

# WBA Wirrabara Land System

Upper catchment area of the Rocky River in the Wirrabara district, Southern Flinders Ranges

- Area:** 97.0 km<sup>2</sup>
- Annual rainfall:** 450 - 600 mm average
- Geology:** Siltstones (Tapley Hill Formation) and tillites (Appila Formation), with minor interbedded sandstones. There are significant alluvial deposits in valley floors.
- Topography:** The land system lies in the upper catchment of the Rocky River and includes the river flats and tributary creeks, undulating rises with slopes up to 10% flanking the flats, and some rolling low hills in the west, with slopes to 30%. There are minor steeper slopes in this area. The land is moderately dissected by watercourses; these all flow into the Rocky River which flows southwards into the broad flood plains of the Laura Land System. Salinity is evident in some areas, usually breaking out on lower slopes.
- Elevation:** 280 m at the point where the Rocky River exits the system just north of Stone Hut, to 570 m at Mt. Ellen on the western margin.
- Relief:** Maximum relief is 130 m on the steeper land in the east, but relief in this area is usually less than 100 m. A large part of the Land System has less than 40 m relief.
- Soils:** Most soils are moderately deep on weathering basement rock. Loamy surface soils with red clayey subsoils are most common. There are some shallow loams formed directly on rock or calcrete capped rock. On lower slopes, soils are deeper, with sandy loam to clay loam surfaces, abruptly or gradually overlying red or brown (commonly mottled) clayey subsoils.

## Main soils

*Moderately deep to shallow soils formed over basement rocks on rises*

**K2** Acidic loam over red clay on rock

**D1** Loam over red clay on calcified rock

**C2** Gradational loam over calcified rock

*Deep soils formed on alluvium on lower slopes and flats*

**F2/D3** Sandy loam over dispersive clay

## Minor soils

*Moderately deep to shallow soils formed over basement rocks on rises*

**L1** Shallow stony loam on rock

**B4** Shallow gradational loam on calcrete

**D7/D3** Loam over dispersive red clay on deeply weathered rock

*Deep soils formed on alluvium on lower slopes and flats*

**F1** Sandy loam over brown clay

**M2** Deep gradational brown clay loam

**D2** Deep loam over red clay

**C3** Deep gradational red clay loam

**M4** Deep gradational loam



**Main features:** The Wirrabara Land System consists of a mixture of moderately steep to steep non arable hill country, undulating rises and gently sloping outwash fans and valley floors. Most soils are poorly structured loamy surfaced texture contrast types. They have reasonable inherent fertility, and shallowness is only a problem on steeper slopes. Poor surface structure is the main limitation, causing reduced infiltration and moisture holding capacity, and impeded emergence and root growth. These problems are compounded on lower slopes where waterlogging and salinity are locally significant.

