MER Merildin Land System

Clayey flats and rises between Farrell Flat and Manoora

Area: 70.5 km^2

Annual rainfall: 495 – 575 mm average

Geology: The Land System is characterized by clayey sediments, probably of Pleistocene age, associated with ancient rivers or possibly lakes. The sediments overlie fine grained and quartzitic rocks which are within a metre of the surface on more prominent rises. However, clays formed from the weathering of these rocks appear to be the parent materials for soils on much of the rising ground. The valleys of the modern streams which have cut through the older sediments are characterized by fine grained and silty alluvium. All older sediments are mantled by soft, fine grained carbonates of aeolian origin.

Topography: The landscape comprises a level plain north of the Wakefield River in the Merildin area, gently inclined outwash fans and rises east of the plain, abutting the range to the east, and undulating rises formed on basement rocks south of the River. The Wakefield River flows through the Land System from east to west, and together with its tributaries, has cut a valley 15 to 30 m deep through the older land surface.

Elevation: 500 m in the south eastern corner to 400 m where the Wakefield River flows out of the System.

Relief: Maximum relief is 30 m

Soils: The soils are typically fine textured, except for those formed on more recent alluvium

Main soils

E2b Red cracking clay - common (alluvial plains)
E3b Brown to dark cracking clay - common (alluvial plains)
C3a Gradational clay loam on deeply weathered rock - limited (rises)
E2a Red cracking clay - limited (rises)

Minor soils

A6 Calcareous clay loam - plains and rises
C3b Gradational clay loam - flats
D3a Hard loam over dispersive red clay - rises and fans
D3b Hard loam over dispersive red clay - lower slopes and flats
D7 Clay loam over dispersive red clay on highly weathered rock - rises
E3a Brown to dark cracking clay - rises
F2 Thick sandy loam over brown mottled clay - creek flats
M4 Gradational silty loam - creek flats

Main features: The characteristic feature of the Merildin Land System is its predominantly clayey soils. These are deep and inherently very fertile. Productive potential is high, although these soils have some drawbacks. These include accessibility and workability problems when wet, seasonal waterlogging in wet winters and slow plant germination. The gradational clay loams are more favourable agricultural soils than the cracking clays. The other important soils are texture contrast types. These usually have poor surface structure requiring gypsum and / or surface

management modifications to overcome problems of excessive runoff, erosion, working difficulties and patchy emergence. The dispersive types, with poor subsoil structure as well, are prone to waterlogging. Overall, erosion potential is low, except on the more undulating rises. However, watercourses in clayey soils are highly susceptible to gullying. Minor saline seepages adjacent to the Farrell Flat Land System and on the Wakefield River flats should be monitored.

Soil Landscape Unit summary: 8 Soil Landscape Units (SLUs) mapped in the Merildin Land System:

