

MCR Mount Crawford Land System

Flats and ironstone rises and low hills between Cromer and the Warren Reservoir

Area: 34.6 km²

Annual rainfall: 675 - 765mm average

Geology: The Mount Crawford Land System is the most northern remnant of the ancient lateritic capping which once blanketed much of the Mt. Lofty Ranges. The underlying basement rocks are phyllites and schists of the Balhannah and Saddleworth Formations, and micaceous sandstones and quartzites of the Mitcham and Stonyfell Quartzite Formations. These rocks outcrop in places but are generally deeply weathered, or covered by the lateritic mantle. Minor resistant quartzite ridges, outliers of the Pewsey Vale Peak Land System, rise above the lateritic surface. Dissection of the highlands has created valleys within which sandy to sandy clay sediments have been deposited. Between the rises and the flats are outwash slopes with gravelly sediments. Minor Tertiary sand deposits occur on the lateritic surface.

Topography: The original lateritic elevated plain has been substantially eroded by the South Para River (which flows across the northern part of the System) and its tributaries to produce a landscape of four distinctive facets:

1. Gently undulating summit surfaces (the old lateritic land surface).
2. Undulating to moderately steep slopes formed on basement rocks.
3. Gently inclined outwash fans adjacent to basement rises and summit surfaces.
4. Alluvial plains and flats.

Elevation: 390 m in the north west (South Para exit), to 450 m on quartzite ridges in the south.

Relief: Relief varies from 20 to 50 m

Soils: Ironstone soils are predominant. They are mixed with sandy loam over clay soils on hillslopes, and deep sandy to loamy soils on alluvial flats.

Main soils

Soils formed on deeply weathered rocks on rises and summit surfaces

J2 Brown ironstone soil

K1/J2 Red ironstone soil

Soils formed on alluvial flats

F2 Sandy loam over brown sodic clay

G3/G4 Sand over brown sodic clay

Minor soils

Soils formed on basement rocks on hillslopes

K4a Loamy sand over yellow brown sandy clay

K3 Sandy loam over red clay

K1 Sandy loam over brown clay

K4b Sandy loam over poorly structured brown clay

L1 Shallow stony sandy loam

Soils formed on outwash slopes and alluvial flats

F1 Loamy sand over mottled clay

H3 Deep bleached siliceous sand



Main features: The Mount Crawford Land System is characterized by extensive ironstone soils and broad sandy flats. With the exception of some red loamy soils of moderate fertility on the western slopes, the land is generally highly infertile, acidic and prone to waterlogging. The sand over clay flats are particularly susceptible to wetness. Much of the rising ground comprising ironstone rich sandy texture contrast soils formed on kaolinitic weathering sandstones, is used for *Pinus radiata* plantations or conservation. The flats are generally too wet for forestry and are mostly used for grazing.

Soil Landscape Unit summary: 13 Soil Landscape Units (SLUs) mapped in the Mount Crawford Land System:

