

FLA Flaxley Land System

Undulating to rolling low hills between Mount Barker and Macclesfield

Area: 40.3 km²

Annual rainfall: 735 – 940 mm average

Geology: The system is underlain by mixed grain-size metamorphosed sedimentary rocks of the Brachina, Tarcowie and Tapley Hill Formations. Main lithological types are metasandstones, metasiltstones, phyllites and low grade schists. These rocks are commonly deeply weathered, having soft kaolinized profiles extending for several metres. These deeply weathered areas are the last remnants of an ancient lateritic peneplain, where the entire land surface was worn down to a more or less flat plain which was subjected to a long period of intense weathering involving the formation of laterites. Lateritic profiles are preserved on flat topped hills (summit surfaces). Locally derived alluvium has accumulated in drainage depressions and on lower slopes.

Topography: Most of the land system is a moderately dissected block of country with a fall to the north and west. The landscape is undulating to rolling low hills, several with flat topped summit surfaces. There is a well defined watershed on the eastern side marked by a discontinuous series of summit surfaces. These surfaces are remnants of ancient lateritic peneplains that have resisted the erosion processes which have shaped the rest of the landscape. Water courses flow from this divide to Western Flat Creek to the west or directly into Mount Barker Creek to the north. A small section of irregular rolling low hills south of the Echunga - Macclesfield road drains southwards into the Angas River catchment.

Elevation: 320 - 440 m

Relief: Up to 80 m but generally less than 50 m

Soils: The soils are generally moderately deep to deep, formed on highly weathered rock or alluvium. Soils formed in fresh weathering rock at moderately shallow depth are minor. Sandy loam surfaces overlying brown (often mottled) subsoils are distinctive. Ironstone gravelly soils are more common than elsewhere in the district.

Main soils

Soils formed on fresh weathering basement rock

K1 Acidic gradational loam (**K1a**) or sandy loam (**K1b**)

K2 Acidic loam over red (**K2a**) or brown (**K2b**) clay on rock

K4 Acidic sandy loam over brown clay on rock

Soils of lower slopes formed on deeply weathered rock

F1 Sandy loam to loam over brown clay over deeply weathered sandstone (**F1a**) or kaolinitic and ironstone gravelly clay (**F1b**)

Minor soils

F1c Sandy loam to loam over brown clay over fine grained alluvium

F2 Sandy loam over poorly structured brown clay

J2 Ironstone soil – sandy loam (**J2a**) or loam (**J2b**) over lateritized rock

L1 Shallow sandy loam on rock



Main features: The Flaxley Land System is undulating to gently rolling terrain characterized by deep texture contrast or gradational soils forming in highly weathered basement rocks. Sandy loam to loam surfaces overlie clayey subsoils which commonly impede water movement. The predominant sandy loam soils have moderately low natural fertility, due to low clay content and the high degree of profile weathering. All soils are susceptible to acidification. Most are highly erodible. With more than 95% of the land arable and sloping to some extent, the potential for erosion is high. The deeply weathered profiles contain substantial reserves of salts, some of which have been mobilized as vegetative water use has declined. This has led to saline seepages developing on lower slopes and drainage depressions.

Soil Landscape Unit summary: 6 Soil Landscape Units (SLUs) mapped in the Flaxley Land System:

SLU	% of area	Main features #
AyC	2.4	Rolling low hills with relief to 80 m and slopes of 18-30%, formed on basement rocks. There is minor rock outcrop. Main soils: <u>Acidic gradational sandy loam</u> - K1a (E) <u>Shallow sandy loam on rock</u> - L1 (L) <u>Acidic sandy loam over brown clay on rock</u> - K4 (C) The soils have variable depth, but most have clayey subsoils and adequate water holding capacities. Fertility is moderately low and all soils are prone to acidification. The land is too steep for cultivation, but suitable for pastures and perennial crops, although there are occasional rocky outcrops. Erosion potential is high.
CqC CqD	25.8 46.0	Gently inclined lower slopes, undulating rises and gently rolling low hills formed on mixed metasiltstones and metasandstones, commonly kaolinized. Slopes range from 3% to 18% and relief varies from 20 to 70 m. Water courses are well defined and occupy broad shallow drainage depressions, where minor saline seepages occur. There is negligible rock outcrop and very minor surface stone. CqC Undulating rises and lower slopes with relief to 20 m and slopes of 3-10%. CqD Gently rolling low hills with relief to 70 m and slopes of 10-18%. The soils almost all have texture contrast profiles with sandy loam to clay loam surfaces and variably structured and coloured subsoil clays. They are moderately deep to very deep over basement rock. The deepest soils occur on lower slopes and drainage depressions where the parent materials are either deeply weathered rocks or locally derived alluvium, and on upper slopes where deep weathering profiles are common. Main soils: <u>Acidic sandy loam over brown clay on rock</u> - K4 (E) <u>Sandy loam over brown clay</u> - F1a/F1b (C) <u>Acidic loam over brown or red clay on rock</u> - K2b/K2a (L) <u>Acidic gradational loam or sandy loam</u> - K1a/K1b (L) These soils are deep, but most have moderately low inherent fertility, and many have restricted drainage due to slowly permeable subsoil clays. All soils are susceptible to acidification, and most are highly erodible. As all slopes are potentially arable, erosion hazard is an important issue in these landscapes.
FaZ	9.6	Very gently undulating upper slopes and summit surfaces (remnant deeply weathered land surfaces) underlain by kaolinized and lateritized basement rocks. Main soils: <u>Ironstone soils</u> - J2a/J2b (V) <u>Acidic gradational sandy loam</u> - K1b (L) <u>Acidic gradational loam</u> - K1a (M) These soils are deep but imperfectly drained due to thick subsoil clays, and infertile due to strong leaching and high concentrations of phosphate fixing ironstone gravel. Exposure on crests further reduces productive potential. Deeply weathered substrate materials often contain high amounts of salts which are mobilized if water tables rise. Minimization of recharge through increased water use efficiency is critical on this land.
LeB	1.6	Lower slopes of 1-4% slope formed on deeply weathered basement rocks or locally derived alluvium. Main soils: <u>Sandy loam or loam over brown clay</u> - F1a (E) on weathering rock <u>Sandy loam over brown clay</u> - F1b/F1c (E) on alluvium <u>Sandy loam over poorly structured brown clay</u> - F2 (L) on alluvium These soils are deep but imperfectly drained due to their thick clayey subsoils which perch



