

# RAT Rathjen Land System

Discontinuous belt of dissected low rocky hills extending from south of Keyneton to south of Palmer

**Area:** 51.4 km<sup>2</sup>

**Annual rainfall:** 425 - 650 mm average

**Geology:** The land is formed on granites and granitic gneisses which were intruded into the older surrounding Kanmantoo Group rocks during the Ordovician geological period. Variable weathering of these rocks has resulted in a patchwork of rocky outcrops where weathering has been slight, and rock free ground where weathering has been significant and hard rock may be deeper than a metre. Locally derived alluvium, gritty sands to sandy clays, fills drainage depressions, but these are minor.

**Topography:** The landscape is characteristically uneven and rocky. Depending on the nature of the rocks, slopes can be smooth, relatively rock free and gentle (5 - 10%). More common however, are moderately steep to steep very rocky slopes with spectacular outcrops of granitic tors, tombstones and massive reefs. Watercourses are well defined, but gully erosion, with some exceptions, is relatively minor.

**Elevation:** 120 m to 480 m

**Relief:** Variable up to 100 m

**Soils:** The soils are typically sandy surfaced and gritty, with or without clayey subsoils, over hard to weathered rock. Where present, subsoil clays are commonly dispersive. Deeper texture contrast or gradational soils occur on lower slopes and flats.

## Main soils

### *Hillslopes*

- L1a** Shallow loamy coarse sand
- L1b** Shallow stony loamy sand
- K4/D7** Sandy loam over dispersive brown clay
- K5** Loamy sand over reddish brown sandy clay loam

## Minor soils

### *Flats and drainage depressions*

- F2** Sandy loam over dispersive brown clay
- M1** Gradational sandy loam

**Main features:** The Rathjen Land System is dominated by rocky slopes which are non arable, and commonly non trafficable. Shallow stony and sandy soils have low productive potential. Limited areas of more subdued topography have deeper soils with clayey subsoils and are generally free of extensive outcrop. Waterlogging, erosion potential and low fertility are the main limitations to land use. Creek flats are a minor component of the landscape. Watercourses are susceptible to erosion due to the high run off from adjacent rocky slopes. However, most are relatively stable. There is sporadic saline seepage in some drainage depressions.