SLU	% of area	Main features #
AqC	2.4	Low quartzite ridges 30-50 m high with slopes of 15-40% and 10-20% surface quartzite. Main soils: <u>Sandy loam over red clay</u> - K3 (E) <u>Sandy loam over poorly structured brown clay</u> - K4b (C) <u>Shallow stony sandy loam</u> - L1 (C) These soils are shallow to deep, inherently infertile and acidic. The ridges are moderately steep to steep, with limited productive potential.
AyC	3.1	Low hill, 50 m high and with slopes of 15-30% formed on phyllites and schists. Soils are as for BfC/BfD. They are moderately deep and marginally fertile, productivity being mainly limited by the moderately steep slopes.
BfC BfD	7.7 3.3	Rises and slopes formed on phyllites and schists of the Saddleworth and Balhannah Formations. There is minor surface stone. BfC Undulating rises and lower slopes with relief to 30 m and slopes of 4-10%. BfD Moderate slopes of 10-18%. Main soils: <u>Sandy loam over red clay</u> - K3 (E) } on slopes <u>Sandy loam over brown clay</u> - K1 (E) } <u>Sandy loam over poorly structured brown clay</u> - K4b (M) } <u>Sandy loam over brown sodic clay</u> - F2 (L) on lower slopes and drainage depressions These soils are moderately deep, marginally fertile, and prone to acidification. They are moderately well drained and moderately erodible.
CcD CdC CdD	1.7 9.2 1.0	Slopes and rises formed on micaceous sandstones and quartzites of the Stonyfell and Mitcham Formations. There is variable surface sandstone, quartzite and ironstone. CcD Moderate slopes of 10-15% adjacent to the steep quartzite ridges of the Pewsey Vale Peak Land System. CdC Undulating rises with slopes of 3-8%. CdD Low ridges with slope of 8-16%. Main soils: <u>Loamy sand over yellow brown sandy clay</u> - K4a (V) <u>Brown ironstone soil</u> - J2 (L) <u>Sandy loam over poorly structured brown clay</u> - K4b (L) <u>Shallow stony sandy loam</u> - L1 (L) on steeper slopes These soils have low inherent fertility, and are acidic throughout, but are commonly deep. They are moderately well drained. On steeper slopes, erosion potential is high.
COC	3.5	Undulating to rolling low hills formed on metasandstones, schists and gneisses of the Backstairs Passage Formation. Slopes range from 3% to 12% and relief is up to 60 m. COC Undulating low rises with relief to 20 m slopes of 3-6%. There is a range of soils, many of which are characterized by sandy surfaces with more clayey subsoils forming in weathering rock. Main soils: <u>loamy sand over brown clay</u> - K4a (E), <u>gradational loamy sand</u> - K5 (C), <u>sandy loam over red clay</u> - K3a (L), <u>Shallow stony loamy sand</u> - L1 (L) occurs where rock is shallow and outcropping. <u>Loam over red clay</u> - K2 (M), and <u>loam over brown silty clay loam</u> - K1a (M) occur on some upper slopes and where basement rocks are fine grained. <u>Sandy loam over red clay on gneiss</u> - K3c (M) occurs on gneissic rock bands in the east. Deep <u>loamy sand over brown dispersive clay</u> - F2a/F2b (M), <u>sandy loam over sandy clay</u> - F1 (M) and <u>gradational loamy sand</u> - M1 (M) occur in drainage depressions. The soils, although sandy, are moderately fertile, most having clayey subsoils to prevent excessive leaching. All soils are susceptible to acidification. Some, mainly on lower slopes



		are imperfectly drained. Although most of the land is arable, surface soils are highly erodible, so maintenance of protective vegetative cover is an important management consideration. There are occasional rocky outcrops, but overall they are not a major restriction on land use. Drainage depressions are characterized by well defined and sometimes eroded watercourses, and sporadic saline seepage and waterlogged areas. These may be associated with acid sulfate conditions.
FdZ	26.4	Gentle upper slopes, crests and summit surfaces formed on highly weathered kaolinized schists and metasediments of the Kanmantoo Group of rocks. There are minor deposits of Tertiary sands. Slopes 5-10%, with occasional breakaway slopes of 20%. Most of land surface is a flat to very gently inclined summit surface. There is variable surface ferricrete. Soils have sandy to sandy loam surfaces with abundant ironstone gravel. Subsoil clays are thick and grade to kaolinitic weathering material. Main soils: <u>Brown ironstone soil</u> - J2 (V) <u>Red ironstone soil</u> - K1/J2 (L) Thick sands (M) on Tertiary remnants These soils are very old and leached. Inherent fertility is very low, a condition exacerbated by strong acidity and high phosphate fixing capacity caused by the abundant ironstone gravel. The brown ironstone soils are imperfectly drained, with perched water tables readily forming on the clayey subsoil. On slopes, water erosion potential is moderate to high.
LEA LEE	17.8 3.0	Broad alluvial flats and drainage depressions formed on sand, clayey sand and sandy clay alluvium. LEA Alluvial flats. LEE Flats adjacent to the South Para River and major tributaries. Main soils: <u>Sand over brown sodic clay</u> - G3/G4 (E) <u>Sandy loam over brown sodic clay</u> - F2 (E) <u>Deep bleached siliceous sand</u> - H3 (L) These soils are deep but inherently infertile and acidic. The sodic soils are prone to severe waterlogging. There are sporadic patches of saline seepage.
LFB LFC	8.5 12.4	Lower slopes and undulating rises with relief of less than 20m and slopes of less than 10%, formed on gravelly clays derived from the erosion of lateritic materials from adjacent hills. Watercourses are moderately well defined in broad, shallow depressions. LFB Gently undulating slopes of 1-3%. LFC Lower slopes and undulating rises with slopes of 3-10%. Main soils: <u>Loamy sand over mottled clay</u> - F1 (E) <u>Sandy loam over brown sodic clay</u> - F2 (E) <u>Brown ironstone soil</u> - J2 (C) <u>Red ironstone soil</u> - K1/J2 (L) on rises These soils are deep, but of marginal fertility and prone to acidification and seasonal waterlogging.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)	(C) Common in extent (20–30% of SLU)
(V) Very extensive in extent (60–90% of SLU)	(L) Limited in extent (10–20% of SLU)
(E) Extensive in extent (30–60% of SLU)	(M) Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