SLU	% of area	Main features #
JUe	6.2	Flats associated with the Wakefield River and larger tributaries. The flats are narrow, running either side of the watercourses which are commonly eroded. There are sporadic saline patches in sections (2-10% overall). Main soils: hard loam over dispersive red clay - **D3b** (E), with thick sandy loam over brown mottled clay - **F2** (C) and gradational silty loam - **M4** (C). These soils are poorly structured and erodible. Natural fertility is moderate, and salinity is a problem in places. Watercourse protection against stream bank erosion and salinity should be a major component of management.
KSA	20.0	Plains formed on clayey Pleistocene alluvium with slopes of less than 1% and having gilgai microrelief (although this has been largely obliterated by cultivation). Main soils: red cracking clay - **E2b** (E) and brown to dark cracking clay - **E3b** (E). These soils have very high fertility and waterholding capacities (although high wilting points mean that germination is slower and capacity to "hang on" in a dry finish is less than is the case for lighter soils). A further limitation is the tendency for clayey soils to become intractable when wet, and waterlogged in wet winters. However, the high productive potential in average to good seasons should outweigh these disadvantages. Erosion potential is low.
KTA KTB	15.7 11.5	Outwash fans formed on clayey Pleistocene alluvium. **KTA** Very gently inclined slopes of 1-2%. **KTB** Gently inclined slopes of 2-4%. Main soils: red cracking clay - **E2b** (E) and brown to dark cracking clay - **E3b** (E) with gradational clay loam - **C3b** (C) and calcareous clay loam - **A6** (M). This land is characterized by deep fertile soils, with high productive potential. The more clayey soils are most fertile, but also have the limitations of intractability when wet, some degree of waterlogging and slow germination. Sheet/rill and wind erosion potential is low, but watercourses on clayey soils are highly susceptible to gullying.
TBA TBB TBC TBL	2.5 28.5 3.7 11.9	Rises formed mainly on clays derived from the weathering of siltstones and minor quartzites. **TBA** Very gently inclined low rises with slopes of 1-2% **TBB** Gently undulating rises with slopes of 2-4%. **TBC** Undulating rises with slopes of 3-8% and relief to 30 m **TBL** Complex of low rises with slopes of 2-4%, and outwash fans with slopes of 1-3%. There are minor saline seepages on some lower slopes. Main soils: gradational clay loam - **C3a** (E) and red cracking clay - **E2a** (E), with brown to dark cracking clay - **E3a** (C), hard loam over dispersive red clay - **D3a** (C) and calcareous clay loam - **A6** (M) on lower slopes, and hard loam over dispersive red clay on highly weathered rock - **D7** (L) on upper slopes where weathering rock is near the surface. Soils on fans in TBL are as for KTA. These mostly clayey soils are inherently fertile, with high waterholding capacities. High clay contents generally restrict drainage; so much of the land is difficult to work once wet. The gradational clay loams, with less clayey surfaces are more favourable than the cracking clays. Poor surface structure and dispersive subsoils are characteristic of the texture contrast soils - the D3 and D7 soils are the least favourable soils in these landscapes. Overall, this land is potentially highly productive. Erosion potential is low to moderate.

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

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

Detailed soil profile descriptions:

A6 Calcareous clay loam (Pedal, Hypercalcic Calcarosol)
Calcareous clay loam to light clay becoming more clayey and calcareous with depth.

C3a Gradational clay loam on deeply weathered rock (Hypercalcic, Red Dermosol)
Loam to clay loam grading to a well structured red clay, highly calcareous with depth overlying highly weathered rock.

C3b Gradational clay loam (Hypercalcic, Red Dermosol)
Loam to clay loam grading to a well structured red clay, highly calcareous with depth over alluvium.

D3a Hard loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness hard setting loam, abruptly overlying a coarsely structured dispersive red clay, calcareous with depth, grading to heavy clay or deeply weathered rock.

D3b Hard loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness sandy loam to clay loam with a bleached A2 layer, abruptly overlying a coarsely structured dispersive red clay, calcareous with depth, grading to alluvium.

D7 Clay loam over dispersive red clay on highly weathered rock (Hypercalcic, Red Sodosol)
Medium thickness hard loam to clay loam over a coarsely structured dispersive red clay, calcareous from about 50 cm, grading to highly weathered rock within 100 cm.

E2a Red cracking clay (Red Vertosol)
Reddish brown well structured clay, becoming coarser structured and calcareous with depth, grading to heavy clay. Surface cracks in summer.

E2b Red cracking clay (Red Vertosol)
Reddish brown well structured clay, becoming coarser structured and highly calcareous with depth, grading to alluvial clay. Surface cracks in summer.

E3a Brown to dark cracking clay (Brown Vertosol)
Brown well structured clay, becoming coarser structured and calcareous with depth, grading to heavy clay or deeply weathered rock. Surface cracks in summer.

E3b Brown to dark cracking clay (Brown Vertosol)
Brown well structured clay, becoming coarser structured and calcareous with depth, grading to clayey alluvium. Surface cracks in summer.

F2 Thick sandy loam over brown mottled clay (Hypocalcic, Brown Sodosol)
Thick hard sandy loam with a pink or bleached A2 layer, sharply overlying a coarsely structured dispersive brown and red mottled clay, weakly calcareous with depth, grading to medium grained alluvium from about 100 cm. Watertable common between 100 and 200 cm.

M4 Gradational silty loam (Brown Kandosol)
Thick brown silty loam to sandy loam grading to a brownish, weakly structured sandy to silty clay loamy or clayey subsoil formed in alluvium.

Further information: DEWNR Soil and Land Program