

# MEA Meadows Land System

Gentle slopes and flats between Echunga and Hope Forest

**Area:** 41.3 km<sup>2</sup>

**Annual rainfall:** 785 – 875 mm average

**Geology:** The bulk of the System is underlain by fine grained sediments deposited by streams flowing westwards from the Meadows Escarpment. In places there are outwash fans formed on a mosaic of deeply weathered basement rocks and outwash sediments. These areas are characterized by ironstone gravels. There are minor outcrops of Permian glacial sediments protruding through the sedimentary cover in the south.

**Topography:** The Land System is an extensive apron flanking the western side of the Meadows Escarpment. The landscape grades from gentle slopes, fans and low rises adjacent to the escarpment, to flats and low lying areas in the west. Water courses emanating from the escarpment flow more or less westwards across the landscape and join Meadows Creek which flows southwards through the middle of the System.

**Elevation:** 260 m in the south to 380 m in the north

**Relief:** Up to 30 m from valley flat to upper margin of outwash fan. Low rises and elevated plains are less than 10 m high.

**Soils:** The soils are deep and typically texture contrast with clayey subsoils. There are limited areas of clay loamy to sandy uniform or gradational soils.

#### Main soils

**F1a** Sandy loam over brown clay on fine grained alluvium

**F1b** Sandy loam over brown clay on kaolinitic sediments

**M2** Deep grey clay loam on clayey alluvium

#### Minor soils

**J2a** Acidic, deep sandy loam ironstone soil

**F2** Sandy loam over poorly structured brown clay on alluvium

**F1c** Sandy loam over brown clay on coarse grained alluvium

**J2b** Acidic, deep loamy ironstone soil

**M1** Deep sandy loam

**Main features:** The Meadows Land System is a broad elongate valley adjacent to the western edge of the Meadows Escarpment. The flat valley floor grades to gentle slopes along its eastern edge, adjacent to the escarpment. The soils are deep and dominated by sandy loams over thick clayey subsoils. These perch water, so imperfect to poor drainage is a feature of the land. This problem is exacerbated by the large volumes of additional water entering the system from adjacent higher ground. The soils are moderately fertile and prone to acidification. The more sloping ground is susceptible to water erosion if cultivated. There is sporadic saline seepage throughout.



**Soil Landscape Unit summary:** 10 Soil Landscape Units (SLUs) mapped in the Meadows Land System:

SLU	% of area	Main features #
FaZ	7.1	<p>Slightly elevated very gently undulating plains formed on deeply weathered lateritized basement rocks and outwash sediments. Slopes are less than 2%. Soils are deep with ironstone gravels.</p> <p>Main soils: <u>Ironstone soils</u> - <b>J2a</b> / <b>J2b</b> (V)  <u>Sandy loam over brown clay</u> - <b>F1b</b> (L)</p> <p>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. Deeply weathered substrate materials often contain high amounts of salt which are dissolved and mobilized if water tables rise. This has the potential to cause saline seepage on lower lying land. Minimization of recharge through increased water use efficiency is critical on this land. Saline seeps occur in some lower lying areas.</p>
LFB LFC	12.0 2.5	<p>Lower slopes and undulating rises with relief of less than 30 metres and slopes of less than 10%, formed on gravelly clays derived from the erosion of lateritic (ironstone) materials from adjacent rises and hills. Watercourses are moderately well defined in broad, shallow depressions.</p> <p><b>LFB</b> Gently undulating lower slopes of 1-3%.  <b>LFC</b> Lower slopes and undulating rises with slopes of 3-10%.</p> <p>Most soils have texture contrast profiles with sandy to loamy surfaces, often with ironstone gravel, and yellow or brown mottled subsoil clays. The soils are mostly formed on alluvium, but on low rises, the underlying material may be deeply weathered kaolinitic rock.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - <b>F1a</b> / <b>F1b</b> (E)  <u>Sandy loam over poorly structured brown clay</u> - <b>F2</b> (E)  <u>Acidic, deep sandy loam ironstone soil</u> - <b>J2a</b> (C) on low rises</p> <p>These soils are deep but imperfectly drained due to slowly permeable subsoil clays, especially the sodic class (F2). They are moderately fertile and most are susceptible to acidification. The more sloping land is prone to erosion when cultivated. There is sporadic saline seepage.</p>
LKB	0.6	<p>Lower slopes transitional from rising ground to creek flats. Underlying materials are sandy clay to clay outwash sediments derived from upslope glacial valley deposits.</p> <p><b>LKB</b> Slopes less than 2%.</p> <p>The soils are highly variable, reflecting the source areas of the parent sediments. Most soils have sandy to loamy surfaces over mottled clay subsoils.</p> <p>Main soils: <u>Thick sand over sandy clay</u> - <b>G3b</b> (E)  <u>Loam over brown clay</u> - <b>F1b</b> (C)  <u>Sandy loam over poorly structured brown clay</u> - <b>F2</b> (L)  <u>Deep bleached siliceous sand</u> - <b>H3b</b> (L)  <u>Wet highly leached sand</u> - <b>I2b</b> (L)  <u>Bleached loamy sand over sandy clay loam</u> - <b>M1</b> (M)</p> <p>Soils are deep but poorly drained due to tight clayey subsoils and lower slope position. Fertility is moderate to low depending on sandiness of surface soil. Most are acidic.</p>
LiA	4.0	<p>Low lying flats with slopes of less than 1% formed on alluvial clays. The soils are deep with heavy clay subsoils.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - <b>F1a</b> (E)  <u>Deep grey clay loam</u> - <b>M2</b> (E)</p> <p>This land is generally poorly drained due to its low lying position and slowly permeable clayey subsoils. Parts are inundated for extensive periods in most years. However, the soils are deep and fertile, although marginally saline in places.</p>