**Soil Landscape Unit summary:** 18 Soil Landscape Units (SLUs) mapped in the Wirrabara Land System

SLU	% of area	Main features #
AGB AGC AGD AGE	1.6 13.6 0.9 1.1	<p>Moderately steep to steep rocky slopes formed on fine grained rocks.</p> <p><b>AGB</b> Rocky slopes up to 30 m high and with gradients of up to 40% adjacent to Rocky River. Roughly half of the land is covered by rocky reefs.</p> <p><b>AGC</b> Irregular low hills with slopes of 15-30% and relief to 80 m. There is less than 5% rocky outcrop and 10-20% surface stone.</p> <p><b>AGD</b> Steep rocky slopes of 30-60%, up to 80 m high. There is up to 20% rock outcrop and abundant surface stone.</p> <p><b>AGE</b> Steep hills, 130 m high with slopes of 20-40%.</p> <p>Main soils: <u>acidic loam over red clay on rock</u> - <b>K2</b> (E), with <u>shallow stony loam on rock</u> - <b>L1</b> (C), <u>sandy loam over brown clay</u> - <b>F1</b> (L) and <u>deep gradational red clay loam</u> - <b>C3</b> (M). These low hills are moderately steep to steep and rocky with no potential for cropping. Soils are generally fertile, but depth and therefore waterholding capacity varies.</p>
BAC BAD	12.4 9.2	<p>Rises formed on fine grained rocks.</p> <p><b>BAC</b> Rises with slopes of 6-12%, relief of 10-40 m and 2-10% surface sandstone and quartzite.</p> <p><b>BAD</b> Slopes of 10-20%, 40 m high, with 5-10% rock outcrop and 10-20% surface sandstone and quartzite.</p> <p>Main soils: <u>acidic loam over red clay on rock</u> - <b>K2</b> (E), with <u>shallow stony loam on rock</u> - <b>L1</b> (C), <u>sandy loam over brown clay</u> - <b>F1</b> (L) and <u>sandy loam over dispersive clay</u> - <b>F2/D3</b> (L) on lower slopes. The rises are semi arable depending on slope (erosion potential) and rockiness. The soils are generally fertile but are prone to structural problems, particularly on lower slopes, where waterlogging can be a problem. On mid to upper slopes, poor soil structure leads to excessive runoff, reduced waterholding capacity and restricted workability.</p>
DEC DEH DEM	25.5 1.9 5.9	<p>Rises formed on calcified fine grained basement rocks.</p> <p><b>DEC</b> Rises with slopes of 4-12%, relief to 30 m and up to 10% surface siltstone and calcrete.</p> <p><b>DEH</b> Rises with slopes of 4-12%, relief to 30 m, eroded watercourses and up to 10% surface siltstone and calcrete.</p> <p><b>DEM</b> Rises with slopes of 4-12%, relief to 30 m and saline seepage.</p> <p>Main soils: <u>loam over red clay on calcified rock</u> - <b>D1</b> (E) and <u>gradational loam on calcified rock</u> - <b>C2</b> (E), with <u>shallow gradational clay loam on calcrete</u> - <b>B4</b> (C) and <u>deep gradational red / brown clay loam</u> - <b>C3/M2</b> (L). These rises are arable with soil structural problems, erosion potential, shallowness and salinity the main limitations. Poor surface structure leads to excessive runoff (and erosion) as well as restricted workability and patchy emergence. Salinity is generally confined to lower slopes.</p>
DPC	2.1	<p>Undulating rises with slopes of 3-10%, relief to 30 m, and characteristic prominent crests, formed on kaolinized fine grained rocks. Main soils: <u>loam over dispersive red clay on deeply weathered rock</u> - <b>D7/D3</b> (V) with <u>loam over red clay on calcified rock</u> - <b>D1</b> (L) and <u>gradational loam on calcified rock</u> - <b>C2</b> (L). These rises are arable although the soils are generally poorly structured and of only moderate fertility. Water erosion is a potential problem throughout. Excessive runoff, limited workability and patchy emergence and lower slope salinity are common management issues.</p>