**Soil Landscape Unit summary:** 12 Soil Landscape Units (SLUs) mapped in the Rathjen Land System

| SLU                                    | % of area                                | Main features #  |
|--|--|--|
| AgB<br>AgC<br>AgD<br>Agt<br>Agu<br>Agv | 2.4<br>29.4<br>9.6<br>8.6<br>23.5<br>2.0 | <p>Rises and low hills formed on gneisses, granitic gneisses and granites. There is sporadic to extensive rock outcrop and surface stone. Relief ranges from 20 m to 100 m, and slopes from 5% to 75%. There are occasional precipitous slopes. Watercourses are well defined in narrow and commonly gullied depressions.</p> <p><b>AgB</b> Rounded rocky rises and low hills with relief to 60 m and slopes of 5-20%.</p> <p><b>AgC</b> Rocky low hills with relief to 100 m and slopes of 15-30%.</p> <p><b>AgD</b> Steep to very steep and rocky hillslopes up to 60 m high with slopes of 30-75%.</p> <p><b>Agt</b> Very rocky rises and low hills with relief to 60 m and slopes of 5-20%. There is 20-50% rock outcrop.</p> <p><b>Agu</b> Very rocky low hills with relief to 100 m and slopes of 15-30%. There is about 50% outcropping rock.</p> <p><b>Agv</b> Very rocky steep slopes of 30-50% with about 50% outcropping rock.</p> <p>Main soils: <u>shallow loamy coarse sand</u> - <b>L1a</b> (L-E) and <u>shallow stony loamy sand</u> - <b>L1b</b> (L-E) associated with steeper slopes and rocky outcrop, and <u>loamy sand over reddish brown sandy clay loam</u> - <b>K5</b> (E-L) and <u>sandy loam over dispersive brown clay</u> - <b>K4/D7</b> (C) on gentler slopes where soils are deeper. This land is too steep and / or rocky for any uses other than grazing (except for some small patches between rocky outcrops). Some of the moderate slopes are sufficiently rock free for pasture improvement, but most of the land is not readily accessible to conventional machinery.</p> |
| CTD                                    | 19.5                                     | <p>Undulating to rolling rises and low hills formed on highly micaceous gneisses. Relief is 20 to 50 m and slopes are 6-15%. Rock outcrop is sporadic. Watercourses are well defined in broad depressions.</p> <p>Main soils: <u>sandy loam over dispersive brown clay</u> - <b>K4/D7</b> (V), with <u>shallow loamy coarse sand</u> - <b>L1a</b> (L), <u>shallow stony loamy sand</u> - <b>L1b</b> (L) and <u>loamy sand over reddish brown sandy clay loam</u> - <b>K5</b> (L). This land is relatively free of rocks, and is virtually fully arable.</p> <p>Main soils: moderately deep, but only marginally fertile. The clayey subsoils cause perching of water, so some waterlogging can be expected. The sub dominant soils are shallower but well drained. Erosion potential is high, so appropriate control measures are needed if the land is cropped.</p>   |
| ETI                                    | 0.7                                      | <p>Soils are shallow to moderately deep and subject to erosion, particularly by runoff from adjacent steeper slopes.</p> <p>Slopes formed on metasandstones of the Backstairs Passage Formation and mixed metasilstones and metagreywackes of the Carrickalinga Head Formation.</p> <p><b>ETI</b> Lower slopes with gradients of 10-20%. There is 10-20% rocky outcrop, but the remaining land is arable.</p> <p>Main soils: <u>shallow stony sandy loam</u> - <b>L1a</b> (E) and <u>hard sandy loam over red or brown clay</u> - <b>K3/D1</b> (E). This land is semi arable, with about a third of the area too steep and / or rocky for cultivation. The arable strips have generally shallow stony soils with restricted water holding capacity and which are prone to erosion because of the moderate slopes and high runoff.</p>  |
| LCJ<br>LCe                             | 0.7<br>2.2                               | <p>Creek flats and drainage depressions in the northern sections of the System, formed on variable locally derived alluvium. This is typically sandy or gritty through to sandy clay.</p> <p><b>LCJ</b> Gently sloping (2%) alluvial flats with eroded water courses.</p> <p><b>LCe</b> Drainage depressions with eroded water courses and sporadic saline seepage.</p> <p>Main soils: <u>sandy loam over dispersive brown clay</u> - <b>F2</b> (E) and <u>gradational sandy loam</u> - <b>M1</b> (E). These soils are deep and of moderately low fertility, but susceptible to waterlogging, compaction and erosion. The latter is exacerbated by salinity resulting from insufficient water use higher in the catchments. Controlled grazing, erosion control, nutrition maintenance and revegetation with salt and waterlogging tolerant plants are the main management issues.</p>   |
| LVO<br>LVe                             | 0.8<br>0.6                               | <p>Creek flats and drainage depressions in the southern section of the System, formed on variable locally derived sandy to sandy clay alluvium.</p> <p>Main soils: <u>gradational sandy loam</u> - <b>M1</b> (E) and <u>sandy loam over dispersive brown clay</u> - <b>F2</b> (E). These small areas have deep soils of moderately low fertility. They are subject to waterlogging and erosion. There is minor saline seepage.</p>   |



# 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:

- F2** Sandy loam over dispersive brown clay (Eutrophic, Grey / Brown Sodosol)  
Thick hard massive sandy loam with a bleached A2 layer over a brown and grey mottled medium clay with coarse prismatic structure, becoming sandier with depth, continuing below 100 cm.
- K4/D7** Sandy loam over dispersive brown clay (Sodic, Eutrophic / Calcic, Brown Sodosol)  
Medium thickness gritty loamy sand to sandy loam with a bleached A2 layer, sharply overlying a brown, red, yellow and grey mottled dispersive clay, grading to weathering highly micaceous gneiss at about 100 cm.
- K5** Loamy sand over reddish brown sandy clay loam (Mesotrophic, Brown Kandosol)  
Thick gritty and gravelly loamy sand grading to a brown or red gritty sandy clay loam to sandy clay, grading to weathering granite by 70 cm.
- L1a** Shallow loamy coarse sand (Acidic, Paralithic, Bleached-Leptic Tenosol)  
Thick gritty and gravelly loamy coarse sand to coarse sandy loam, grading to weathering rock within 50 cm.
- L1b** Shallow stony loamy sand (Lithic, Leptic Rudosol)  
Thick gritty loamy sandy to sandy loam with quartz and gneiss stones throughout, grading to weathering rock within 50 cm.
- M1** Gradational sandy loam (Eutrophic, Grey / Brown Kandosol)  
Thick grey sandy loam grading to a brown and grey mottled massive sandy clay loam, continuing below 100 cm.

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

