	8.8	1.1	24.1	38.4	34.3	2.7				320	1.5	14.8	4.5	30	7.5	51	1.1	7	1.7	12	-	-
Red-Brown Earths - Dr 2.13 - Site 5																								
11758	0-2	FSCL (h)	6.9	11.4	28.4	26.5	23.4	1.9	5	0.53	0.08	230	1.2	21.5	5.1	24	5	24	1.2	6	1.6	7	8.6	40
11759	2-25	FSCL (h)	7.2	6.5	31.9	29.5	27	1.9	2.1	0.23	0.05	180	1.0	16.1	3.5	22	3.7	23	1.1	7	2.3	14	5.5	34
11760	25-45	HC	7.6	1.3	23.5	29.7	43.6	1.6	1.1	0.14	0.05	230	0.9	20.8	5.3	25	6.8	33	1.7	8	2.0	10	5	24
11761	45-60	HC	7.9	1.3	41.3	25.5	31.6	1.2				190	1.1	16.1	4.5	28	6.3	39	1.1	7	1.6	10	2.6	16
11762	60-105	FSCL (h)	9	1.4	51.2	23.9	23.4	2.2				300	1.4	12.9	4.9	38	5.8	45	0.8	6	1.4	11	-	-
Red-Brown Earths - Dr 2.13 - Site 12																								
11792	0-10	FSCL	7	5.9	26.2	29.9	25.5	1.7	1.5	0.61	0.1	220	1.2	21.5	5.6	26	4.1	19	0.9	4	1.8	8	9.1	43
11973	10-35	MC (fsy)	7.5	2.2	33	32.5	29.5	1.2	0.8	0.18	0.05	140	0.9	18.5	3.9	29	2.0	22	0.5	4	1.5	11	4.6	34
11974	35-60	MC	7.8	0.6	30.6	28	39.1	1.5	0.8	0.06	0.06	210	1.2	20.1	5.7	28	6.5	32	0.8	4	2.5	12	4.6	24
11795	60-105	MC	8.7	1	30.9	38.1	28.2	1.4				360	2.0	15.1	6.3	42	6.0	40	0.4	3	2.4	15	-	-
Red-Brown Earths - Dr 2.13 - Site 18																								
11817	0-20	FSCL	6.1	7.1	42.6	22.1	22.8	1.2	2.5	0.21	0.04	160	0.8	16.9	2.1	12	1.9	11	1.9	11	0.9	5	10.1	61
11818	20-40	HC	7.9	2.4	15.4	9	71.1	2.1	1.9	0.21	0.03	480	3.2	39.2	5.7	15	14.1	36	4.4	11	7.4	19	7.6	19
11819	40-50	MC-HC	8.6	2	15.4	12.2	71.7	2.3	0.8	0.11	0.03	860	6.8	35.0	5.7	16	16.9	48	2.3	7	10.1	29	-	-
11820	50-85	HC	9.2	4.2	16.5	11	56	13.1				1460	11.3	34.6	6.4	19	16.5	48	1.9	5	9.8	28	-	-
11821	85-105	MC	9.2	1.7	15.1	10	58	12.5				1670	13.6	38.4	6.5	17	19.1	50	2.2	6	10.6	27	-	-
Red-Brown Earths - Dr 1.13 - Site 6																								
11763	2-5	Lfsy	6.5	16.1	14.8	14.2	21.5	4.3	17.1	1.81	0.25	670	4.3	43.2	8.6	20	8.6	20	1.1	3	5.1	12	19.8	45
11764	5-25	MC (fsy)	7.3	18.3	26	21.3	28.9	1.4	2.4	0.26	0.06	240	1.3	15.4	4.4	29	3.7	24	0.6	4	1.7	11	5	32
11765	25-45	MC (fsy)	7.6	21.1	35.9	17.9	22.7	0.9	0.8	0.08	0.04	180	1.1	9.4	3.0	32	2.6	28	0.5	5	0.8	9	2.5	26
11766	45-75	SC	7.9	30.9	22.8	7.9	39.8	1.1				220	1.3	16.4	4.2	26	5.7	35	1.0	6	2.2	13	3.3	20
11767	75-95	MC	8.2	7.9	9.2	31.3	52.3	1.5				230	1.3	16.9	3.5	21	9.4	56	1.0	6	3.0	17	-	-
11768	95-105	MC	8.2	5.7	13.7	35.9	45.7	1.3				210	1.5	18.5	6.4	35	8.3	45	0.9	5	2.9	15	-	-

Figure 1 – Location of Sites for Representative Soils