ESD	3.2	Rises with slopes of 10-25%, relief to 50 m, 10-20% rocky outcrop and 10-20% surface quartzite and siltstone formed on fine grained basement rocks. Main soils: <u>loam over red clay on calcified rock</u> - <b>D1</b> (E) and <u>gradational loam on calcified rock</u> - <b>C2</b> (C), with <u>shallow stony loam on rock</u> - <b>L1</b> (C), and <u>shallow gradational clay loam on calcrete</u> - <b>B4</b> (L). These rises are semi arable due to moderate slopes (erosion potential) and rocky reefs. Waterholding capacity and fertility are the main soil limitations. These are more of a problem on the shallower soils (L1 and B4). The deeper soils have only slight limitations.
JEB JEC	1.6 1.5	Outwash fans formed on fine grained alluvium. <b>JEB</b> Slopes of 2-4% with minor surface quartzite. <b>JEC</b> Slopes of 4-8% and up to 10% surface quartzite. Main soils: <u>deep loam over red clay</u> - <b>D2</b> (V) and <u>deep gradational red clay loam</u> - <b>C3</b> (E). These slopes are fully arable although erosion is a potential problem due to the combination of generally poorly structured surface soils and moderate slopes. Minor limitations are due to excessive runoff, temporary waterlogging, restricted workability and patchy emergence.
JQB JQC JQE JQL	0.5 2.3 7.8 2.0	Flats, valleys and lower slopes formed on clayey alluvium. <b>JQB</b> Slopes of 2-4%. <b>JQC</b> Slopes of 3-10%. <b>JQE</b> Narrow flats and drainage depressions, slopes 0-4%. <b>JQL</b> Slopes of 2-4% with saline seepage. Main soils: <u>sandy loam over dispersive clay</u> - <b>F2/D3</b> (V) and <u>deep loam over red clay</u> - <b>D2</b> (E). This land is fully arable with deep soils. However the predominant soils are sodic and poorly structured leading to waterlogging, restricted workability, runoff and patchy emergence. These problems are compounded by the development of sporadic saline seepages.
XJJ	6.9	Alluvial flats adjacent Rocky River. Slopes are less than 2%. The river channel is the dominant feature. There are occasional swampy areas. Main soils: <u>deep gradational loam</u> - <b>M4</b> (V) and <u>deep gradational brown clay loam</u> - <b>M2</b> (E). The flats have deep fertile soils although they are prone to waterlogging, salinity in places and flooding. Restricted accessibility caused by the river channel and the narrowness of the unit limit cropping potential.

# 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:

- B4** Shallow gradational loam on calcrete (Petrocalcic, Red Dermosol)  
Medium thickness loam to clay loam grading to a well structured red clay over calcrete capped rock within 50 cm or semi-hard carbonate grading to weathering rock within 100 cm.
- C2** Gradational loam over calcified rock (Calcic, Red Dermosol)  
Medium thickness hard setting sandy loam to clay loam grading to a well structured red clay, calcareous with depth, over weathering siltstone within 100 cm.
- C3** Deep gradational red clay loam (Calcic, Red Dermosol)  
Medium thickness clay loam to clay with 10 - 20% quartzite stones grading to a well structured red clay with soft carbonate within 50 cm grading to clayey alluvium.
- D1** Loam over red clay on calcified rock (Calcic, Red Chromosol)  
Medium thickness hard setting sandy loam to clay loam abruptly overlying a well structured red clay, calcareous with depth, grading to weathering siltstone within 100 cm.
- D2** Deep loam over red clay (Calcic, Red Chromosol)  
Medium thickness hard setting clay loam to sandy loam abruptly overlying a red well structured clay, calcareous with depth, grading to alluvium.



- D7/D3** Loam over dispersive red clay on deeply weathered rock (Calcic / Hypercalcic, Red Sodosol)  
Medium to thick hard sandy loam to clay loam sharply overlying a coarsely structured dispersive red clay, calcareous with depth, grading to highly weathered kaolinized siltstone.
- F1** Sandy loam over brown clay (Eutrophic, Brown Chromosol)  
Medium thickness stony sandy loam to sandy clay loam overlying a well structured brown clay grading to deeply weathered rock or colluvial wash.
- F2/D3** Sandy loam over dispersive clay (Hypocalcic / Hypercalcic, Brown / Red Sodosol)  
Medium to thick hard gritty sandy loam to sandy clay loam with variable quartzite gravel and a bleached A2 layer, sharply overlying a brown or red mottled dispersive clay with soft Class I carbonate from 50 cm over alluvium.
- K2** Acidic loam over red clay on rock (Eutrophic, Red Chromosol)  
Medium thickness stony loam to clay loam overlying a well structured red clay grading to weathering siltstone within 100 cm.
- L1** Shallow stony loam on rock (Basic / Calcareous, Paralithic, Leptic Tenosol)  
Stony sandy loam to loam grading to weathering rock (sometimes with soft carbonate in fissures) by 50 cm.
- M2** Deep gradational brown clay loam (Eutrophic, Brown Dermosol)  
Thick clay loam grading to a well structured brown clay overlying alluvium.
- M4** Deep gradational loam (Eutrophic, Red / Brown Kandosol)  
Thick loam grading to a reddish fine sandy clay loam continuing below 100 cm.

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