LsA LsB LsC	47.0 12.2 7.0	<p>Flats and outwash fans adjacent to the Meadows Escarpment, formed on fine grained alluvium derived from the erosion of basement rocks. Slopes range from 0% to 10% on upslope margins.</p> <p><b>LsA</b> Broad alluvial flats with slopes of 0-1%.  <b>LsB</b> Very gently inclined fans with slopes of 1-3%.  <b>LsC</b> Gently inclined fans with slopes of 3-8%.</p> <p>The soils are deep with variable sandy to clayey surfaces, but always with clayey subsoils.  Main soils: <u>Sandy loam over brown clay</u> - <b>F1a</b> / <b>F1b</b> (V)  <u>Deep grey clay loam</u> - <b>M2</b> (C)</p> <p>These soils are deep but generally imperfectly to poorly drained due to thick slowly permeable subsoil clays. They are moderately fertile but prone to acidification. Saline seepages occur sporadically. Erosion is a potential problem on cultivated, more sloping land.</p>
LtE	6.6	<p>Drainage depressions formed on medium to coarse grained locally derived alluvium. Soils have thick sandy to loamy surfaces overlying mottled clayey subsoils.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - <b>F1c</b> / <b>F1a</b> (V)  <u>Deep sandy loam</u> - <b>M1</b> (C)</p> <p>These soils are deep and moderately fertile, but prone to waterlogging. Watercourses are susceptible to erosion if banks are exposed. These areas are more sensitive than the surrounding flats or gentle slopes, with watercourse protection of prime importance.</p>
PtC	1.0	<p>Undulating rises and rolling low hills formed on sandstones and unconsolidated sandy clays. The undulating rises have slopes as low as 2% and relief of 20 metres. The low hills have slopes of up to 30% and relief to 80 m. The landscape is broken by well defined creek-lines and swamps, and by ferricrete (ironstone) rises. Some prominent crests within the other soil landscapes are also mapped as Pt* because of their distinctively sandier soils.</p> <p><b>PtC</b> Undulating rises and low hills with slopes of 3-8%.</p> <p>The soils are predominantly sandy surfaced, with variable subsoils, including firm heavy clays, friable sandy clays, coffee rock and loose sand. The range of soils in these landscapes reflects this subsoil variability.</p> <p>Main soils: <u>Sand over brown clay</u> - <b>G3a</b> (C) } on slopes  <u>Sandy loam over brown clay</u> - <b>F1a</b> (C) }  <u>Sand over acid clay</u> - <b>G5</b> (L) }  <u>Ironstone soil</u> - <b>J2</b> (L) }  <u>Imperfectly drained highly leached sand</u> - <b>I2a</b> (L) }  <u>Sandy loam over brown clay on weathered rock</u> - <b>F1/K4</b> (M) }  <u>Thick sand over sandy clay</u> - <b>G3b</b> (L) on lower slopes</p> <p>These landscapes are similar to those of Ps*, but soils tend to be less sandy and to have more clayey subsoils. This results in better fertility, but poorer drainage conditions. Soils are generally of low to moderately low fertility and prone to acidification. Imperfect drainage is only likely to be a problem in some irrigated situations. Erosion hazard is high where soil is disturbed, especially on steeper slopes.</p>

# 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, Hypocalcic, Brown Chromosol)  
Thick loamy sand to sandy clay loam with a strongly bleached A2 horizon, overlying a yellowish brown, grey and red mottled clay grading to fine grained alluvium, weakly calcareous at base.
- 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, Eutrophic, Brown Chromosol)  
Thick dark brown loamy sand to light sandy clay loam with a bleached A2 horizon, overlying a yellow brown and grey brown sandy clay with coarse prismatic structure, grading to a grey, brown and yellow mottled clayey sand.
- 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** Acidic, deep sandy loam ironstone soil (Ferric, Mesotrophic, Brown Kandosol)  
Medium thickness loamy sand to sandy loam with abundant ironstone gravel, grading to a brownish yellow and red clay with ironstone fragments, over light grey and red kaolinitic clay at about 100 cm.
- J2b** Acidic, deep loamy ironstone soil (Ferric, Eutrophic, Red Chromosol)  
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.
- M1** Deep sandy loam (Regolithic, Brown-Orthic Tenosol OR Mesotrophic, Grey / Brown Kandosol)  
Thick brown sandy loam, overlying a grey to brown silty sand to silty clay loam with weak prismatic structure, grading to variable sandy, gritty and clayey alluvial sediments.
- M2** Deep grey clay loam (Melanic, Calcic, Grey Dermosol)  
Thick black clay loam with granular structure, overlying a dark grey to black heavy clay with strong blocky structure. The clay is yellower and weakly calcareous with depth.

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