Soils formed on basement rocks on hillslopes

K3 Sandy loam over red clay (Eutrophic, Red Chromosol)

Medium thickness sandy loam to sandy clay loam surface soil, with a pale and very gravelly A2 horizon, overlying a red or dark reddish brown, well structured clay subsoil grading to weathering schist or phyllite by 100 cm.

K1 Sandy loam over brown clay (Eutrophic, Brown Dermosol / Chromosol)

Thick gravelly brown sandy loam surface soil, overlying a dark brown and yellow micaceous, coarsely prismatic clay loamy to clayey subsoil, grading to weathering schist from about 100 cm.



- K4a** Loamy sand over yellow brown sandy clay (Mesotrophic, Brown Kurosol)
Thick, brownish loamy sand to sandy loam with a paler coloured and gravelly A2 horizon, overlying a yellow and brown, weakly structured sandy clay subsoil, grading to weathering sandstone (often kaolinized) by 100 cm.
- L1** Shallow stony sandy loam (Lithic, Leptic Tenosol)
Medium to thick very stony loamy sand to sandy loam with a paler coloured A2 layer, overlying moderately hard schist, micaceous sandstone or phyllite.
- K4b** Sandy loam over poorly structured brown clay (quartzitic Eutrophic, Brown Sodosol)
Thick, loamy sand to loam surface soil, with a bleached and quartz gravelly A2 horizon, overlying a very firm, brownish yellow heavy clay derived from the weathering of quartzitic rocks.

Soils formed on deeply weathered rocks on plateaux (summit surfaces)

- J2** Brown ironstone soil (Bleached-Ferric, Mesotrophic, Brown Kurosol)
Medium thickness grey brown loamy sand with a bleached A2 horizon containing over 50% ironstone gravel, overlying a yellow brown clay with soft red inclusions of weathered ironstone, grading to a greyish silty clay forming in weathering schist or micaceous sandstone deeper than 200 cm.
- K1/J2** Red ironstone soil (Bleached, Mesotrophic, Red Kurosol)
Medium thickness grey massive sandy loam with a bleached A2 horizon and ironstone gravel throughout, overlying a red and grey coarse blocky clay grading to kaolinized metasilstone or metasandstone at about 100 cm. Hard rock is deeper than 200 cm.

Soils formed on outwash slopes

- F1** Loamy sand over mottled clay (Bleached-Mottled, Eutrophic, Brown Kurosol)
Thick, greyish loamy sand to sandy clay loam surface soil with a bleached and ironstone gravelly A2 horizon, overlying a brownish yellow, brown and red well structured clay subsoil, grading to kaolinitic and ironstone gravelly clay continuing below 200 cm.

Soils formed on alluvial flats

- F2** Sandy loam over brown sodic clay (loamy Eutrophic, Brown Sodosol)
Thick massive grey loamy sand to loam with a bleached and quartz gravelly A2 horizon, overlying a yellow brown and grey brown sandy clay to clay with prismatic structure, grading to coarse, medium or fine textured micaceous alluvium from about 100 cm.
- G3/G4** Sand over brown sodic clay (Mesotrophic, Brown Sodosol / Natric, Brown Kurosol)
Thick to medium grey sand to light sandy loam with a bleached A2 horizon, overlying a yellow brown, dark brown, red and grey mottled sandy clay to clay with coarse prismatic structure, grading to a sandier sediment below 100 cm
- H3** Deep bleached siliceous sand (Arenic, Bleached-Orthic Tenosol)
Very deep greyish brown massive sand, grading to white sand, overlying layers of brown, yellow and grey sand to clayey sand.

Further information: [DEWNR Soil and Land Program](#)