		water. Natural fertility is low to moderate, and all soils are prone to acidification. Saline seepages occur sporadically. Runoff water from adjacent rising ground increases the vulnerability of this land to water erosion.
LtE	14.6	Drainage depressions formed on medium to coarse grained locally derived alluvium. Soils have thick sandy to loamy surfaces over mottled clayey subsoils. Main soils: <u>Sandy loam over brown clay - F1b/F1c</u> (V) <u>Sandy loam over poorly structured brown clay - F2</u> (L) These soils are deep and moderately fertile, but prone to waterlogging. Saline seepages are more frequent than elsewhere in the land system. Water courses are well defined and susceptible to erosion if banks are exposed.

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:

- F1a** Sandy loam over brown clay (Bleached-Mottled, Mesotrophic, Brown Kurosol)
Thick grey loamy sand to loam with a gravelly and bleached A2 horizon, overlying a brown, yellowish brown and red coarsely prismatic sandy clay to clay subsoil, becoming siltier and greyer with depth. Soft weathering metasandstone occurs from about 150 cm.
- F1b** Sandy loam over brown clay (Bleached-Mottled, Mesotrophic, Brown Kurosol)
Thick greyish loamy sand to sandy clay loam with a bleached and ironstone gravelly A2 horizon, overlying a brownish yellow, brown and red well structured clay, grading to kaolinitic and ironstone gravelly clay continuing below 200 cm.
- F1c** Sandy loam over brown clay (Bleached-Mottled, Hypocalcic, Brown Chromosol / Sodosol)
Thick loamy sand to sandy clay loam surface soil with a strongly bleached A2 horizon, sharply overlying a yellowish brown, grey and red mottled clay subsoil grading to fine grained alluvium.
- F2** Sandy loam over poorly structured brown clay (Bleached-Mottled, Natric, Brown Kurosol)
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.
- J2a** Sandy loam ironstone soil (Ferric, Mesotrophic, Brown Kandosol)
Medium thickness loamy sand to sandy loam with abundant ironstone gravel, overlying a brownish yellow and red clay subsoil with ironstone fragments, grading to light grey and red kaolinitic clay at about 100 cm.
- J2b** Loamy ironstone soil (Ferric, Eutrophic, Red Kurosol)
Medium thickness dark brown loam with a pink A2 horizon containing abundant fragments of ferruginized siltstone, overlying a red and yellow brown clay with blocky structure, grading to grey mottled kaolinitic silty clay. Hard siltstone is deeper than 200 cm.
- K1a** Acidic gradational loam (Mesotrophic, Red Dermosol)
Thick fine sandy loam with minor ironstone grading to a brownish or reddish coarsely blocky clay loam to clay, siltier with depth, grading to kaolinized phyllite or siltstone, continuing to depths of 200 cm or more.
- K1b** Acidic gradational sandy loam (Bleached, Mesotrophic, Brown Dermosol)
Medium thickness loamy sand to sandy loam with a pale and gravelly A2 horizon, grading to a yellow and brown sandy clay loam grading to a clay loam or light clay subsoil formed in soft weathering sandstone.



- K2a** Acidic loam over red clay on rock (Eutrophic, Red Kurosol)
Medium thickness reddish loam to clay loam with a gravelly and paler coloured A2 horizon, overlying a red very well structured clay grading to weathering phyllite from about 100 cm.
- K2b** Acidic loam over brown clay on rock (Eutrophic, Brown Kurosol)
Thick loam with a paler coloured gravelly A2 horizon, over a dark brown, yellowish brown and red mottled coarsely structured clay subsoil, grading to weathering metasiltstone or phyllite deeper than 100 cm.
- K4** Acidic sandy loam over brown clay on rock (Bleached-Mottled, Eutrophic, Brown Kurosol)
Thick gravelly sandy loam with a bleached and gravelly A2 horizon, overlying a yellowish brown, red and greyish brown coarsely prismatic clay subsoil, grading to weathering metasandstone below 100 cm.
- L1** Shallow sandy loam on rock (Paralithic, Bleached-Leptic Tenosol)
Thick, greyish very gravelly sandy loam with a bleached A2 horizon, grading to hard metasandstone within 50 cm.

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

